

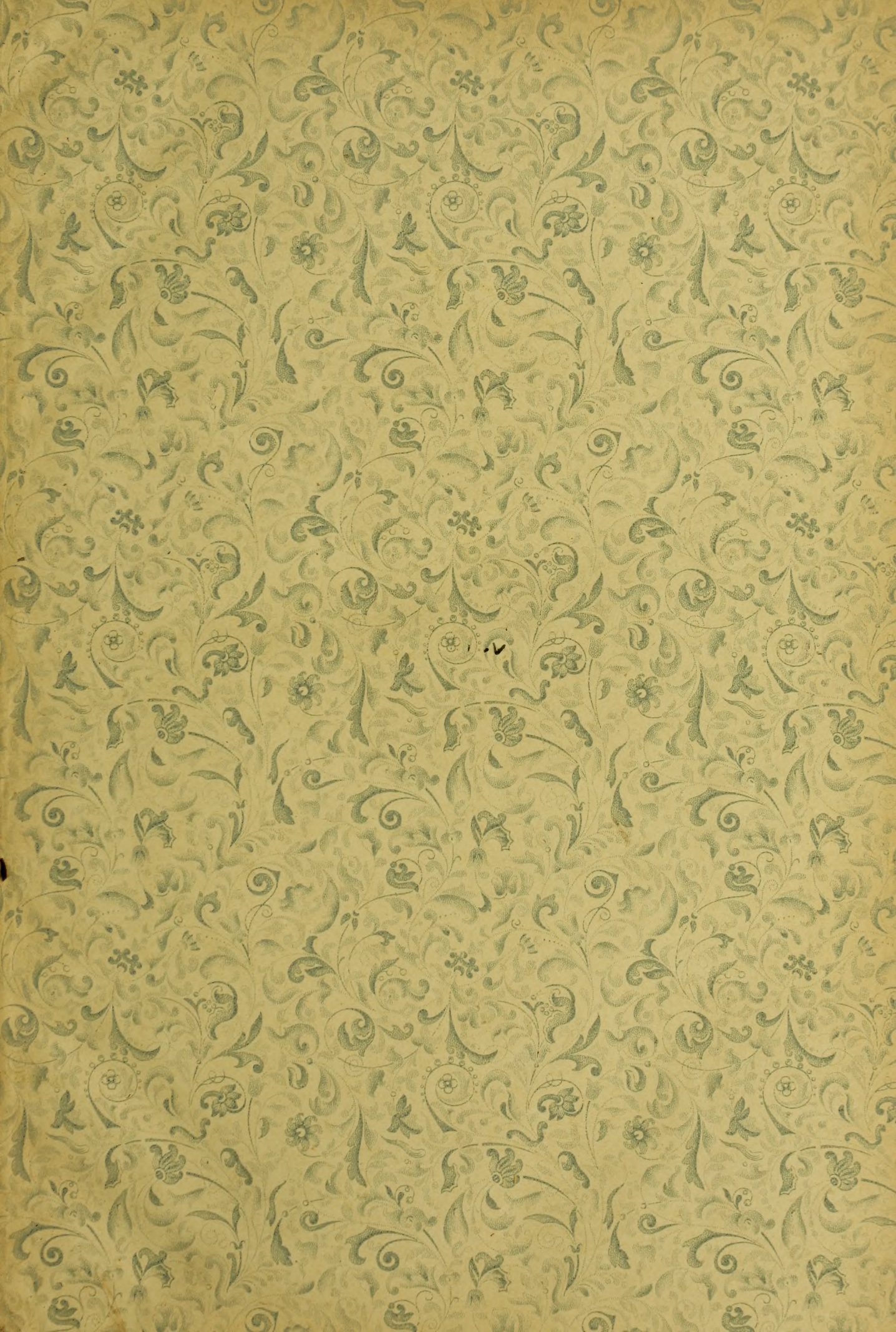




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# THE BUILDING NEWS

## AND ENGINEERING JOURNAL.

### RISKY STRUCTURES.

THE public are exposed to a great many dangers in addition to those which the London Building Act takes special cognisance of in the form of neglected and dilapidated buildings. We have repeated warnings of the sudden collapse of roofs, floors, piers, decayed stonework, cornices—even the disastrous failure of scaffoldings and cranes, and occasionally of such erections as those put up on the top of many buildings for the support of telephone wires, which have given way when premises are destroyed by fire, also signboards on buildings. We now particularly refer to that class of these structures, which is just now very extensively adopted—namely, the lofty metal supports for telephonic communication. These are quite modern structures that no previous architectural development has had to deal with. They are the requirements of an age of advanced civilisation and of rapid transmission of intelligence. Unfortunately, however, circumstances have made it possible only to deal with the means employed by utilising the tops of our buildings, and of placing all the communicable wires and junctions on the roofs of houses. Expense and delay have no doubt to some extent been saved by overhead wires; but our artistic susceptibilities have been shocked by the masses of cobweb-like and labyrinthine cables which obscure to some extent light, and blur the sky-lines of our cities. A glance upwards from any of our leading thoroughfares and streets in the City will show the growth of this system of overhead network, and how rapidly it is spreading to our suburbs. Massive iron standards, placed singly or in rows with cross-bars, whose summits bristle with insulators, are common enough on the summits of corner premises; but here and there we see metallic tower-like erections of steel pillars braced together, carrying some hundreds of cables. These central junctions are very necessary, yet it cannot be denied that all these metallic structures are sources of danger. And they are dangerous in more than one way. In the first place, they impose on our buildings a load that they were never intended to carry. It may be true that every care is taken to distribute by base plates and other means the weight of the iron standards and cables on the walls of the building; but we are very doubtful if many of the premises selected for their position are capable of supporting the weight safely. Is it always possible to examine beforehand the condition of the wall or stack on which the erection is placed? But apart from this, these walls—often party walls—are built only for the separation of buildings in different occupations, and not for the support of a considerable weight. What, indeed, would happen if the connecting

roof, floors, and cross-walls were removed or burnt out by fire? The walls could not for a moment stand the strain and thrust that would be exerted; the whole structure would suddenly give way, as in the recent collapse of the iron supports near Regent-street. In short, it is mainly by the support of the roofs and floors that sufficient lateral rigidity is given to the brickwork or masonry to enable it to support the metallic burden. As far as we know, special provisions, such as iron strutting or independent brick piers, are seldom, if ever, provided, so that in the case of a fire on one side these structures would bodily pull or drag the building down and seriously endanger the lives of firemen and others in the streets below.

Secondly, there is a danger arising from the vibratory action of the suspended cables and wires stretched as they are at a considerable tension, and which must have a disturbing and injurious effect upon the masonry supports or walls of buildings. This vibration would be more active in windy weather or during violent gales. Even supposing the most effective means are taken to insure only a vertical load on the walls—such as by not rigidly connecting the bed-plates by bolts, by the use of saddle-shaped iron shoes to rest on the copings of walls—there must still be a certain amount of vibratory motion imparted of a vertical kind, which would in time seriously impair any brick or masonry structure. And, lastly, unless the metallic structure is connected with the earth effectively, there is a certain, though perhaps remote, danger from lightning discharges.

The practical avoidance of all these risks would be accomplished by the erection of independent structures of iron for the purpose of carrying the cables; or better, by an underground system of conduits, which would save our streets from further disfigurement. This is surely a matter for regulation by our local authorities.

The bill-posting or hoarding nuisance is one of the greatest eyesores; but we seem only on the threshold. Every salient corner and prominent street building which affords a chance of advertising or placing the huge poster upon, "artistic" or otherwise, is soon caught up, and one of the lucrative sources of revenue now kept in view by *entrepreneurs*, or speculative builders who build new premises, is to afford a large space by hoarding, or on the building itself, for advertising posters. This age, *par excellence*, will be known as the big-poster age. Even corner premises are made windowless, or barricaded up for a source of profit. But we have here to consider a certain element of danger in these huge barricadings and hoardings covered with

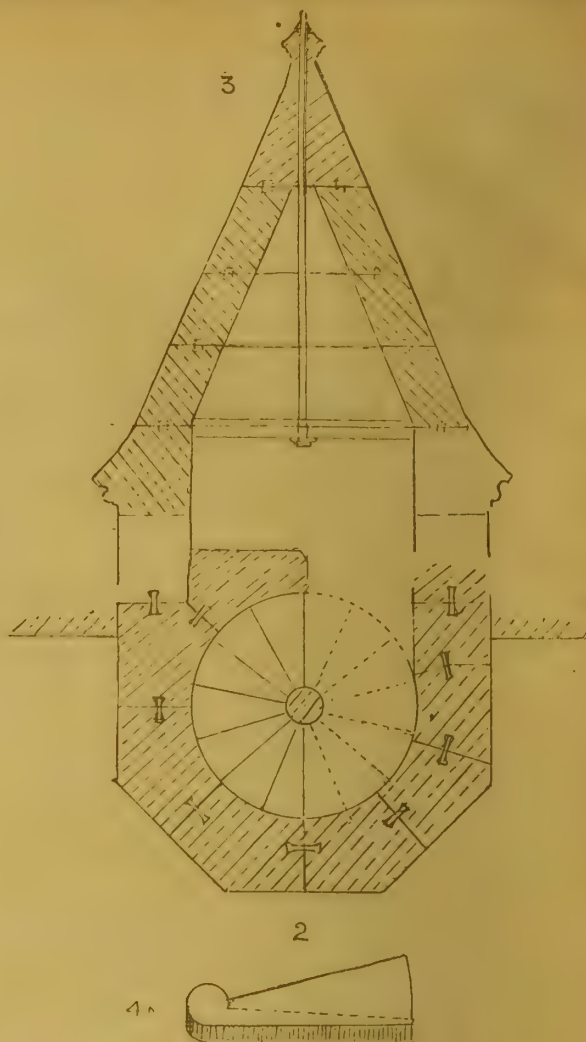
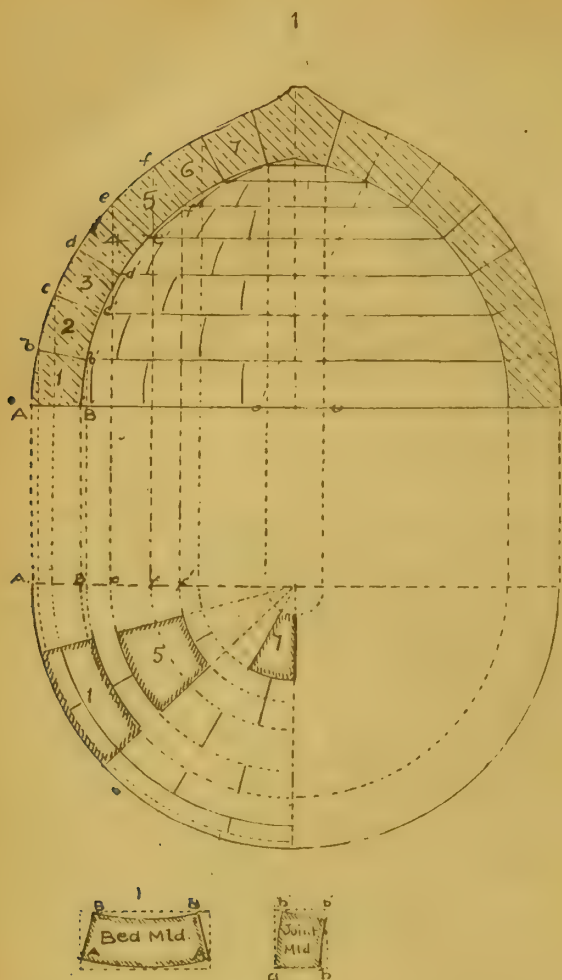
squares of paper, or scaffoldings round new buildings made profitable for displaying the latest soap or beef extract. We say nothing of their inartistic, degrading character, and what the foreigner must think of us; but simply of their risk in communicating fire in a form especially inflammable. Before long we shall have to frame special by-laws to meet this eyesore and peril, and the London County Council have their hands pretty full just now. Then there is the dangerous suspended or projecting lamp, often obstructing pedestrians carrying umbrellas. The consent of the Council should be obtained in all these cases, and regulations have been already framed for the purpose. Certain useful restrictions have been proposed also as to the size and projection over the public way of signs. The time when they were artistic and safe has long passed away.

### MODEL SPECIFICATIONS.—XIX.

#### DOMES, SPIRES, TURRETS, WINDOWS.

WE now intend to notice special features of stonework which it may be required to specify, such as domes, stone cappings, spires, traceried windows, Gothic pillars, capitals, and bases. These are details not of everyday occurrence, and there is little to be found about them in ordinary textbooks. Domes and vaults form a very important branch of constructive masonry. Numerous treatises and papers have been written on the theory of their construction and the methods of drawing them; the construction of intersecting vaults or groins, of finding the moulds of beds and joints of arches such as those of a circular arch in a round tower—all of which are useful exercises, and ought to be understood by the architect who wishes to specify intelligently. Those who wish to pursue the subject will find these methods explained in any treatise on masonry of Gothic work, also in Professor Willis's valuable treatise on the "Vaults of the Middle Ages," and in Mr. Lawrence Harvey's lectures. But the chief points to notice, which concern the erection of a vault or dome, are the intersections of the groins, and the moulds for beds and joints, for upon these depend the accuracy of the stone-cutting. Whether the stones of every course of a dome should be cramped together or dowelled is a question of expediency. In domes of small diameter, the stones may be merely bedded in mortar, with horizontal joints, or simply plugged with slate dowels; but in those of considerable diameter—say, over 20ft. or 25ft.—cramping is necessary, as every cramped course becomes a chain or bond, and restrains the tendency to spread at the base. A chain bond is necessary also to be placed outside the





tambour or dome at springing; but there are few general directions for architects as to the kind of chain bond, its size, and connections. A number of straight bar links of flat iron connected by rivets is the most practicable form. To prevent sliding of any of the courses of flat domes, it appears desirable to dowel the joints. Stone domes or cupolas of any size are not often adopted in this country, and there are many practical reasons why they should be constructed of hollow terracotta blocks, or preferably of concrete, with iron or steel ribs. The smaller cupolas which crown turrets, towers, and the like are less open to the risks of large, uncovered stone domes. These risks are chiefly (1) outward spreading, and (2) the difficulty of rendering the stone watertight or non-permeable, as it is impossible to guarantee that every course is laid with its bedding strata to exclude water. Lapped joints seem desirable.

To a lesser degree the same principles and risks apply to conical roofs of stone and to spires. Very little practical information is obtainable about spire construction, and the architect can only refer to actually executed works. Of course, for small conical spires to turrets, and the like, the relative thickness of the masonry renders any precautions as to spreading unnecessary if the lower courses are dowelled or cramped, and the apex stone is solid (see sketch 3); but for spires of any height a chain bond at the base of spire or occasional dowelled courses may be necessary. As for the thickness of stone shell, many of the best examples show a uniform dimension from base to summit of from 9in., 8in., or 7in., though sometimes the thickness is diminished in stages. We shall refer more to this in our next.

We show in our sketches an octagonal turret with "winding" stair. The wall-

stones may be secured by dovetail cramps of copper or iron imbedded in chases cut in the stones (see sketch). The steps are cut out of solid York or Portland stone, tooled or rubbed, the outer ends pinned into wall about 6in., the inner end forming a stone newel (see sketch 4).

The traceried window is another important item of Gothic work. It is necessary to state dimensions of mullions, thickness of tracery, where the bed joints are to be, and a detail drawing of the window drawn to an inch scale or larger should be supplied, for the mason to obtain his moulds (see sketch 5). In specifying pillars, capitals, and bases, the mode of bedding the stones, their height, and details of the moulded or carved capitals and bases ought to be given.

51. *Dome*.—The dome over hall (or crossing) to be constructed as shown in working drawings, and according to the thicknesses and dimensions thereon figured. The stone to be the best selected Portland stone from the "Whitbed" (or other bed), in courses 12in. (or 15in.) deep, of 12in. in bed, and in lengths of 2ft. or 3ft. breaking joint. The stones in each course (or every two or four courses) to be cramped together by copper dovetail cramps 15in. long, 2½in. by ½in. (or dowelled with slate dowels run in cement), and to be bedded and jointed in fine mortar (or cement). Or—

The octagon dome to spring from squinch arches, and to be in courses gradually diminishing towards the top from stones 15in. thick at the springing to 8in. at the apex, and of heights according to detail, breaking joint. Each stone to be wrought and cut accurately to bed and joint moulds, and every course, or every third or fifth course, to be cramped with copper cramps 10in. long (2in. by ½in.), or fixed by slate dowels 1½in. square, accurately fitted into V-grooves, and run in with brimstone or flushed with cement. At the springing a groove or channel to be cut for a band of iron, or chain of flat bars connected by rivets at the angles of octagon, and bedded in cement or brimstone to prevent any spreading tendency of the dome.

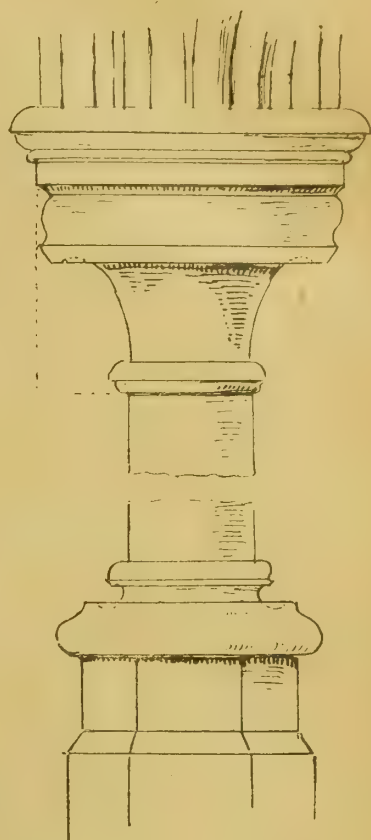
52. *Stair Turret*.—The octagon stair turret to be built, as shown in drawings and details, of solid Portland (or Bath or other stone) worked fair inside to a circle in courses of 12in. (or more) high, and to be not less in thickness or bed than 12in.; the beds and joints to be worked square and true, and made to radiate to centre of turret. Each course to break joint and to be cramped as shown, with copper dovetail cramps 9in. (or 10in.) long, and run with lead or brimstone. The spiral staircase to have steps each cut out of a solid, hard York tooled (or rubbed) stone, 6in. (or 7in.) thick, 2ft. 9in. long, and 9in. (or 10in.) wide, the outer end of each step to be pinned into wall 6in. in cement as the work proceeds, the inner end to form a circular newel 6in. (or 8in.) in diameter (see sketches 2, 3, and 4).

53. *Stone Roof or Spirelet*.—The conical or octagonal roof or spirelet of stone to be constructed as shown (Fig. 3), with courses of stone worked to bevelled or raking faces inside and outside, with angle quoins (if any), the beds to be worked level, and the joints true, breaking joint; each stone to be 12in. by 12in., and 18in. extreme dimensions. The stones to be dowelled with square slate dowels (or each course to be plugged with lead at the joints), and the apex stone to be out of a solid stone 2ft. or 3ft. deep, mortised for copper spindle 1½in. diameter.

54. *Traceried Windows*.—The windows to have jambs and sills of solid stone moulded to the details supplied, and the mullions and transoms, if any, to be 6in. by 10in. (or 6in. by 8in.) in single (or two or three) stones, bedded and dowelled to sills, and the tracery to be worked according to large scale drawing, and of the sectional sizes and forms shown, and to be jointed according to drawing. Or—

The traceried heads of windows (see sketch 5) to be executed from the detailed drawings, from centres of main curves and foliations and cusps as indicated, and with joints as shown. The tracery bars to be according to dimensions figure, or 6in. (or 4in.) on face by 10in. (or 8in.) in depth, and to be executed under the supervision of the architect (or the lines and curves of tracery to be drawn out full size and approved by him). The work to be done neatly, and with all necessary copper or slate dowels or lead plugs, as may be necessary.





**55. Pillars.**—The pillars or shafts to be 8in. (or 12in.) in diameter, of selected close-grained Corn-grit (or Monk's Park) Bath stone, in stones of not less than 3ft. or 4ft. high, bedded on 4lb. lead seatings (or in stone-dust mortar). The beds to be level and true, and dowelled if necessary. The base and capital (see sketch 6) to be moulded according to section or profile given (or give extreme dimensions of stones, projection of abacus and base). Or—

**Carved Capitals.**—The capitals to be carried according to design of the architect (or from model prepared and approved by him). For this purpose give the extreme dimensions of block to be carved.)

(NOTE.—The clauses we have given generally refer to features in stone buildings; but they also apply to brick buildings where stone details and dressings are used, the only difference being that the stone blocks must in the latter case course with the brickwork, or to a certain number of courses in height, as in the case of ashlar facings, jamb stones, quoins, &c., and the bedding or thickness ought also to be regulated by the thicknesses of half a brick, a brick, &c.)

#### GRANITE WORK AND FACINGS.

The specification for granite-faced work should state the kind of granite, as red or grey Aberdeen (or Cornish) granite, which may be either axed, picked, or polished on the face. All spots, iron stains, or other imperfections to be avoided.

**56. Ashlar Facing.**—The external face of lower story, to be cased in red (or grey) Aberdeen or Cornish granite, free from all blemishes, finely axed (or polished) on face 9in. in thickness in courses 12in. (or 18in.) in height, and to be set in cement mortar and neatly pointed. The facing to be bonded with blocks every superficial yard, and of the whole thickness (or 18in.) of wall.

**57. Plinth.**—The plinth courses to be 15in. (or 18in.) in height and 12in. on bed, and in lengths of 3ft. (or 5ft.), the moulded course to project 4in. from face of wall, with bonder stones of the whole thickness. Or—

The plinth to be of solid granite blocks (state dimensions), or to be of the whole thickness of wall, with moulding, as shown in detail.

**58. Window Sills.**—The sills of ground floor windows to be 14in. by 8in. (or other dimensions), sunk weathered, grooved, and throated with mitred ends, and to have seatings for reveals and jambs. Or—

The sills to be moulded as shown in detail, weathered and throated, &c., as before (state how finished: whether finely axed or polished).

**59. Entrance Columns and Pilasters.**—The columns and pilasters to entrance to be of polished red (or grey) Aberdeen granite, with the shafts in one (two or three) stones in height, bedded on 4lb. lead, and with the required entasis and diminution, the pilasters to be bonded into walls 4½in. (or 9in.) The apophyses, bases, and capitals to be worked and moulded as shown on details, and the whole to be neatly pointed, the lead seatings to be within an inch of face of columns. Or—

The pilasters inclosing the iron stanchions to be of polished Aberdeen granite slabs 4in. (or 6in.) thick, properly jointed and cramped at return sides, and the space between stanchion and granite to be solidly filled in with brick and cement.

**60. Arches.**—The arches to doorway, &c., to be constructed of voussoirs, moulded (as shown) and neatly jointed. The jamb-stones or mullions of windows to be bonded to walls every third or fourth stone, and to be rebated for frames.

#### LONDON STREET IMPROVEMENTS.\*

A VERY useful and interesting narrative of London street improvements accomplished during the past forty years, or from 1855, when the Metropolitan Board of Works was called into existence, to March, 1889, when the London County Council superseded them, down to December, 1897, has been prepared by Mr. Percy J. Edwards, clerk of the Improvements Committee, and is now published by P. S. King and Son, the agents for the sale of the L.C.C. publications. Only Metropolitan street improvements, including the Thames Embankments, are dealt with. No attempt has been made to describe the clearance of unsanitary areas, and the provision of dwellings for the labouring classes, the con-

\* History of London Street Improvements, 1855-1897. By PERCY J. EDWARDS, Clerk of the Improvements Committee. London: P. S. King and Son, Bridge-street, Westminster.

struction of bridges and tunnels, &c., across the Thames, nor of proposed street improvements not yet sanctioned by the Council. The author deals simply with facts, and not with questions of policy. Three general plans of interest are given. The first is a plan of London in 1855, the year when the late Metropolitan Board of Works commenced their labours; the second is a map of London as it existed last year, showing the street improvements carried out by, or undertaken with, the co-operation of that Board between 1855-1889, those completed by the London County Council, and improvements carried out or in course of execution by the County Council during 1889-1897, and these are indicated by different colours, and a third shows Sir Christopher Wren's plan for the restoration of the City after the Great Fire, for which the author is indebted to the authorities of All Souls' College, Oxford. But the various plans of improvements to a large scale will be found particularly useful.

It would be impossible in a hurried notice of this volume to even glance at the many improvements undertaken from 1855 to 1889. The Covent Garden Approach (or Garrick-street) from the west between Coventry-street and Covent Garden, opened to the public in March, 1861, is the first described; the line of communication between High-street, Borough, and Stamford-street, Blackfriars-road (Southwark-street), opened in January, 1864; the important street from Blackfriars Bridge to the Mansion House (Queen Victoria-street), which cost upwards of two millions, opened in 1871; the Commercial-road or Whitechapel improvement, opened in 1870; the Holborn or Middle row improvement, by the removal of the houses at the Middle-row, Holborn, opened in 1867; the High-street, (Kensington) widening; the Park-lane (Hamilton-place) improvement; and other great thoroughfares like Clerkenwell-road and Theobald's-road, opened to the public in 1878; Northumberland-avenue, opened in March, 1876; Shaftesbury-avenue, Charing Cross-road, Harrow-road, Newington-butts, &c., are all described and sectional plans to a good scale are given in each case. The early history of each undertaking, the memorials presented, the applications to Parliament, for the necessary powers, the details of property, width and length of street,



subways, net and gross cost, amount realised by disposal of surplus land, are concisely stated. Many of these improvements are widenings of main streets, like the Gray's Inn-road, a most important work; Camberwell-road, Peckham-road, Upper-street Islington, &c. Over eleven and a half millions were expended by the late Board on Metropolitan street improvements during their period of office.

The Council's improvements since 1889 make a formidable list. The Council's action in regard to street improvements, the requirements of planning a new street, the architectural features, control of frontages, the methods to be adopted in planning are discussed, and the remarks are worth attention. In these we find some of our suggestions have been mentioned—such as the importance of laying down a general architectural scheme providing for the general features of buildings on the route, thus imparting dignity and beauty to the new streets, and the failure from an architectural aspect of the Charing Cross-road and Shaftesbury-avenue, both of which thoroughfares we were the first to criticise directly they were formed. The remarks on procedure when carrying out improvements, levying an improvement charge, rehousing of displaced labouring classes, subways, &c., are worth attention.

Under the head of street improvements which have been completed by the L.C.C. we may just mention Rosebery-avenue from Gray's Inn-road to St. John's Street-road; from Clerkenwell-road to "The Angel" at Islington; the Coldharbour-lane widening, completed in March, 1890, Church-street, Fulham; under the head of improvements under statutory powers, Piccadilly-circus open space, a wide but unsuccessful area, with its memorial fountain; the Isle of Dogs bridges, &c. Amongst improvements in course of execution in December, 1897, are mentioned the Tower Bridge approaches and the Strand widening at Holywell-street, a scheme contemplated as long ago as 1836, and advocated several times since. It is needless to recount the various steps. In 1883 the late Board decided that the widening of the Strand and a new street from it to Holborn was a work of urgency, and application was made to Parliament for powers. Again, in 1889, the Improvements Committee recommended the Council to seek Parliamentary powers. They adopted the report, and decided that the owners of property benefited should contribute towards cost, known as "betterment." Since 1893 several schemes have been submitted to the Council, and the Committee advised the Council to undertake the widening of the Strand at Holywell-street by removing the houses on its south side between the churches of St. Mary and St. Clement Danes. Last week we gave the later plan of the proposed central street from Holborn to the Strand, which the Improvement's Committee recommend the Council to carry out. Those interested in the previous schemes will find plans and descriptions in this report, no less than seven of these plans being shown. It is a great advantage to have these several schemes embodied with the reports and plans, by which we are able to compare the relative merits of the proposals. Mr. Edwards's History fills up a void, and supplies information we have long looked for in vain; Only one in actual touch with the London County Council, and who has all the documents and transactions at his command, could compile such a volume as this.

#### THE SANITARY INSTITUTE.

THE preliminary programme of the Sixteenth Congress, to be held at Birmingham from September 27 to October 1, has now been issued. The President of the Congress is Sir Joseph Fayrer, Bart., K.C.S.I., M.D., F.R.C.P., F.R.C.S., LL.D., Q.H.P., F.R.S.

Dr. Christopher Childs, M.A., D.P.H., will deliver the lecture to the Congress, and Dr. Alex. Hill, M.A., J.P., Master of Downing College, and Vice-Chancellor of Cambridge University, will deliver the popular lecture.

Excursions to places of interest, in connection with sanitation, will be arranged for those attending the Congress. A conversation will be given by the Rt. Hon. the Lord Mayor (Councillor C. G. Beale), and a garden party, at the Botanical Gardens, Edgbaston, will be given by members of the Sanitary Committee.

It appears from the programme that over 300 authorities, including several county councils, have already appointed delegates to the Congress,

and, as there are also over 2,000 members and associates in the Institute, there will probably be a large attendance in addition to the local members of the Congress.

In connection with the Congress, a Health Exhibition of Apparatus and Appliances Relating to Health and Domestic Use will be held as a practical illustration of the application and carrying out of the principles and methods discussed at the meetings, which not only serves this purpose, but also an important one in diffusing sanitary knowledge among a large class who do not attend the other meetings of the Congress.

The Congress will include:—Three general addresses and lectures. Three sections, meeting for two days each, dealing with (1) Sanitary Science and Preventive Medicine, presided over by Alfred Hill, M.D., F.R.S. Edin., F.I.C., M.O.H., Birmingham; (2) Engineering and Architecture, presided over by W. Henman, F.R.I.B.A.; (3) Physics, Chemistry, and Biology, presided over by G. Sims Woodhead, M.D., F.R.C.P., F.R.S. Edin. Five special conferences: Municipal Representatives, presided over by Ald. W. Cook, Chairman of the Health Committee, Birmingham City Council; Medical Officers of Health, presided over by John C. McVail, M.D., D.P.H., F.R.S. Edin.; Municipal and County Engineers, presided over by T. de Courcy Meade, M.Inst.C.E.; Sanitary Inspectors, presided over by W. W. West, Chief Sanitary Inspector, Walthamstow; Domestic Hygiene, presided over by Mrs. C. G. Beale (the Lady Mayores).

The local arrangements are in the hands of an influential local committee, presided over by the Right Hon. the Lord Mayor of Birmingham, with Professor A. Bostock Hill, M.D., D.P.H., W. Bayley Marshall, M.Inst.C.E., and J. E. Willcox, Assoc. M.Inst.C.E., as hon. secretaries.

#### LONDON COUNTY COUNCIL WORKS DEPARTMENT.

AT Tuesday's meeting of the London County Council, the Finance Committee submitted a statement of the cost of works executed by the Works Department for the half-year ended March 31. The statement was sub-divided, so as to show which of the works were commenced under the late and which under the present management, in order to enable the Council to form some judgment as to the working of the system on which the department is at present conducted.

The statement of estimated works embraced in all eleven works which have been completed and reported upon during the half-year. Three of these were begun under the late management, and before the reorganisation of the department, brought about as the result of the inquiry by the Special Committee. The final estimate for these amounted to £6,102, whilst the actual cost has amounted to £6,658, showing a balance of cost above final estimates of £556. The only loss has come from one work—the Pimlico river fire-station—on which there is a balance of cost above final estimate of £718, the final estimate being £990 and the actual cost £1,708. The other two works which have been executed for the Housing Committee show a saving over final estimate of £162, making the balance of cost above estimate for the three works £556. With regard to the eight other estimated works, which were commenced since the reorganisation of the department, the final estimate for the works amounted to £23,021, whilst they have been executed at a cost of £17,846, showing a balance of cost below estimate of £5,175. No loss is shown in any of the works, whilst on several the saving has been large. On paving works and the formation of roads carried out for the Housing Committee on the Boundary-street area there has been a saving of £2,995, the estimate being £7,749, and the actual cost £4,754. On paving and work done for the Improvements Committee at Deptford there has been a saving of £1,058 on a job estimated to cost £8,977, and which was executed for £7,719. On jobbing works carried out during the half-year for the various committees, the schedule value of which was £18,065, there has been a saving of £2,033. The largest saving has been made in work executed for the Main Drainage Committee.

A table appended to the statement gives the total results of the operations of the department since its creation in November, 1892. The final

estimate for works commenced before the reorganisation of the department was £621,251, whilst the actual cost was £656,773, showing a loss of £25,519. For the works commenced since the reorganisation the final estimate was £28,692, and the actual cost £23,039, or a saving £5,653. The net result is, therefore, that the total operations of the department since its commencement with regard to estimated works have resulted in a loss of £19,866, this being the balance of actual cost above final estimate. For all the jobbing works carried out by the department since April, 1895, before which date there was no schedule of prices for comparison, the schedule value was £74,231, whilst the actual cost has been £68,282, showing a total saving of £5,948. There are 12 other works which have been completed up to March 31, the total original estimate for which was £50,909; but these have not been reported upon as yet.

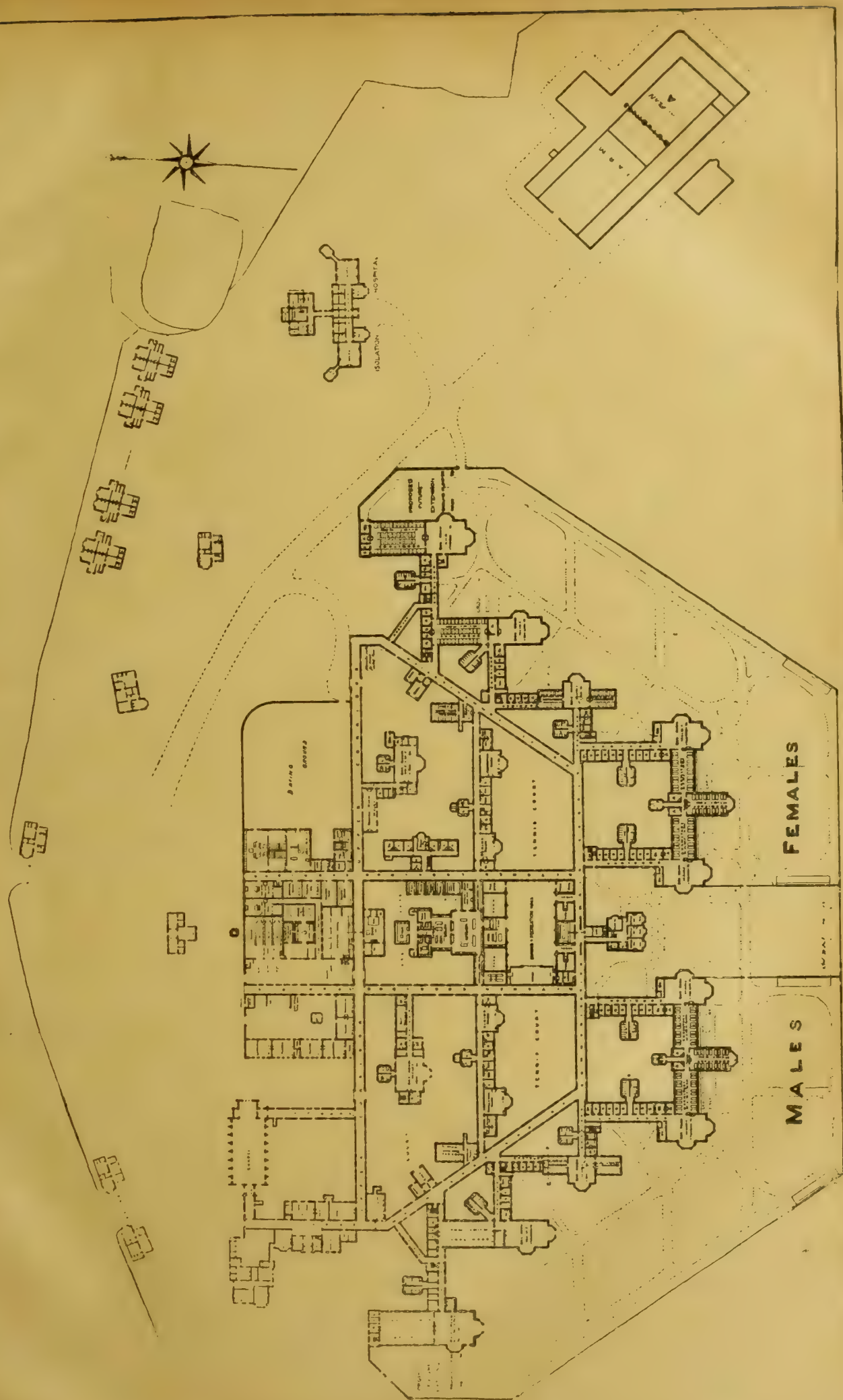
#### CITY OF BIRMINGHAM LUNATIC ASYLUM.

THIS plan illustrates the selected design by Messrs. Martin and Chamberlain, of Birmingham. The scheme represents a fully-equipped asylum, embodying the principle of contriving the reception ward and infirmary wholly on the ground floor. Necessarily this arrangement necessitates the spreading of the buildings over a larger area of ground than would otherwise be the case had the infirmary been divided between the two main floors. The superintendent can pass uninterruptedly from ward to ward throughout the whole series of buildings. Dormitories are arranged in immediate connection with, and on the same floor level, as the day-rooms. All the main floors have two or more aspects, with full sunlight and thorough cross-ventilation. The single rooms are situate in the corridors off either the day-rooms or dormitories, to prevent the noisy patients disturbing the others. Granolithic stone is to be used for staircases, and all constructional ironwork will be protected from fire. Salt-glazed bricks in the washhouses and laundries will be used for a 5ft. dado. Narrow tongued oak boards will be used for the floors of day-rooms and corridors within the wards, and pitch-pine for the dormitories, single rooms, and attendants' apartments. The walls of the main buildings will be 16in. hollow walls. Glazed screens are used to divide the dormitories from the day-rooms, so as to insure easy supervision. The medical superintendent's house and main entrance are in the north-west corner of the site. The whole of the north part is occupied by engineering workshops and stores departments. The buildings have been arranged to follow as far as practicable the fall of the ground by employing a gentle rise or fall in the various corridors. All steps are thus avoided. The dispensary is placed centrally, with a library near. The dining-hall, kitchen, and administrative department generally assume a symmetrical arrangement. The windows of the patients' rooms are designed in three heights, the parts above the transom being made to hinge on the sill and fall inwards into a hopper frame in the usual way. This is glazed in the front and two sides. Sliding sashes are used below and counterbalance one another. The sanitary arrangements are described as being on the most improved scheme. We hope to be enabled to give more detailed plans and a view later on.

An archaeological discovery has just been made at Tongres, province of Hasselt, Belgium, where excavations in one of the tumuli at the intersection of two Roman roads have brought to light a sarcophagus containing the remains of a Roman artist of the 3rd century. With the remains were found a large number of urns, vases, and miscellaneous trinkets; and also bronze cups containing remains of the artist's colours, which are expected to throw some light on the processes of contemporary painting.

The rector of Spexhall, near Halesworth, Suffolk, writes appealing for the modest sum of £250 to restore the round tower of his little parish church. "There are," he says, "but about 3ft. standing above the ground. It is not known when it fell, but there remains a considerable buttress which was evidently built up in support after probable damage by lightning some 150 years ago. The wooden belfry for the single bell which is left admits the rain, and threatens to injure the 15th-century font by continued damp. We have as a parish restored the main fabric of nave and chancel, and have done so fairly well, but our means are now exhausted."





CITY OF BIRMINGHAM LUNATIC ASYLUM.—MESSRS. MARTIN AND CHAMBERLAIN, Architects.



## STAGE CONSTRUCTION.\*

**A**NOTHER important contribution to the construction of modern theatres, and a useful supplement to his valuable work, "Modern Opera Houses and Theatres," has been brought out by Mr. Edwin O. Sachs, architect, and published by Mr. B. T. Batsford. The volume on our desk is a large, handsomely got-up folio, and contains ninety pages of letter-press, six plates from engineers' working drawings, and 170 illustrations reproduced by improved processes from various sources. Mr. Sachs is an expert authority on theatre construction, and his work is intended to furnish managers of theatres, engineers, and others with information as to what has been already accomplished in stage mechanism here and abroad. The subject has received little attention; the works on theatres and allied subjects have not touched this special and technical branch, and the author's endeavour to meet the demands for information of the application of modern science and methods to the mounting of plays ought to be welcomed by all managers, specialists, and engineers. The author's experience and efforts in the cause of lessening the risks of fire have been brought to bear also on the question. The examples selected for illustration include many of the leading Continental opera-houses and theatres in Austria, France, Germany, Belgium, Holland, England, &c. Many quotations are given from leading authorities in various countries, and we commend to the careful attention of the interested reader the introductory remarks and the conclusions of the author. Wood stages, both English and Continental, are first described, followed by "wood and iron stages," such as those of the Grand Opera House, Paris; the Municipal Theatre, Rotterdam; D'Oyly Carte's English Opera House, London. Next come iron stages, as those of the Municipal Theatre, Amsterdam, the "Asphaleia" system, Court Theatre, Vienna, &c.

The author notices the reform in stage mounting, the experiments made at Bushey by Mr. Hubert Herkomer, who has introduced on his small stage many artistic arrangements, and Sir Henry Irving's reforms. Many interesting and useful data are given. The height of the proscenium opening being regulated by its width, this decides the full height of stage from the floor to the "gridiron," so that the scenery may be lifted bodily out of sight above the proscenium arch without rolling or folding. Again, the scenes lowered under the stage floor have to disappear from the vision of the audience: therefore the height from the bottom of well under the stage should, if possible, equal the height of the proscenium opening. We quote the author's remarks. He says:—"English architects, in particular, who make a speciality of theatre planning frequently sink part of their building below the ground in order to make the street level equidistant from those occupying the top-most seats of the gallery and those seated in the area or floor of the house. This sinking of the pit below the street naturally places the stage and stage 'cellar' also below the ground, and when the cellar is as much as 30ft. below the stage floor, it is more often than not below the level of the main drainage, and in some houses in London below the level of the Thames bed. In such cases the difficulty is in keeping the water out of the cellar or well, and pumps have to be employed daily to clear out the water." Deep cellars or wells are to be avoided in the Metropolis. The distance from curtain line to back of stage varies from 30ft. to 80ft. in the larger houses. The author explains certain technical parts of the stage, such as "rigging loft" or gridiron, the wooden staging or open floor laid upon the tie-beams, an important division, as a considerable weight has to be supported by the gridiron—everything in the shape of scenery above the stage. Then there is the division known as the "flies," between the gridiron and the level of stage, or the galleries on both sides from the proscenium wall to back of stage, connected by a bridge, all of which are generally of wood. The various mechanical appliances, such as cloths, borders, battens, "fly galleries," the ropes and blocks, windlasses, &c., are minutely described and illustrated by plans and sections drawn to a large scale.

Several valuable plans and sections of the

theatres at Brussels, of the Eden Variety Theatre, Paris; Court Opera House, Dresden, and of Vienna, illustrate Continental wood stages generally.

The wood and iron stages comprise many important examples. The stage of the National Opera House, Paris, is taken as the first, and it has had a large influence, though its extraordinary dimensions prevent it from being accepted as a useful model. We may quote the dimensions of the stage, 53 metres, or 174ft., between side walls of stage; 26 metres, or 85ft., in depth; 52ft. 6in. at the proscenium opening, and nearly 103ft. working room between the columns which support the flies. Several Continental opera-houses have exceeded this depth of stage, and the Covent Garden Theatre has nearly the same dimensions. Views of the under machinery, plan and transverse sections, &c., are given. The height of stage to floor of gridiron is 119ft., and there are five tiers of fly galleries, besides sets of flying bridges placed over the "rues," and hung from the gridiron. There are three levels of gridiron. The stage of the Municipal Theatre, Rotterdam, is described with equal completeness, also the D'Oyly Carte Opera House, London. Of iron stages, the author deals with the Amsterdam Municipal Theatre, an iron stage worked by manual power. It presents a good example of metal construction, with a self-contained stage surrounded by a thick wall. The stage is carried by iron joists from side to side, and stiffened by iron columns, and the galleries and gridiron are all of iron framing. The "Asphaleia" stage was an important development of stage reform introduced by a syndicate after the Ring Theatre disaster. The object of the reformers was to prevent a recurrence of that calamity. Several illustrations of the system are given. The author points out the strong and weak points in the system, and illustrates it by actual stages, such as at the Municipal Theatre, Halle. The stage at Buda-Pesth, large plans and sections of which are given, show various important features; the abolition of the flies, a source of danger, is one of the points claimed, but Mr. Sachs points out certain defects, as the greater storage of canvas in the upper machinery, and the acoustic properties of the stage are not satisfactory, besides other mechanical drawbacks. One of the most recent and elaborate stages is that of the Court Theatre, Vienna. The latest development of stage mechanism is the electric "Turntable" stage, and this is fully explained; but we here take leave, for the present, of Mr. Edwin O. Sachs's valuable work, which must be regarded rather as studies of individual stages than as formulating any definite results.

## THE CARPENTERS' COMPANY'S EXAMINATIONS.

**T**HE annual examinations for shop and outdoor foremen, &c., took place at the Company's Hall in London Wall, and at their Technical Schools in Great Titchfield-street during last week. The usual course of lectures given for the benefit of the candidates during the previous weeks had been very numerously attended. These lectures are delivered by professors of architecture and engineering, and other eminent men. The number of candidates who entered for the examination was well up to that of the last two years. The average number of marks gained was in excess of that of any previous year, showing that each year a higher standard is reached. The Carpenters' Company was assisted by the usual representative board of examiners.

The names of the successful candidates in order of merit are:—

FIRST CLASS.—Jno. Crewdson (Gold Medal), W. H. Betambeau and F. Hartnoll (Silver Medal), W. B. Sweet (Bronze Medal), J. Packham, T. E. Kinch, G. M. McCorquodale, and J. H. Davies.

SECOND CLASS.—W. J. Barnes, W. J. Collins, Ernest White, A. H. Walker, G. H. Griffiths, H. S. Jones, G. W. Adkins, A. H. Imber, A. Norton, W. Wintersgill, W. Forth, G. W. Filby, C. R. Tinson, A. Pringle, and F. J. Griffiths.

Candidates already holding the Company's certificate who came up to improve their position, and failed to do so, do not appear in this list, although they may have maintained their former position.

The Lambeth Vestry have accepted the resignation of Mr. James Norrington, to take effect at the end of the present year.

## SOME INSTANCES OF PILES AND PILE-DRIVING, NEW AND OLD.—I.\*

**I**T is the aim of this paper to present facts rather than theories, and to give the experiments themselves rather than a discussion of the formulae which have somehow managed to cluster around them. In 1879 I made my first attempts, in company with a fellow student, F. B. Knapp (M. Bost. Soc.). The experiments were made on a small scale, and deserve mention only from the generally unsatisfactory nature of the results and from our perhaps hasty conclusion that the simplest formula was liable to be the best. Since that time I have held official relations with not a few piles of larger growth in various parts of the country. The fact of having made some tests within the last year for the Boston Transit Commission, near Haymarket-square, under direction of H. A. Carson, chief engineer, was the immediate cause of this paper. On account of the upward pressure of the tide-water upon the submerged station areas of the subway as designed at that time, this pressure being transferred by means of the concrete invert to the coned pile-heads, it was desirable to know something of the safe upward force as well as the safe downward force, that could be applied to a pile. Sixteen spruce piles were driven 2½ft. centres in a pit about 24ft. deep, penetrating into the clay from 11ft. to 34ft., the successive sets and falls for every 10 blows being taken. The Cavanaugh extension-rail pile-driver was used with 1,710lb. hammer. Speaking generally, we got about ½in. set for 11ft. drop, or 18,800ft. lb., without deduction for overhaul of rope. The effect of a rest over Sunday was shown by giving the piles five blows Monday morning and observing the set. The average was then compared with the average of the ten taken previously. This is perhaps not so satisfactory as a single blow in each case would have been. The effect of rest is particularly noticeable in the case of piles when driven with bark on, the bark apparently easing the pile as it went down, owing, perhaps, to the lubricating action of water following down with greater freedom, or to the sliding of the pile inside the bark.

PLANS SHOWING ORDER IN WHICH PILES WERE DRIVEN.

10	8	7	1
11	9	6	5
13	12	15	4
2	14	16	3

Piles spaced 2ft. 6in. between centres.

Nos. 1, 9, 10, 13, 14, 15, bark on.

Nos. 2 to 8, 11, 12, and 16, bare off.

The successive sets for each 10 blows for each pile were plotted, and show clearly that in the case of some piles the work of the hammer was to push away the material ahead of the point rather than to overcome the friction of the sides. The increase of this side friction over Sunday confirms this view. So far as our knowledge of the locality goes, the clay gets no softer at the greater depths. Grade of surface, E. 118° 0. Grade final cut-off or soft clay, E. 93° 79. Grade hard blue clay about 120lb. per cubic foot, E. 90. All piles cut off square on point. Earth around piles rose about 6in. during the driving. No brooming of heads occurred.† The piles were sawed off 2½ft. above final cut-off. An I-beam, 15ft. long, was then arranged as a lever, pivoted on a pair of angles riveted together, with loose plates to adjust the height underneath, then fastened down to the adjoining piles by ½in. wire rope with two loops spliced, and loaded at the free end with about 6 tons of steel shapes, handy by. An upward pull of 10 or 12 tons was first tried on piles 3, 16, 14, and 2. Failing to start either one of these, we proceeded as indicated in the table. Nos. 4 and 5, 6 and 15, 9 and 12, were tested together in pairs. The only pile which moved of the six was No. 6, which had only 11ft. penetration, the other 4ft. being in softer clay. It settled 1½in.

\* Stage Construction: Examples of Modern Stages. Being a Supplement to "Modern Opera Houses and Theatres." By EDWIN O. SACHS, Architect. London: B. T. Batsford.

\* A paper by HORACE J. HOWE, member Boston Society of Civil Engineers, and read before that society.

† See experiments by Don J. Whittemore, American Society Civil Engineers, 1890.



## PILE TESTS, BOSTON TRANSIT COMMISSION, NEAR HAYMARKET SQUARE.

Pile Number.	Length, feet.	Diameter Butt, inches.	Diameter Point, inches.	El. of Pt. before Driving, feet.	Fall, last Ten Blows, feet.	Set, last Ten Blows, inches.	Average Set, inches.	After Piles had been in Ground 36 Hours.				Remarks.	Lever Tests.		
								Fall, Five Blows, ft.	Set, Five Blows, in.	Average Set, in.	El. of Pt. after Driving, ft.		Penetration, ft.	Up Tons.	Down Tons.
1	41.5	11½	6	City Base. 93.5	9	7	0.7	11	3	0.6	City Base. 65.9	27.6	{ Driven 12.9ft., May 21, 1897, 10.30 a.m. { Bark on	—	—
2	32.0	12	6	94.0	13	4	0.4	11	Not taken	—	66.9	27.1	{ Continued May 22, 8.30 a.m. .... Bark off	—	—
3	41.0	12	6	93.6	8	5	0.5	11	2	0.4	59.9	33.7	Driven May 21, 11 a.m. ....	—	—
4	38.6	12	7	93.7	8	4	0.4	11	1½	0.38	62.6	31.1	May 21, p.m. ....	—	—
5	35.0	12	7½	94.0	11	5	0.5	11	1 Blow = 0.50	64.4	29.6	{ Began 4.30 p.m., May 21 { Bark on	30.6	{ No movement of this pile, or	
6	30.0	12	8	93.4	10	7	0.7	11	3½	0.7	82.3	11.1	{ Continued 7 a.m., May 22 { Bark off	—	{ of No. 5 from same loading.
7	37.0	11	9	93.5	9	5	0.5	11	3	0.6	81.0	12.5	Began 7.30 a.m., May 22	—	36.8
8	25.0	12	8½	93.7	9	5½	0.55	11	2½	0.53	78.8	15.0	Continued 7 a.m., May 22	—	38.0
9	25.0	12	8½	94.0	12	11	1.10	11	1½	0.35	76.1	17.9	Began 7.30 a.m., May 22	—	Settled 1.4. (See No. 15.)
10	25.0	12	8½	94.0	12	9½	0.95	11	2½	0.43	76.8	17.2	Continued 7 a.m., May 22	—	At this strain, pile head No. 12
11	25.0	11	7	93.9	9	5½	0.55	11	2½	0.53	76.9	17.0	Began 7.30 a.m., May 22	—	pulled off. Same loading.
12	25.0	12	8	94.0	10½	4	0.4	11	1	0.2	76.3	17.7	Continued 7 a.m., May 22	—	At this strain pile head pulled
13	25.2	12	8½	94.2	10	5	0.5	11	2½	0.48	77.7	16.5	Began 7.30 a.m., May 22	—	off. (See No. 9.)
14	25.7	12	9	94.1	11½	6	0.65	11	2½	0.55	74.5	19.6	Continued 7 a.m., May 22	—	No movement of this pile, but
15	25.0	12	9½	94.1	8	4	0.4	11	1½	0.30	78.2	15.9	Began 7.30 a.m., May 22	—	No. 6 settled from same loading.
16	25.0	12	10½	94.3	11	6	0.6	11	2½	0.45	74.8	19.5	Continued 7 a.m., May 22	—	

under a load of 38 tons and stopped. Estimated skin friction 3,500lb. per square foot in hard clay. No further settlement was observed for three hours, pile 15 meanwhile withstanding an upward pull of 31 tons with 16ft. penetration. Of course, tests on single piles should be taken for what they are worth. It does not follow that a cluster would be of equal efficiency, on the average, to the results shown. The test on piles 9 and 12 failed on account of pulling off the head of No. 12. It is to be regretted that the test on Nos. 4 and 5 could not have been carried to the ultimate load, which would have been 50 or 60 tons, in my judgment—not an easy load to handle. The purpose of the test, however, had been accomplished. Tests finished June 7, 1897, Mr. H. R. Kimball, assistant engineer. In applying any formula dependent upon the set of pile, due to a certain fall of hammer, a correction for overhaul of line from drum to hammer should be made of from 8 to 10 per cent. upwards, this correction being subtracted from the weight of the hammer. I have observed instances elsewhere where the engine was at some distance and working diagonally to the driver, with ropes, leaders, &c., new, where this correction averaged 50 per cent. for 10 cuts of the hammerline, using successive sets as a basis for comparison. The history of piles and pile-driving is interesting and instructive. If we do not consider what has been done in the past, as suggested by Sir Christopher in the text, it might well be said of us:—

"The pile by the river's brim  
A wooden pile was to him,  
And it was nothing more."

To this end I beg leave to call your attention to the following authorities as I consider them:—

## SIR CHRISTOPHER WREN.

First, Sir Christopher himself is quoted (Davy, 1841) as saying that the piling when properly employed will outlast the durability of the superstructure itself. And he built St. Paul's and 50 churches besides.

## PERRONET.

Coming down to the 18th century, the noted French constructor, Perronet, gives definite instructions regarding pile-driving. He said that a pile can support a load of 25 tons as soon as it refuses to move more than ¾in. under 50 blows of a monkey weighing 1,190lb. falling 4ft., or under 10 blows of the same monkey falling 12ft. At Neuilly, however, Perronet placed a load of 51 tons on piles 13in. square, but driving the pile 'till it refused to move more than ¾in. under 25 blows of a monkey of same weight falling 4½ft.; but such a load was unusual. At Bordeaux the driving was stopped when the pile did not go down more than ¾in. under 10 blows of a monkey weighing 1,100lb. falling about 15ft. But one of the piers settled considerably, the load on a pile being 22 tons, whereas, at Rouen, by insisting on Perronet's rule, no settlement occurred. In this connection it is stated that M. Sazilly concluded from experiments made at the Orleans Viaduct that piles might support, with security, a load of 40 tons when they refuse to move more than ¾in. under 10 blows of a monkey weighing 1,500lb. falling 13ft. While these results seem large, it is to be noticed that the piles were 13in. square, as stated.

## LONDON BRIDGES.

A word here as to the London bridges, so instructive on account of their failures. In general, trouble came when piles fell short of reaching stiff blue clay, and were too heavily loaded. Old London Bridge was commenced in 1176 and finished about 1209. The piers rested on piles driven only around the outside of the pier, so placed as to carry the whole weight. They were of elm, and at the expiration of 600 years, on being drawn up, showed no material decay. A part of this bridge fell about 1281, and the whole structure was removed to give place to the new bridge in 1825. This gives us a clue to the age of the game we see the children play, familiar to all—"London Bridge is falling down," &c. Old Westminster Bridge (1739-49) failed, piles in one pier only. Blackfriars Bridge (1760-71) failed also, 45 piles in each caisson. Rebuilt and completed 1869. Waterloo Bridge (1809-17) failed, 68 tons per pile. New London Bridge (1825-31) has settled about a foot down stream in places, 80 tons per pile, or 5 tons per square foot of entire area of the pier. New Westminster Bridge, begun in 1858, on the contrary, has not settled with 12 tons per pile (test of 60 tons) and 2 tons per square foot of foundation. Elm piles 32ft. long are driven 18 to 20ft. into the blue London clay. New Tower Bridge, completed 1894, caissons about 21ft. into the bed of the river.

## PRACTICE IN HOLLAND.

Turning to Holland, we find the engineers using the following formula (Mason's) at the beginning of this century:—

$$L = F \frac{W^2 h}{S(W + P)}$$

and also another modification similar to Sanders's formula. In Holland the greater part of important engineering structures have to be built on piles which never reach rock; at the best, only a stratum of coarse sand or gravel, and often not even this, in which case the pile is supported by the friction and adhesion of the surrounding soil. R. Haagsma (*Engineering*, 1892) also states that the factor 6 was applied to the above formula generally. He proposes a new one, which he claims is more correct in theory:—

$$L = F \frac{h_1 - h_2}{S_1 - S_2} \cdot \frac{W^2}{W + P}$$

Where  $h$  = fall.  
 $W$  = weight of hammer.  
 $P$  = weight of pile.  
 $S$  = set.  
 $L$  = safe load.  
 $F$  = factor of safety.

Certainly the Dutch have had a long experience with bearing-piles. The original site of the City of Amsterdam was a salt marsh requiring piles 50ft. to 60ft. long. After passing through a mixture of peat and sand of little consistency, at a depth of about 40ft. they enter a bed of firm clay. The tops are sawed level, and covered with thick plank, on which the masonry is constructed. Though some of the houses have declined from the perpendicular, they are considered to be quite secure against falling. The Palace was built in 1648. The natural ground is below the level of the ocean. St. Petersburg is also founded on piles—sometimes several tiers of

them. Venice also. But data are wanting regarding both cities.

## PRESERVATION UNDER WATER.

Before leaving the Continent, however, mention might be made of a remarkable example of preservation of piles under water, in the bridge built by the Roman Emperor Trajan over the Danube. Cresy ("Encyclopædia of Civil Engineering") states that a pile examined in the last century "was found petrified. This, however, was not the case for more than the thickness of ¾in., beyond which the timber was not in any way changed from its ordinary character." That is during 17 centuries.

## ROYAL BORDER BRIDGE.

We come next to the Royal Border Bridge over the Tweed, formally opened by the Queen and Prince Albert, 1850, when her Majesty was pleased to name it. Sir George B. Bruce, chief engineer, says in a paper to the Institution of Civil Engineers:—"It is very difficult to lay down any general laws with regard to piling. The strata through which a pile has to pass may in one case offer little resistance; yet other strata bearing the same name and apparently of the same character will offer great resistance and be very difficult to penetrate. Thus, though borings are exceedingly valuable, and afford great satisfaction to the engineer, inasmuch as he feels he is not working altogether in the dark, yet they cannot always be depended upon. Nothing can make him feel quite sure but actual trial, by driving a long pile as far as it can be got into the site of the pier. It is the common practice, when laying down in design the lengths of the piles for carrying a bridge or other work, to show them to be driven 3ft. or 4ft. into gravel, provided it is conveniently situated; but, according to the experience gained in this work with Nasmyth's piling machine, even strong gravel does not present any great resistance to the motion of piles pitched 3ft. or 4ft. from each other, unless the gravel is lying on a *substratum harder than itself*. Thus, in some instances, piles were driven down 30ft. below the bed of the river, and in strong gravel went at the rate of lin. by three blows, the strata under the gravel being soft; whereas when the gravel was on rock they did not penetrate more than lin. by 200 blows. The bearing-piles of this bridge carry each about 70 tons. The standard of intensity which was fixed for the driving of these piles was lin. by 150 blows at the end of the driving; but in two of the piers the driving did not average more than lin. by 20 blows of 1,700lb. hammer falling 16ft. This, though practice has proved it to be sufficient, is considered too easy [.] driving to be trusted with such a load, if circumstances admit of their being driven harder. They were driven from 30ft. to 40ft. into gravel and sand, which latter was in some cases wet. The greatest length of bearing-piles driven in one day of 10 hours was 189ft.; but the average driving was not more than 50ft., making the average cost of manual labour 7½d. per lineal foot. Total cost of Royal Border Bridge, £120,000; composed of 28 semicircular arches, 61ft. 6in. span; height above river, maximum, 126ft.

## JOHN C. TRAUTWINE.

John C. Trautwine (*Journal Franklin Institute*, 1842) gives various results and designs, and



argues in favour of piles for what he calls "rail-road superstructure." The Nasmyth steam-hammer was invented in 1839, and first used in harbour works, 1845. This seems to have given an impetus to pile-driving in England and in this country.

(To be continued.)

#### CLEVELAND ASYLUM, MIDDLESBRO'.

THIS new borough asylum, which has been named Cleveland Asylum, was formally opened on June 15. The site, which is 98½ acres in extent, is situated in the parish of Martin, about two miles from the centre of the town of Middlesbrough. The present buildings provide accommodation for 250 patients—125 of either sex—whilst the administrative offices will admit of the asylum being extended to accommodate 150 more patients. The plan is so arranged that the future extensions can be made without interfering with the occupation or cooking of the present building. The administrative offices are placed centrally with the patients' blocks on either side. The administrative offices comprise the official block, recreation hall, kitchen offices, steward's stores, and bakery. The official block or front offices is a two-story building placed centrally in the front. Immediately to the rear of the front offices are the visiting rooms, dispensary, and chaplain's room and library. The recreation hall is 60ft. 4in. by 35ft. 9in., with a stage 35ft. 9in. by 15ft. The kitchen offices comprise the kitchen, scullery, vegetable scullery, larders, meat store, store and cooks' room. Provision is made for cooking by gas, steam, and ordinary fire. The steward's stores consist of a main store, 61ft. 9in. by 18ft. store-keeper's office, sample room, with bread-room on either side. Abutting on the stores is the goods delivery yard, at the entrance to which is the weigh-bridge. The patients' blocks are placed to the right and left of the administrative offices. The blocks comprise four wards on either side, the corresponding wards on each side being duplicates of each other. The ground floor of the nearest block to the centre on each side is appropriated to the sick and infirm, whilst the recent and acute cases are accommodated on the first floor of the same block. The second block is allotted to epileptics and working and chronic patients, the former being placed in the ground-floor ward. Each of the wards is self-contained, and is worked quite independently. All the day rooms have southerly aspects and uninterrupted views, whilst the dormitories are cross-ventilated. The w.c.'s and other sanitary fittings are placed in spurs shut off from the wards by cross-ventilated lobbies. The staircases provide two exits from each ward in case of fire. At the back of the male wards, and looking into an inner court, are the tailors', shoemakers', and upholsterers' workshops, and at the rear of these workshops are the builders' workshops. On the female side, in a corresponding position to the builders' workshops, is the laundry. The general laundry contains a washhouse, ironing room, drying closet, receiving rooms, and distribution rooms. At the back of the general laundry is a foul linen washhouse with separate drying room. Adjoining the general laundry is the officers' laundry. Provision is made for steam and hand washing. The plan is arranged to admit of the separation of the sexes in the delivery and reception of the linen. The detailed buildings include superintendent's house, cottage hospital (for ten patients), chapel (accommodating 204), farm buildings, mortuary, and lodges. The whole of the wards and other portions of the buildings occupied or used by the patients and staff are, in addition to open fireplaces, heated by hot water on the low pressure principle. The lighting is by gas supplied by the Corporation Gasworks. The cost of the asylum, including land and furniture, has been about £85,000. Mr. C. H. Howell, the late consulting architect to the Commissioners in Lunacy, was the original architect for the building, but, through failing health in the early stages of the work, he had to retire from practice, and the work has been carried out under the direction of Mr. A. J. Wood, 22, Surrey-street, Victoria Embankment, W.C., who succeeded to Mr. Howell's practice after being with him for 20 years. Mr. E. A. Jones, of Linthorpe, Middlesbrough, was the clerk of the works.

The Southwold corporation propose to erect 22 cottages, at a cost of between £4,000 and £5,000.

#### THE REVISED SCHEDULE OF PROFESSIONAL CHARGES.

A SPECIAL business meeting of the Royal Institute of British Architects was held at 9, Conduit-street, W., on Monday evening to further consider the revised memorandum on the professional practice as to the charges of architects brought forward by the Council on June 6. The well-known schedule now in force was, it will be remembered, sanctioned by the Institute in 1872, and confirmed at a general conference of architects of the United Kingdom in the same year.

Mr. Edward A. Grüning, vice-president, occupied the chair, and among those who took part in the discussion were the chairman, Mr. J. Douglass Mathews, Mr. H. H. Statham, Mr. John Slater, Mr. C. Forster Hayward, Mr. Edmund Woodthorpe, Mr. W. Hilton Nash, Mr. S. Flint Clarkson, Mr. Wm. Woodward, Mr. Hampden W. Pratt, Mr. A. W. Tanner, Mr. H. Hardwicke Langston, Mr. C. B. Brodie, Mr. W. H. Atkin Berry, Mr. Zeph. King, and Mr. Max. Clarke.

At the close of the proceedings a vote of thanks was carried by acclamation to the Practice Standing Committee for their labour in revising the schedule.

The revised schedule as finally approved is of such general interest that we give it in full below, marking in brackets the alterations from the original draft submitted by the council made by the general body of the Institute. It will be seen that the alterations made from the draft are of a minor character, and do not affect the charges themselves.

1. The usual remuneration for an architect's services, except as hereinafter mentioned, is a commission of 5 per cent. on the total cost of works executed under his directions. Such total cost is to be valued as though executed by a builder with new materials. This commission is for the necessary preliminary conferences and sketches, approximate estimate when required (such, for instance, as may be obtained by cubing out the contents), the necessary general and detailed drawings and specifications, one set of tracings, duplicate specification, general superintendence of works, and examining and passing the accounts, exclusive of measuring and making out extras and omissions.

2. This commission does not include the payment for services rendered in connection with negotiations relating to the site or premises, or in supplying drawings to ground or other landlords, or in surveying the site or premises and taking levels, making surveys and plans of buildings to be altered, making arrangements in respect of party-walls and rights of light, or for drawings for, and correspondence with, local and other authorities, or for services consequent on the failure of builders to carry out the works, or for services in connection with litigation or arbitration, or in the measurement and valuation of extras and omissions. For such services additional charges proportionate to the trouble involved and time spent are made. The clerk of the works should be appointed by the architect, his salary being paid by the client. (In the draft this last sentence was placed at the end of the first paragraph.)

3. In all works of less cost than £1,000, and in works requiring designs for furniture and fittings of buildings, or for their decoration with painting, mosaics, sculpture, stained glass, or other like works, and in cases of alterations and additions to buildings, 5 per cent. is not remunerative, and the architect's charge is regulated by special circumstances and conditions.

4. When several distinct buildings, being repetitions of one design, are erected at the same time from a single specification and one set of drawings and under one contract, the usual commission [is] (originally "may be") charged on the cost of one such building, and a modified arrangement made in respect of the others; but this arrangement does not apply to the reduplication of parts in one building undertaking, in which case the full commission [is] (originally "may be") charged on the total cost.

5. If the architect should have drawn out the approved design, with plans, elevations, sections, and specification, the charge is 2½ per cent. upon the estimated cost. If he should have procured tenders in accordance with the instruction of his employer, the charge is ½ per cent. in addition. (Two and a half per cent. is charged upon any works originally included in the contract or tender, but subsequently omitted in execution.) These charges are exclusive of the charge for taking out quantities. Preliminary sketches and interviews, where the drawings are not further proceeded with, [are] (originally "to be") charged for according to the trouble involved and time expended.

6. Should the client, having approved the design and after the contract drawings have been prepared, require material alterations to be made, whether before or after the contract has been entered into, an extra charge is made [in proportion to the time occupied in such alterations].

7. The architect is entitled during the progress of the works to payment (by instalments) on account at the rate of 5 per cent. on the amount of the certificates when granted, or alternatively on the signing of the contract [to half the commission on the amount thereof], and the remainder by instalments during their progress. (Clauses 6 and 7 were transposed in original draft.)

8. The charge per day depends upon an architect's professional position, the minimum charge being three guineas.

9. The charge for taking a plan of an estate, laying it out, and arranging for building upon it, is regulated by the time, skill, and trouble involved.

10. For setting out on an estate the position of the

proposed road or roads, taking levels, and preparing drawings for roads and sewers, applying for the sanction of local authorities, and supplying all necessary tracings for this purpose, the charge is 2 per cent. on the estimated cost. For subsequently preparing working drawings and specifications of roads and sewers, obtaining tenders, supplying one copy of drawings and specification to the contractor, superintending works, examining and passing accounts (exclusive of measuring and valuing extras and omissions), the charge is 4 per cent. on the cost of the works executed, in addition to the 2 per cent. previously mentioned.

11. For letting the several plots in ordinary cases the charge is a sum not exceeding a whole year's ground-rent; but in respect of plots of great value, a special arrangement must be made.

12. For approving plans submitted by the lessee, and for inspecting the buildings during their progress, so far as may be necessary to insure the conditions being fulfilled, and certifying for lease, the charge is a percentage not exceeding 1½ per cent. up to £5,000, and above that by special arrangement.

13. For valuing freehold, copy hold, or leasehold property the charge is—

On £1,000 .....	1 per cent.
Thence to £10,000 .....	½ " "
Above £10,000 .....	¼ " " on residue.

In valuations for mortgage, if an advance is not made, one-third of the above scale. The minimum fee is three guineas.

14. For valuing and negotiating the settlement of claims under the Lands Clauses Consolidation Act or other Acts for the compulsory acquisition of property, the charge is on Ryde's Scale, as follows:—

ON AMOUNT OF SETTLEMENT, WHETHER BY VERDICT, AWARD, OR OTHERWISE.

Amount.	Gs.	Amount.	Gs.	Amount.	Gs.	Amount.	Gs.
£		£		£		£	
100	5	2,400	25	5,400	40	8,400	55
200	7	2,600	28	5,600	41	8,600	56
300	9	2,800	27	5,800	42	8,800	57
400	11	3,000	28	6,000	43	9,000	58
500	13	3,200	29	6,200	44	9,200	59
600	14	3,400	30	6,400	45	9,400	60
700	15	3,600	31	6,600	46	9,600	61
800	16	3,800	32	6,800	47	9,800	62
900	17	4,000	33	7,000	48	10,000	63
1,000	18	4,200	34	7,200	49	11,000	64
1,200	19	4,400	35	7,400	50	12,000	73
1,400	20	4,600	36	7,600	51	14,000	83
1,600	21	4,800	37	7,800	52	16,000	93
1,800	22	5,000	38	8,000	53	18,000	103
2,000	23	5,200	39	8,200	54	20,000	113
2,200	24						

Beyond this half a guinea per cent.

The above scale is exclusive of attendances on juries or umpires, or at arbitrations, and also of expenses and preparation of plans.

15. For estimating dilapidations and furnishing or checking a schedule of same, the charge is 5 per cent. on the estimate, but in no case less than two guineas. For services in connection with settlement of claim by arbitration or otherwise, extra charges are made, under Clause 8.

16. For inspecting, reporting, and advising on the sanitary condition of premises, the charge must depend on the nature and extent of the services rendered. (Here the word "necessary" which in the draft preceded "services" has been omitted.)

17. In all cases travelling and other out-of-pocket expenses are paid by the client in addition to the fees. If the work is at such a distance as to lead to an exceptional expenditure of time in travelling, an additional charge [may be] (in draft "is") made under Clause 8.

18. When an architect takes out and supplies to builders quantities on which to form estimates for executing his designs, he should do so with the concurrence of his client, and it is desirable that the architect should be paid by him rather than [by] the builder, the cost of such quantities not being included in the commission of 5 per cent.

#### CHIPS.

Probate has been granted of the will of Sir Robert Rawlinson, K.C.B., of Lancaster Lodge, 11, The Boltons, West Brompton, who died on May 31, and the value of whose estate has been sworn at £83,750.

Mr. M. Garton, a Southampton brewer, has offered to complete the new wing of the Royal South Hants Infirmary at a cost of over £5,000. This wing was to be Southampton's Jubilee Memorial; but the funds raised to carry out the project were insufficient. Mr. Garton had previously contributed £2,000 towards the same object.

A memorial, numerous and influentially signed by artists, has been addressed to the Prime Minister, urging that the vacant land on the east side of Exhibition-road shall be reserved for the extension of the art museum.

The foundation-stone of a new English church was laid on June 24 at Düsseldorf by Bishop Wilkinson. It will be a Gothic structure seating about 200 people, and is an offering from an old resident family.

The Bishop of Middlesbrough dedicated on Monday a series of six stained-glass windows, and also three small windows under the gallery, at St. Peter's Roman Catholic Church.



## A BUILDERS' EMPORIUM.

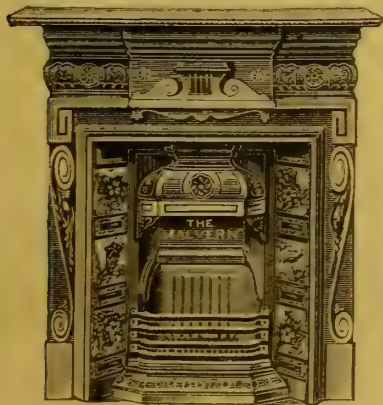
FOR the numerous requirements of architects and builders, the well-known establishment of Messrs. Young and Marten, of the Caledonian Works, Stratford, may, without exaggeration, be called a building emporium. Every requisite of building construction, from cement and bricks to the finished fittings and decoration of the most elaborate building, may be obtained at the works of this enterprising firm. A visit to these extensive premises only can give any of our readers the faintest idea of the immense business carried on there. The complete catalogue issued by this firm is indeed a mammoth work, embracing ten or more sections specially devoted to building and its kindred industries, and a more comprehensive directory of the builder's requirements it is impossible to conceive. Yet a catalogue, however complete, does not convey like a personal inspection the quality of the manufactured goods. We will here briefly glance at a few of the branches carried on by Messrs. Young and Marten. Their facilities for easy transport and shipment, their extensive wharfe and goods siding, enable them to conduct business at a considerable advantage and saving to customers. At the large siding premises every kind of manufactured iron and other goods are stored and put together suitable to large and small buildings, and in such variety that builders can at once determine what they want. Rainwater and sanitary goods, manhole covers, made by the firm, dispensing with hinges; columns and girders, stable fittings, wrought and cast-iron railings, Mediaeval ironwork, and heating apparatus. The assortment of ranges and grates,

grate, fitted with tiles; also several very cheap self-setting ranges, such as the "Wyanem," "Delight," and "Acme."



"Georgian" Kitchen.

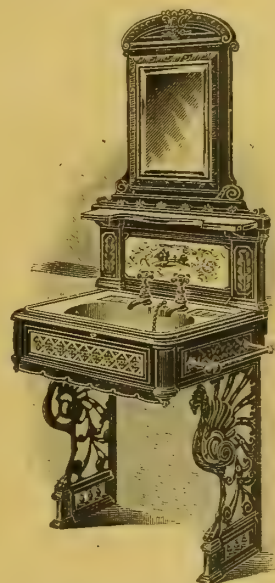
Turning to another department, the same completeness and comprehensiveness is observed, the wants of the large speculative builder as well as the contracting firm working under the architect are considered. Builders' castings form a considerable item. Every description of rainwater pipes and connections, round and rectangular in section, plain and ornamental



The "Malvern" Tile Mantel Register.



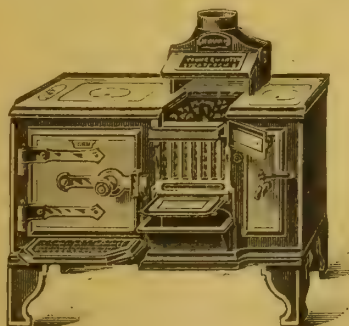
The "Tylney" Mantel Register.



Lavatory Stand, with Mirror.

from the complete article to the loose parts, is unique. We notice all the latest and most improved types and patterns suitable for the mansion, the hotel, and the cottage. Some of the finished tile grates we noticed, such as the "Sandringham," the improved "Teale," the "Cavendish" set, are very superior in quality and ornamentation, and are for semi-slow combustion; the bars are moulded and movable. Hob grates and dog grates of very pleasing designs in Renaissance and Louis XIV. styles leave the architect every choice in selection. For the humbler kind of residences the "cheap mantel register," made in every width and height and pattern, can be supplied by this firm, and some of the quieter designs, Nos. 1871, 2387 in catalogue, are admirable. Then we have mantel registers with overmantels, in which the whole thing is made in iron. These are excellent and clean castings; some have single, others double shelves, with mirror overmantel. The new registered design like the "Malvern" is a triumph of workmanship and decoration, and can be picked out to suit the room decoration. The tile decoration, landscape and Louis XV., is very *recherché*. In another department we notice "tile mantel registers" of every description and price, with sides fitted with tiles, plain and ornamental. The registers numbered 1897, 1898, 1899 are exceedingly nice designs. The addition of the cast-iron overmantel, with bevelled-edge mirror, is a consideration in the fitting of modern houses for the middle classes. Here we find every part of the fireplace: the bars, interior tiles, mantels and overmantels, wood and iron chimneypieces, to the complete and finished articles. In the ranges we see several very complete, such as the "Alexandrian," range, open and close fire, lifting

heads, and guttering are to be met with. Crestings, gates, and railings—of great variety of design—cast and wrought ironwork, form an important section, to which a large sectional catalogue is devoted, and the architect's special wants are met by the firm, whose artistic wrought ironwork is worth attention. Many of the designs for grilles for windows and door panels, brackets and standards for lamps, church-door furniture, altar rails, cast-iron verandahs and porches, spiral stairs, garden accessories, may be mentioned. Then we have the important section of stable and cow-house fittings. Every kind of manger



The "Wyanem" Portable Cooking Range.

and hayrack, stall and loose-box division may be seen, and at varying prices. For heating apparatus, Messrs. Young and Marten's catalogue gives some idea of the variety of types of boilers,

patented for heating purposes, vertical saddle-back, from which to choose; coil cases, radiators of every pattern.

Sanitary goods, from stoneware pipes and traps to pumps, lavatories and baths, closets, and the higher class of fittings, form a very notable feature, and large showrooms are devoted to this branch. A cast-iron bath, with inlet at bottom of bath, called the "steamless" bath, is an improvement. The bath is portable, and stands on feet. The "Marguerite" is another good bath. Wash-down pedestal closets, such as the "Invictas," the "Cedric," L.C.C. pattern, "Capstan," are numerous, and the cast-iron lavatories and fittings, hundreds of patterns of which are in stock, afford a wide choice for every want. We can merely refer in passing to the gasfittings, chandeliers, electric bells, &c., supplied by this firm. The "Surprise" balance pendant is a capital mode of raising or lowering the shaded light, and is an elegant fitting to the drawing-room. Many very artistic pendants in brass and relief metal are exhibited, and the shades are very artistic, highly varied in shape and colour.

Paperhanging and decoration form another artistic section, and the stock of wall-papers, from 2½d. to 9s. a piece, is immense. This firm has also one department given up to leaded and

brilliant cut and ornamental and stained glass, oils, colours, and varnishes, and other requisites for the painter and decorator.

An inquest was held at Solihull, on Monday, respecting the death of Charles Harrison Smith (38), brickmaker, of the firm of Enos Smith and Sons, whose body was found floating in the Warwick and Birmingham Canal at Elmdon on Saturday morning. Deceased went to his business on the previous Tuesday, and in the evening proceeded to the Boat Inn, Catherine-de-Barnes, being sober when he left. Nothing more was heard of him until his body was found in the canal, a quarter of a mile from the inn. There were two incised wounds on the throat and a wound on the left leg, which, according to medical testimony, were post mortem, probably occasioned by passing boats. A verdict of "Found drowned" was returned.

The Prince of Wales has approved of Mr. Lutyens to design the English pavilion for the coming Paris Exhibition. The pavilion is to be in the style of an old English manor-house. One wing of the building will be particularly ornate in furniture and fittings, for the Prince has signified his intention of residing there when in Paris.

The squire of Chelmondiston, a prettily situated village on the banks of the Orwell, Mr. C. H. Berners, has presented to that parish (known throughout the Samford Hundred as "Chimpin") a hall, and the site on which it stands, as a Diamond Jubilee memorial. The work of erection was carried out by workmen on the Wolverstone estate, under the superintendence of Mr. C. Tebbit. The building, the cost of which has been £500, is 60 ft. by 22 ft., and is capable of seating 300 people. The walls are of matchboarding, and the roof is open timbered, stained and varnished. At one end of the hall is a committee room which leads on to the platform.



## ENGLISH ART IN THE EIGHTEENTH CENTURY.

AT the Passmore Edwards Settlement in Tavistock-place, Mr. Humphry Ward gave, on Friday afternoon, the second of his course of lectures upon this subject, and dealt with the life and works of Sir Joshua Reynolds. He remarked that the great debt which English art and civilisation owed to Sir Joshua was not only due to his qualities as a painter; it was due in an almost equal degree to his personality. Perhaps his greatest achievement of all was to persuade the Court, the aristocracy, and the men of letters that art is an essential part of civilisation. In two ways he showed that he was something more than a great painter. He was able to form general views about art and to state them authoritatively and in admirable literary form; and, moreover, his strong personal charm gave him the power of becoming and remaining the friend of the most influential people of his time. Proceeding to sketch the life of Sir Joshua, the lecturer described his early years, his residence in Italy from 1749-52, his immediate and wonderful success in London, and the different stages of his subsequent career, with the gradual modifications of his style. By a series of lantern slides he illustrated the wide scope of the painter's invention, and showed how, though he painted over 2,000 portraits, he seldom repeated himself, verifying Dr. Johnson's remark, "I know no man who has passed through life with more observation than Mr. Reynolds." Then, passing to the Discourses, he spoke of Sir Joshua's views on "the grand style," and of that curious paradox, noted by Mr. Ruskin, that his own immortal successes belonged to a class of art which he himself thought secondary, while his failures belonged to a class which he considered the highest. He told the story of the once famous picture of "The Infant Hercules," which was sold to the Empress Catherine for the then enormous sum of 1,500 guineas, and which a few years ago was found after a long search by an enterprising English lady, without its frame, with its face to the wall, hidden in the midst of a stack of pictures in one of the garrets of the Hermitage Palace at St. Petersburg. The contrast between the fate of these "grand style" pictures of Sir Joshua and his portraits, of which the value is rising every year, was curiously significant. The lecturer announced that the remainder of the course would be deferred till the autumn.

## OBITUARY.

AFTER a long illness, Mr. JAMES MATTHEWS, LL.D., of Springhill, Aberdeen, architect, ex-Lord Provost of the city, died on Tuesday at his town residence, Albyn-terrace, in his seventy-eighth year. He had not enjoyed good health since his retirement some five years ago, and the severe internal complaint from which he suffered undermined a once vigorous constitution. In his death the city has lost a prominent and valued citizen. The eldest son of the late Mr. Peter Matthews, teller in the Commercial Bank, Aberdeen, the deceased was educated at Gordon's College, and afterwards became a pupil of architecture in the office of Archibald Simpson, the designer of many notable buildings in the city. Young Matthews was an apt pupil, and soon showed that he had inherited the gifts of his profession from his grandfather, William Ross, architect and builder, who erected Union Bridge from designs by Telford—a structure which at the time was the largest single-span in Great Britain. The late Mr. Matthews proceeded to London, and received further training in the office of the late Sir Gilbert Scott, R.A., which left its mark on many characteristic buildings in the North of Scotland. Returning to his native city, he entered, in 1845, into partnership with Mr. Thomas Mackenzie, Elgin; but on the death of the senior partner, Mr. A. Marshall Mackenzie, A.R.S.A., his son, joined the firm in 1877, and its designation from that year has been Matthews and Mackenzie. Among the works designed by the deceased may be noted the New Grammar School, the Town and County Bank, the Free Church College, the Music Hall, St. John's Episcopal Church, Free West Church, Albyn-terrace, the most of Rubislaw-terrace, St. Nicholas Poorhouse, Inverness Town Hall, Inverness Lunatic Asylum, Elgin Town Hall, and the mansion houses of Ardee, Brotherton, Desswood, Glack, Brucklay, Monboddie, Inglesmauldie, Drummair, and Ballindalloch; while among the later buildings for

which the firm were the architects were the Northern Assurance Offices, the Art Gallery, the Harbour Office, the Free South Church, the Grand Hotel, and reconstruction of the Palace Hotel. Mr. Matthews entered in 1865 the town council, and retired after being eight years at the board, and he was a member of the school board from 1879 till 1882. In 1883, when the community were greatly exercised over the City Improvements Bill, he was induced to return as successor to the late Mr. Peter Eslemon in the Provostship of the city. In this capacity the work fell to him of carrying out the operations in connection with the Act which opened up a new access to Rosemount, and led to numerous changes in Ferryhill and other parts of the city. During his term of office the Public Libraries Act was adopted in 1884; in September of the same year Mr. Matthews presented the freedom of Aberdeen to Lord Rosebery; and in 1885 the British Association visited the city. The University conferred on him the honorary degree of LL.D. on the occasion of the opening of the Mitchell Hall, which, with the Mitchell Tower, was designed by his partner, Mr. A. Marshall Mackenzie, A.R.S.A. Mr. Matthews was the chairman and director of several commercial enterprises. The deceased married in 1846 Miss Elizabeth Duncan, and is survived by that lady and by three daughters, all married, of the five members of their family. His only son, James, a promising scientist, died a few years ago.

THE death is announced of Mr. WILLIAM C. TOWNSEND, granite merchant, New York and Aberdeen, practically the originator of the large granite trade—at least on a large scale—between Aberdeen and the United States. Mr. Townsend died suddenly in the City Hospital, Zanesville, Ohio, from chronic dysentery. Mr. Townsend, who was born in Pittsburg, served in the American Civil War, and afterwards started business in Zanesville in the monumental line, and in time so developed his business—entirely a wholesale one—that he has been the largest dealer in granite and marble in the United States, having premises in New York, in Barre, Vermont, in Zanesville, in Aberdeen, and in Carrara, Italy. It is now well on to twenty years since Mr. Townsend established a branch of his business in Aberdeen. At first he carried on a purely export trade from the city, but for a long time, however, he has himself occupied granite-cutting premises in the city, besides taking supplies from other makers. Mr. Townsend himself was only once in Aberdeen, and then merely on a flying visit.

MAJOR-GENERAL ROBERT GOSSETT WOODTHORPE, R.E., C.B., Deputy-Surveyor-General of India, who died in Calcutta, on May 26, at the age of 53, was a talented draughtsman. He joined the service in 1865, and had been a member of the Survey Department 27 years. He was engaged on special duty with the Gilgit Mission of 1885, and attached to the Mekong Commission of 1894.

## CHIPS.

The sub-committee on electricity of the Glasgow Corporation have accepted offers by Messrs. R. and J. McKensie for digger and concrete work in connection with the new electric station at Port Dundas.

The Duke of Roxburghe has offered to contribute £1,000 towards the cost of providing the burgh of Kelso with a new water supply. He has also presented the burgh with the site of the town-hall.

At Accrington, the New Jerusalem Church, built in 1849, was reopened last week after alteration and renovation effected at a cost of £3,000. Mr. C. S. Haywood was the architect for the improvements.

There has been launched from the shipbuilding-yard of Messrs. Robert Stephenson and Co. (Limited), at Hebburn, a steel derrick pontoon, built to the order of Messrs. W. Cory and Son (Limited), of London. This pontoon, which is 50ft. long, 47ft. 6in. extreme width, and 12ft. 6in. in moulded depth, is to be placed on the Thames for discharging and loading coal. The hydraulic work is to be supplied by Messrs. Tannett, Walker, and Co., of Leeds. The pontoon has been built to the designs of Mr. H. Shoosmith, the company's engineer, and has been superintended during construction by him and his assistant, Mr. S. P. Coaker.

The Benwell and Fenham Urban District Council have instructed Mr. Harry W. Taylor, A.M.I.C.E., of St. Nicholas Chambers, Newcastle and Birmingham, to prepare a scheme of main sewerage for the Fenham portion of their district. This will be a fairly extensive undertaking.

## LEGAL INTELLIGENCE.

PERTH NEW BRIDGE.—Mr. Thomas Shaw, Q.C., M.P., oversman in the reference for the Lord Provost, Magistrates, and Town Council of Perth, and Mr. John Rollo, as to the price to be paid for Rodney Lodge and grounds, as far as acquired by the town under Act of Parliament for access to the new bridge over the Tay at Perth, has just issued his proposed findings. Mr. Rollo claimed £20,000. Mr. Shaw proposes to find that the sum due by the Corporation of Perth as compensation to Mr. Rollo for the part of the land and buildings taken for removal therefrom, and for all damage and injury sustained, and to be sustained by the remaining lands belonging to the claimant, is £3,785, and that in full of all claims.

LONDON BUILDING ACT AND COVERED WAYS.—At the West London Police-court, on Friday last, Mr. John Crowle, owner of the De Vere Hotel, was summoned at the instance of the London County Council, under section 22 of the London Building Act, 1894, for having erected a structure beyond the general line of buildings on south side of Kensington-road. Mr. Thomas Chilvers, from the solicitor's department, appeared to support the summons, and Mr. Bethune, instructed by Messrs. Turner and Co., defended. Mr. Chilvers, in opening the case, stated the structure complained of was a covered way 12ft. high, 8ft. wide, and 7ft. deep, erected at the entrance to the De Vere Hotel, which defendant, after the Council had informed him they objected to it, erected beyond the general line of buildings, and Mr. Chilvers mentioned the fact that the premises had been the subject of considerable litigation during the years 1882 to 1886, an order having been made at that court in the former year, which was taken to the House of Lords in the latter, it having in the mean time gone before Vice Chancellor Bacon, and the Court of Appeal. It had been a very important case, and was known in the report as "Barlow v. The Vestry of Kensington." For the defence, Mr. Bethune contended that the covered way, which only consisted of brickwork about 2ft. high, and iron framework fitted with glass, was not a structure within the meaning of the section; also that the certificate was bad, as the architect had not drawn a line of buildings, but several lines; and, further, that the magistrate could not convict the defendant, as no order had been made by the Court, which was necessary before a conviction could be obtained, under section 200 sub-section III. of the Act. The magistrate, in giving his decision, stated the covered way was certainly an improvement to the hoarding which originally existed; but he was of opinion that it was a structure for which defendant should have obtained the consent of the Council, and he considered he had power, under section 200 sub-section XI. of the Act, to impose a penalty, and he should fine the defendant 10s., and order him to pay £1 3s. for costs.

REGINA V. PAWLEY.—We gave briefly in our last issue the result of this trial, which ended only just as we went to press; but we think a full note of the proceedings is desirable. On June 23 Mr. Charles James Chirnsey Pawley was indicted for and charged on the coroner's inquisition with the manslaughter of the seven persons who lost their lives by the collapse of the roof of Abbey Mansions, Orchard-street, Westminster, on April 21, 1898. Mr. C. F. Gill appeared for the prosecution, and Mr. Horace Ivory and Mr. Hugo Marshall for the defence, instructed by Messrs. Marshall and Marshall, of 3 and 4, Lincoln's Inn-fields, W.C. Mr. C. F. Gill: My lord, in this case I am instructed by the Director of Public Prosecutions to take charge of this prosecution, and having had an opportunity of reading and considering the case as disclosed by the coroner's depositions, and having had an opportunity of forming an opinion on the material on which the conclusion was arrived at by the coroner's jury, it does not appear to me, subject to your lordship's view, that there is such evidence of gross culpable negligence as would entitle me to ask the jury to find a verdict of manslaughter. The case arises in consequence of the collapse of the interior of the portion of a block of unfinished buildings called Abbey Mansions, Orchard-street, Westminster, the property of Mr. Pawley. Mr. Justice Grantham: I have not had an opportunity of seeing the finding of the coroner's jury, and I wanted to see on what it was founded. Mr. C. F. Gill: The finding of the coroner's jury was as follows: "The deceased met their deaths through injuries received by the collapse of a portion of the South Block of Abbey Mansions. The cause of the collapse was owing to the faulty design and construction of the pier, due to the culpable negligence of the architect. The jury are of opinion that some of the concrete in the roof was carelessly mixed and irregular in quality; but it was not the initial cause of the collapse. In the opinion of the jury, a greater amount of public control should be exercised over the construction of buildings." Mr. Justice Grantham: What is that about the concrete in the roof? Mr. C. F. Gill: That is part of the finding, my lord. Mr. Horace Ivory: I have a shorthand note of it here. Mr. Justice Grantham: No, there is nothing here on the



coroner's depositions as to that. I see there are several men who have been killed; it may be I may find one to which it is added. It is certainly most remarkable. I will go through them all. No. Each of these seven is limited to the pier. Mr. Gill: It is clearly wrong that should be so. Mr. Ivory: The finding of the coroner's jury was a special finding, and the passage with regard to the concrete in the roof should have been recorded. Mr. Gill: It is clearly wrong; it was a written special verdict. The verdict ought to have been returned in the form in which it was handed in by the jury. There is no doubt that it was a verdict returned in the terms I have read to your lordship. One question in the case was the state of the concrete in the roof. A considerable amount of evidence was given as to the concrete, and the jury expressed the opinion that some concrete in the roof was carelessly mixed and irregular in quality; but it was not the initial cause of the collapse. Mr. Ivory: I was there, and I have a shorthand note of what took place. A long discussion ensued between us as to what the effect of the verdict was. The coroner said he should construe it as a verdict of manslaughter. Mr. Justice Grantham: I do not think it is material now or that it is worth while discussing it further. Mr. Gill: I was under the impression that it was before your lordship. Mr. Justice Grantham: No, it is not. I think the verdict ignores altogether the matter of the concrete. Mr. Gill: It is fortunate that there is a reliable report of the finding. Mr. Ivory was present at the inquest and contended that the finding of the coroner's jury should not be construed into a verdict of manslaughter. I am not concerned to discuss how matters are conducted before the coroner's courts. Sometimes extraordinary things occur there. The result of the collapsing of the roof was that the floors gave way, and the unfortunate men met their death. At the inquest there was very properly a full and exhaustive inquiry as to what brought about this terrible accident. A great mass of evidence was given in order to deal with what the actual cause was. It turned a good deal upon the opinions of experts as to the weight a pillar might bear. There were considerable differences of opinion among the witnesses who were called, and there was a considerable body of evidence given showing the condition of the concrete in the roof. In the course of that inquiry before the coroner, there was no opportunity of counsel addressing the jury or dealing with questions that have arisen in order to point out questions which might arise. The view I take is—that there is no kind of evidence here to justify me in asking the jury to find the defendant guilty of manslaughter, and therefore it is unnecessary to embark on a long inquiry of this kind, at the end of which I should not be acting rightly in asking them to find a verdict of guilty, and so I propose to offer no evidence. Mr. Horace Ivory: May I say a word on behalf of Mr. Pawley? As my learned friend has properly said, neither counsel nor solicitor representing an accused person before a coroner has any right to address the coroner or the coroner's jury upon the law or upon the facts. And I wish to call your lordship's attention to this fact that the inquest was started under the impression—an impression created by a letter written by a witness named Collins—that this pier, which was the subject of discussion—had been constructed in a most negligent, and culpably negligent, manner, with soft bricks and mortar, and everyone was prepared to admit that if this had been its real construction, it was most gross carelessness, and he would be guilty of manslaughter. Then Mr. Collins wrote a letter to a member of the London County Council—that was really before the inquest was opened, and it was referred by the London County Council to the coroner. This letter was read or stated to the jury before the inquest commenced, and they started upon this inquiry with the preconceived opinion that the pier had been constructed in this manner, and when I arrived on the scene it was clear to me that there was a notion prevalent in the court that this was the actual nature of the pier, the construction of which had been conducted in the most negligent way. When Collins gave evidence, he repeated some of these statements, and swore that the pier was constructed with soft bricks and mortar, and that the joints of the iron girders were not bolted, but merely tied with string. That was the evidence that this man gave on oath. I very soon after that had an opportunity of extracting from other witnesses who actually constructed the pier, and others who saw it after it had fallen, what the material was, and there was not a word of truth in his statement that it was constructed with soft bricks, but of good hard bricks and cement, as every expert admitted. When I started on this inquiry, the jury and the coroner looked with horror when I said that Collins had committed perjury; but it was clear that he had committed perjury. That shows the way the inquiry was started, and there was a preconceived idea as to the way in which the pier was constructed. It was quite obvious that the jury were acting under the impression that because Mr. Pawley had not disposed of it.—Mr. Justice Grantham: Having an opportunity of giving evidence, and not giving evidence, he must be guilty.

Mr. Ivory: Yes. That appeared to me to be the view which prevailed at the inquest. As you see by the depositions, it very soon became evident that the only issue in the case which the jury had to decide was whether the collapse was due to the centring of the concrete roof being struck too soon, or whether it was due to the inherent weakness of the pier which supported the girders. That was the real issue upon which the case had to be fought. It was admitted by those who were responsible for striking the centring that some of the roof had only been laid about six days, and a small part of it only four days, and the major portion of it not more than 13 or 14 days. It was admitted by those who were responsible for the laying of the roof, and it was admitted by the expert who was called and upon whose evidence this verdict was found, that seven days was the minimum safe time to strike a concrete roof of this description, and therefore some of it had been found to be struck within the safe time of doing it. Some of the witnesses on the other side said that 21 days was the only safe time in which the centring for a roof of such a thickness should be struck. Further, in their opinion none of the roof was sufficiently set to justify the centring being removed. It was also admitted by those responsible for removing it that Mr. Pawley himself had given instructions on the very morning of the accident that the centring was not to be removed because it was, in his opinion, not sufficiently set. Mr. Justice Grantham: Have you got a copy of the plan showing the way in which the roof was constructed? I have no notion of how it was made up! Mr. Ivory: I can describe it in one minute; it was a flat roof, the girders go across. Mr. Justice Grantham: Whether it was arched or not? Mr. Ivory: No, it was absolutely flat. The boards are bolted through and the concrete is simply poured in. The moment you remove the support underneath the thing may fall. Mr. Pawley himself had given directions that it should not be struck; but either by some accident, some misunderstanding, or something worse the persons who were responsible for having laid this roof—in fact, in the middle of that day—proceeded to remove the whole of the centring. There were independent contractors for the construction of the roof. While the men were actually engaged in the operation of removing the centring the roof it fell, and the very first thing that would have been heard was the cracking of the roof, and actually on hearing the cracking they escaped with their lives in their hands to the parapet of the wall, and it could not be disputed that this collapse took place at the very time that the men were removing the centring from the roof. Therefore if I had had an opportunity of addressing the jury or the coroner I should have pointed out that the very way in which the men were removing the centring was the obvious cause of the collapse. My lord, on the other hand, in order to support this theory that it was the fault of the pier, and that the pier gave way and so let down the roof, one witness was called as an expert for the purpose of establishing that. The district surveyor admitted that it never occurred to him that there was any danger, or that there was anything improper about it. He said that his first view was that it was undoubtedly the concrete which fell from the roof and so caused the collapse, though he subsequently altered his opinion. He came to the conclusion that it was the concrete at the outset. There were three independent gentlemen all well known, including the Vice-President of the Institute of British Architects, and they all said that in their judgment they were quite satisfied there was nothing faulty in the construction of the pier, and that the collapse was entirely caused by the centring being removed from the roof. On the other hand the superintending architect to the London County Council, Mr. Blashill, was called, and he said he had formed an opinion that it was the pier which gave way. If his conclusion is right, then the very worst that can be said against Mr. Pawley is that he differs in opinion. The witnesses called on behalf of Mr. Pawley say that 7 tons per foot super were the safe load for such a pier. Mr. Blashill says that 5 tons per foot super are the safe load. In fact this pier had 6.0 tons per foot super on it. He went on to say that some architects went beyond 5 tons, some had gone as far as 7, and he (Mr. Blashill) was not prepared to say that 7 tons per foot super was not a safe load. Mr. Gruning, a Vice-President of the Institute of British Architects, said that 7 tons per foot super was perfectly safe for a pier of this construction, so, as the evidence stood before the jury, Mr. Pawley was not in fault, and there was even no evidence before the jury that there had been an error of judgment on his part. If that was so with regard to professional men, most of us here might be guilty of misdemeanour on account of errors of judgment. I make these observations only for the purpose of showing your lordship that in my view the very worst that could be put against Mr. Pawley was an error of judgment. Upon these depositions I say that no jury should have come to this conclusion. Other architects are prepared to say that 7 tons is a

safe load for this pier. There were only 6 tons and a little over in this case at the time, and the district surveyor, in fact, has admitted since that his report saying that the accident had been caused by the faulty construction was possibly influenced by the opinion of his chief, the superintending architect of the London County Council. He did say he had modified his view, and that perhaps it might be the concrete that fell. For these reasons, if I had not anticipated that this course of offering no evidence would be taken by the Treasury, I should undoubtedly have moved in the High Court to quash the inquisition by certiorari, because there were many grounds open upon which I could have moved for it to be quashed. Mr. Justice Grantham: How far up did the pier go? right to the top? Mr. Ivory: Yes, my lord. Mr. Justice Grantham: Gentlemen, this is a very important question which has been discussed by the learned counsel, because a course has been taken which perhaps will disappoint some people very much. It is quite right that this course should have been taken openly, so that everyone may understand what has happened. It was a very lamentable accident,—a large building suddenly falling and sending seven men into eternity at once and injuring others. Naturally people said somebody must be to blame, and undoubtedly, unless it was a pure accident, somebody ought to be punished, and naturally they searched about to see who was to blame, and the first thing that was suggested was, who was the architect? That is the view taken by the majority of the public generally at any rate. Unfortunately, it does seem to have been initiated by a letter written by one of the witnesses, who for some reason or other was apparently so interested in some way; at any rate he seems to have made a statement in his letter which was not justified by his facts, and undoubtedly that letter seems to have influenced the minds of the jury, and also the mind of the coroner. It was a very difficult matter to investigate, and I have no fault to find with the way in which the inquest was held. After a very long inquiry and a mass of evidence, which took me five hours to read, the coroner came to the conclusion on the finding of the jury that the defendant was solely responsible for this accident, and that the negligence was culpable, and that therefore a verdict of manslaughter had been found by the jury. It was certainly unfortunate that the whole verdict was not put upon the coroner's depositions. I am not blaming any of the officers that I had not before me the exact finding of the jury. The Treasury, very properly, were desirous of knowing what view I took of this case, and I was requested specially to go through the evidence to tell them and advise them whether in my opinion they would be justified in occupying your time for at least a week when at the end of that time it would have been impossible to say that he was guilty. I must say, therefore, from what I read, for the jury to have found a verdict of manslaughter against the defendant I think was a very extraordinary finding and quite wrong. I had no hesitation in advising the Treasury that they would not be justified in asking the jury to find the defendant guilty of manslaughter. In my judgment the primary cause of the accident was clearly the removing of the centring from the concrete. Not being an architect, and not knowing at first what that centring meant, in going through the evidence I endeavoured to find whether the exact construction of the roof was described, but failed to find any such description and that was why I asked whether the roof was arched or not. The conclusion I came to was—if I had to come to any conclusion as to what was the cause of the accident—that it was certainly the removal of this centring; and the accident happened immediately upon its removal. It is a very remarkable thing that the accident happened simultaneously with the removing of the centring. While the centring, unfortunately, is being so removed a crash or a rumble or something is heard and down it goes on to the girder below. That fell on to the girder on the next floor below, and as that fell the weight of the falling mass would be increased, and as it fell to the next floor below the weight would be greater by the weight of that floor, and so it goes right the way down with increasing weight, but it must all have happened so simultaneously that it was difficult to know which had fallen first. You cannot imagine how short a time the whole thing falling on the iron girder would occupy; it would only be a few seconds. Therefore I am not at all surprised that the jury found it difficult to say which fell first. You must look at the case as well as the evidence on which it is based. The allegation against Mr. Pawley was that there was a faulty construction of the pier in two ways, that soft bricks instead of hard bricks were used, and mortar instead of cement. It appeared that someone had sold 100,000 bad bricks for this work, and the statement was that they were found to be bad, and were ground up for mortar, but no doubt some of them had been used for building, and the suggestion was that they had been used in this pier. If they had been, of course, and the pier had to take the weight of something like 5 or 7 tons per foot



super, it would have made the man guilty of culpable negligence. It is also said that mortar had been used instead of cement. That, of course, would influence the jury. It is rather difficult for me to know the course the evidence took. The evidence of each witness is all put together, and a great many other witnesses were called in the interval before a particular witness was recalled, and so the matter went on, and it is almost impossible for me to follow the various statements. I come to the conclusion, after having gone through the whole of the evidence, that there was no evidence to justify the statement that in the construction of the pier soft bricks and mortar had been used. I find there was nothing to justify the statement except Collins' assertion. In my opinion, that is a false statement, but whether intentional or not I do not say. I come to the conclusion that it was a false statement of fact, and that the pier was not made of soft bricks, but of proper hard bricks and cement, and that when it was examined it was found to be of good solid construction. That being so, and there being no evidence whatsoever that the cause of the accident was the collapse of the pier, and the accident being through no fault of the accused, and the fact being that this concrete does require a considerable time to set, and that you ought to take the extreme view with regard to the period of setting instead of the shortest time; and again there being a doubt as to the composition of the concrete, and whether a certain class of material had been used and required a lengthy period to dry, on these questions I came to the view that the real cause of the accident was the removing of the centring from the concrete, and at any rate, so far as this trial was concerned, it would be most unfair to ask anyone to find the prisoner guilty, where someone else, if anyone, was guilty, and consequently the whole time would have been wasted by holding the inquiry over again, and therefore I advised the Treasury—perhaps I should not say that—but I did suggest this course should be adopted. The whole matter has been thoroughly investigated, and you will say therefore that the prisoner is not guilty. The Clerk of the Court: You say, gentlemen, the prisoner is not guilty? The Foreman: Not guilty.

IN RE F. E. TOWNSEND.—On Saturday, a meeting of the creditors of Francis Edward Townsend, railway contractor, of Plymouth, was held at Bristol. Mr. T. H. Geake, the Official Receiver of Plymouth, presided. The statement of affairs showed liabilities expected to rank at £8,342 11s. 6d., with a deficiency of £7,012 17s. The debtor attributed his failure to losses in connection with a company, liabilities under a partnership, and liabilities under accommodation bills. Mr. H. Easton, of Hereford, who represented a creditor, pointed out that the statement showed the estate to be worth about 3s. 5d. in the pound. He was instructed to say there was a prospect of an offer of 5s. in the pound being made, and he asked for an adjournment. The Official Receiver said he had been requested by two of the largest creditors to vote for the appointment of Messrs. F. W. Dawe (Plymouth) and S. Lord (Manchester) as joint trustees, which he would, of course, do. The meeting was adjourned until Tuesday, July 5, at Plymouth.

ABBEE MANSIONS AND THE LONDON BUILDING ACT.—At Westminster Police-court, on Tuesday, the London County Council and the district surveyor (Mr. E. Dru-Drury) had summonses in the list before Mr. Sheil in reference to the collapsed building known as Abbey Mansions, in Orchard-street, Westminster. The "owner" was summoned for neglecting to take down the loose, cracked, overhanging portions of the walls, and Mr. William Rose Rickard, of 126, City-road, builder, attended to answer charges under the Building Act, 1894, of omitting to construct flooring at a height of above 60ft. from the street level of fire-resisting materials. A number of legal gentlemen were engaged, and Mr. Horace Avory, who defended, said the argument and proceedings would occupy some time. He should have to take a case if the decision was against him. Mr. Sheil said under the circumstances he would not start the hearing. He should adjourn the case for Mr. Marsham to decide. Mr. Seager Berry, for the County Council, said that he wished to point out to the magistrate that the County Council regarded the building as a dangerous structure. The Council were ready to go on, and took no responsibility for delay. Mr. Avory.—There is no danger. We have offered to do anything—of course, without prejudice. The cases were adjourned.

STRAND IMPROVEMENT ARBITRATION.—At the Surveyors' Institute, Savoy-street, Strand, on Tuesday, Mr. James Green held an inquiry to determine the value of the property proposed to be included in the betterment area of the Strand improvement. The inquiry was conducted under the London County Council Improvement Act, 1897, which empowered the Council to widen the Strand between the eastern end of the churchyard of the church of St. Mary-le-Strand and the western end of the churchyard of the church of St. Clement Danes; and in connection therewith to take the lands, with

the houses and the buildings thereon, situate between the two churches and Holywell-street and the Strand on the north and south respectively, and to remove the said houses and buildings to throw the site into the widened thoroughfare of the Strand. The improvement or betterment area under the Act includes the lands all, or any part, of which fronts or abuts upon the northern side of Holywell-street. Several of the cases having been agreed upon, the case of 31, Newcastle-street, at the corner of Holywell-street, was brought forward. Mr. Bevan represented the owners, and Mr. Lyttleton the County Council. Mr. Bevan stated that the house was at present under a sublease to Mr. Russell as a refreshment house. It was let on a lease for 21 years expiring at Christmas, 1908, at £160 per year, but had been sublet for the remainder of the term at £275 per annum. The premises were rated at £300 gross, or £250 net; and the counsel contended that when the lease fell in the value would be at least £325 per annum. Mr. Galsworthy, of Chinnock, Galsworthy, and Chinnock, surveyors and valuers, valued the property at £6,722. If it had been in possession he considered the value would have been £8,125. Mr. W. D. Boullis, surveyor, of 21, Finsbury-pavement, endorsed the valuation of Mr. Galsworthy; and Mr. B. J. Breach, of Farebrother and Co., estimated the ultimate rental value at £350, and the property at £7,135. For the London County Council Mr. Andrew Young, surveyor and valuer, was called. He considered £275 per annum was the rack rental value of the property, and at 22 years' purchase he estimated the value at £6,050. Mr. Wilkinson, valuer, agreed with Mr. Young's estimate. He thought £275 very full rent. The proceedings were adjourned, the referee reserving his decision.

TOWER BRIDGE NORTHERN APPROACH.—At the London Sheriff's Court, on Friday, before Mr. Deputy Under-Sheriff Burchell and a special jury, a claim for compensation under the Tower Bridge Approach Scheme came on for hearing. The parties to the action were Mr. West and the London County Council, and the sum involved was about £13,000. According to counsel's opening statement, it appeared that the Council were anxious to complete the scheme of improvement for opening up the approaches to the Tower Bridge. On the corner of Queen-street and Royal Mint-street stood a plot of land, and it was sought to acquire this. Counsel pointed out that the value of land in this part had enormously increased of late years. He would prove by expert evidence that the value was much greater than appeared at first sight, and that it ranged from £2 to £3 per foot. Sir J. Whittaker Ellis and Mr. Edward Tewson gave expert evidence, and valued the land at £13,666, or £2 per foot, with the usual compensation. For the Council, expert evidence was called placing the value at a much lower figure, and in the end the jury awarded £11,026 as compensation for the compulsory purchase.

FORGERY BY A BUILDER.—At Kilmarnock Sheriff Court on Monday, before Sheriff Hall, William Robertson, builder, West Kilbride and Saltcoats, residing in Albert Drive, Crosshill, Glasgow, was charged with having, on June 3, in Saltcoats branch of the Bank of Scotland, uttered as genuine a bill for £100 of that date on which he had forged the name of Mr. John Smith, shipowner there. Accused pleaded guilty. Mr. Patrick, solicitor, who appeared for the prisoner, said he had been a builder in West Kilbride for over twenty years, and had hitherto borne an excellent character. He had a building in course of erection at West Kilbride and one at Saltcoats. On the date in question—a Friday—his bank account was overdrawn to the extent of about £30. He needed money to pay his workmen on Saturday, and having no other way of getting it, it was tempted to commit this crime. The gentleman whose name was on the bill was a cousin of the accused's wife, and had previously given him the use of his name upon bills. The accused got nothing by this transaction, and the bank lost nothing by the transaction. The prisoner had a wife and five children, only the oldest of whom was earning wages. The Sheriff said he could not consistently with his duty pass a shorter sentence than one of twelve months' imprisonment.

THE WIDENING OF CHEAPSIDE.—The Recorder, Sir Charles Hall, Q.C., M.P., and a special jury sat at the Guildhall on Wednesday to hear the case of the "Trustees of the London Parochial Charities v. the Corporation of the City of London," a claim for compensation in respect of the freehold interest in premises known as No. 4a, Cheapside, which are required for the purposes of the widening of the west end of Cheapside. The property in question was let at a ground rent of £40 per annum for 16 years from Midsummer, 1898, and it was agreed, during the hearing, to be taken on the 3 per cent. tables, £500. It was admitted that the property would be worth about £500 per annum at the expiration of the existing lease in 1914, and the question for the jury was the proper basis upon which to capitalise that reversionary value. For the claimants it was contended by Mr. Daniel Watney

(past president of the Surveyors' Institution) and Mr. G. A. Wilkinson that the £500 per annum receivable after the year 1914 should be valued on the 4 per cent. tables (13.4 years' purchase), or £6,700, which, with the customary addition of 10 per cent. for compulsory sale, brought the claim to a total of £7,370. On behalf of the corporation Mr. Robert Vigers (president of the Surveyors' Institution) and Mr. Alexander Rose Stenning gave evidence to the effect that the reversionary rental of £500 in 1914 should be capitalised on the 5 per cent. tables (9.25 years' purchase), £4,255, showing a total of £5,626, including the usual 10 per cent. The jury awarded the claimants the sum of £6,850.

## CHIPS.

The proposal to construct a light railway on the roadside between Kew Bridge and Hampton Court via Richmond has been abandoned.

The tender of Messrs. Spencer and Co., of Lambeth, has been accepted at £10,000 for the erection of Victoria Mansions, West End-lane, N.W., and the work is being pushed on with all speed. Messrs. Palgrave and Co., 28, Victoria-street, S.W., are the architects, and Mr. W. Pearson their clerk of works.

The ceremony of cutting the first sod of the Cardonald Feuing Company's ground was performed last week by the Lord Provost of Glasgow and numerous friends. The ground contains about 25 acres, and is situated in close proximity to Cardonald Railway Station. It is bounded on the north by railings, and on the east and west by Berryknowes-road and the extended city boundary respectively. A feuing plan has been prepared by Mr. John Robb, architect, 31, St. Enoch-square, and it is proposed to erect semi-detached houses, to cost from £450 to £500, containing three bed-rooms, public-room, kitchen, scullery, pantry, washing-house, and coal-cellar, hot and cold water.

The foundation-stone of the new wing of the Midland Counties Home for Incurables at Leamington was laid last week by the Lord Mayor of Birmingham. The extension scheme is being carried out by sections at a total cost of £17,000. The first two sections now in hand will cost £7,500, including building and furnishing. When the work is completed provision will have been made for thirty-three additional patients, and new kitchen and additional servants' accommodation will have been provided. The present extension includes a men's wing. The architects are Messrs. W. Hawley Lloyd and W. Henman, of Birmingham, and the contractors are Messrs. Smith and Son, of Leamington.

A new bridge across Buss Creek, Southwold, to replace one pronounced unsafe for heavy traffic, was begun on Monday week, when the foundation-stone was laid by the Mayoress. The road in question is the only one into Southwold. The county surveyor of Suffolk, Mr. Henry Miller, was instructed to prepare plans, and designed a steel girder bridge supported on brick piers, with brick abutments and retaining walls, and the parapets will be of wrought-iron lattice-work. The foundations are laid to the west of the existing bridge, which will be in use till the completion of the new one. The new bridge will be double the width of the old—26ft. against 13ft.—and the waterway beneath will be 20ft. The amount of the lowest tender, £1,050, was beyond the estimate, and the corporation decided to carry out the work by their own staff, Mr. F. Ball, an engineer now resident in Southwold, being employed to superintend it. The girders, &c., are to be supplied by Messrs. Dorman, Long, and Co., Middlesbrough.

A local Act of Parliament passed last year enabled the trustees to dispose of the site of Christ Church, Birmingham, which now holds a conspicuous position in the very heart of the city, surrounded by the Post-office, town hall, council house, and other important buildings, and a scheme has been prepared by Messrs. Henman and Cooper, architects, Cannon-street, Birmingham, for utilising the site for a building worthy of so noble a position. The central feature of the proposed building is an Exchange Hall, with subsidiary rooms. The site presents difficulties in consequence of the varying levels and the nearness of the adjacent buildings; these, however, have been overcome in the design by placing the Exchange Hall on the level of Waterloo-street, and so obtaining a lower ground floor for shops facing and on the level of New-street, and by the formation of an arcade on the remaining three sides, by which thirty shops in all are secured. In addition to this, the upper stages of the building are generally set back some 12ft. from the frontage lines. Above the Exchange Hall are four stories of offices, approached by two staircases, on either side of which it is intended to have constantly moving lifts from the basement to the top floor. As the removal of the tower and spire of Christ Church would be sadly felt by those who appreciate the effect of architectural grouping, the endeavour has been to replace it by a tower equally lofty, but more suited to a building for business purposes.



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## Our Illustrations.

WAREHOUSE FOR MESSRS. HORROCKSES, CREWDSON, AND CO., LIMITED, MANCHESTER.

We give an illustration of the warehouses now in course of erection, Piccadilly, Manchester, for Messrs. Horrockses, Crewdson, and Co. The building is fireproof throughout, and lined with glazed bricks in the warehouse portions, and with faience in the staircase and offices. Messrs. Neill and Sons are the builders, and Mr. Charles Heathcote is the architect.

NEW WORKHOUSE FOR THE CITY OF NOTTINGHAM.

THE new workhouse for the City of Nottingham is now in course of erection on a site at Bagthorpe, near Nottingham. The foundations are nearly completed, and estimates will shortly be invited for the superstructure. The main building, or workhouse proper, is to be arranged to provide for the admission of 612, accommodation being apportioned for 120 able-bodied inmates, 100 infirm, 380 persons of both sexes, and for 12 married couples. This part is represented in the lower range of buildings, the administrative block being arranged between, with kitchens, food, and general storerooms, large dining-hall, offices, committee-rooms, and apartments for the master, matron, and servants. The infirmary is noticeable as the extensive range of premises to be constructed at the highest portion of the site. Here provision will be made for 560 patients. In this case also the administrative block forms a division for the buildings inhabited by male and female inmates respectively, kitchen and store accommodation upon a liberal scale being included in addition to distinct quarters for dispensary, operations, medical offices, committee-rooms, and separate apartments arranged for the store-keepers and steward. A small isolation hospital will occupy the extreme top left-hand corner of the site, including a children's infirmary for 30, a nurse's home accommodating 45, and a separate block of premises for the reception of mothers with infants. The engine and boiler house occupies a central position immediately between the workhouse and infirmary, and on either side are buildings representing the workhouse and infirmary laundries respectively. Workshops, stables, the labour master's house, a mortuary, and remand boys' quarters are shown directly behind the workhouse. The large block of buildings at the extreme right of the site provides for the reception of 216 imbeciles, and in proximity to the entrance are the porter's lodge, receiving wards for nine, and vagrant wards for 68, together with stone break-

ing yards and sheds. The chapel, of which we give a separate view, is placed on the knoll commanding the whole site. The total accommodation in the entire building represents provision for 1,614, exclusive of members of the staff. The estimated cost is £250,000, and the whole is being carried out from plans and under the supervision of Mr. Arthur Marshall, A.R.I.B.A., architect, Nottingham, the clerk of the works being Mr. Foxworthy.

SMALL HOUSE FOR WHITTON PARK, MIDDLESEX.

THIS is one of a number of houses which have been designed for the above estate, which was formerly the property of the Duke of Argyll, and where he resided. The site is a very fine one, and has some unique advantages. The architects are Messrs. Cobb and Bottrill. The mansion, which stands almost in the centre of the estate (of about 100 acres in extent), is surrounded by beautiful fine old cedar trees, and will be left intact, together with about twenty or thirty acres of the land adjoining. It is now a clubhouse, and cricket and tennis grounds are being formed so that the residents will have these recreation grounds close at hand. All the houses are to differ in plan.

CASTLE HILL TOWER, HUDDERSFIELD.

ON Saturday last, the 25th inst., the foundation-stone of this building was laid by Mr. J. Frecheville Ramsden, son of Sir J. W. Ramsden, Bart., Lord of the Manor. The tower is being built as a memorial of the Queen's Jubilee. The site on Castle Hill is at once commanding and historical; it is two miles out of the town, and forms a prominent feature in the landscape, within a radius of twenty or thirty miles. In the County Histories mention is made of a castle erected on the hill in the reign of King Stephen, from which it derives its name, and tradition claims for it even more remote interest, as having been the site of a Roman fortress. Whatever of truth there might be in the tradition, nothing has been found to verify it; but the accuracy of the History is vouched for by the remains of the castle walls having been found, whilst excavating for the foundations, at a depth of 7ft. or 8ft. At one angle of the site first decided upon the workmen came upon a sinking in the rock 5ft. square, and commenced clearing it of the debris which filled it; but after digging to a depth of 15ft., and the bottom not having then been reached, further labour on it was abandoned. In consequence of this discovery the site was altered, and the well (if such it be) is now inclosed by the walls of the tower. Nothing of interest was found amongst the debris, but the old masonry, which is receiving the attention of archaeologists, will be properly protected and exposed, the ground landlord, Sir John W. Ramsden, Bart., who gave the site, taking a great interest in the matter. The foundations are carried down to the rock, which is 16ft. below the surface. The tower will be 20ft. square at the base and 100ft. high from the ground to the turret flat, which will be 1,000ft. above the sea level, the total height from the ground being 106ft. It will be massively built in a local stone (Crossland Hill). The cost will be about £2,800. The contractors are Messrs. Ben Graham and Sons, Huddersfield. The quantities were supplied by Messrs. Abbey and Hanson, of Huddersfield. The architect is Mr. Isaac Jones, of 6, Deerbrook-road, Herne Hill, London, whose design was chosen in competition. The accompanying view was prepared by the architect for the proprietors of the *Huddersfield Chronicle*, who have lent it to us through the co-operation of Mr. Jones.

MEMORIAL FOUNTAIN, QUEEN'S PARK, BURNLEY.

IN the competition held recently, this design was placed first in order of merit. It was a condition in the contest that the cost should not be more than £500, and a tender has been accepted slightly within that sum. The erection has been designed in as monumental a character as seemed necessary for a memorial of this description. It is being executed in polished stone of a light cream colour, the only alteration being in the columns, which will be red Peterhead granite, instead of marble, as shown on the drawing. This material does not stand the weather in the district. Mr. E. H. Pickles, borough surveyor, Burnley, is superintending the work for the architect, Mr. J. W. Boyd, M.S.A., of Newcastle-on-Tyne.

BELMONT, LANGLEY, KENT.

THIS house, which dates back to the year 1598, and is prettily situated amidst the Kent orchards, has

lately been altered and restored. The south and east elevations are shown on the sketch. Before the alterations there was a 14in. brick wall to the south front, which had been built within recent years, with wide sash-windows in same. This has been pulled down, and an entirely new front erected. A portion of the west front still remains old, and has been restored, and the details of the old barge-boards, brackets, &c., have been most carefully copied in carrying out the new work. There is a fine yew hedge dividing the garden from the drive, and which in reality runs up to the house, as shown in the plan, but is broken off in the sketch to show the south elevation. The house is the property of Mr. W. S. Forster, of Rumwood, near Maidstone, a fine manor house of this period (1598) lately restored. The alterations were completed last year by Mr. R. Avard, contractor, Maidstone, from the drawings and under the superintendence of Messrs. Heaton and Gibb, architects, Newmarket.

METHODIST FREE CHURCH AND SUNDAY SCHOOL, MAY BANK, WOLSTANTON.

THESE buildings, now about to be erected, will be of brick, with Hollington stone dressings, with leaded lights for the windows. The chapel will give accommodation for 353 in open benches; the orchestra will accommodate about 40. Messrs. Wood and Hutchings, of Tunstall and Burslem, are the architects.

## CHIPS.

The annual dinner of the Royal Institute of Public Health was held on Wednesday night at the Hotel Cecil, the president, Professor William Smith, in the chair.

The Leamington Free Library Committee have recommended the town council to proceed at once with the erection of a building for the free public library and technical institute, that plans and specification should be invited from architects, and that £12,000 should be expended on the building, exclusive of the amount paid for the land and furnishing.

The new buildings at New College, Oxford, facing Holywell, were opened on Wednesday. They have been designed by Mr. Paul Champneys, and are practically a continuation of the buildings known as Pandemonium, the work of the late Sir Gilbert Scott. A new tower and entrance-lodge have been built in memory of Mr. Robinson, late Bursar of New College.

Mr. Edgar R. H. Moorsom, who in May of last year succeeded Mr. George Herriott as chief land agent of the Duchy of Cornwall in the Western Division, has accepted the agency of the Orwell Park estate of Captain E. G. Pretymann, M.P., in East Suffolk, and will enter on his new duties at Michaelmas. His successor in the Duchy agency has not yet been appointed.

A new Wesleyan chapel is to be erected in the Stoney Station-road, Coventry, in order that the building hitherto occupied as chapel and school may be wholly devoted to the latter purpose. The memorial stones of the new building, which will cost £3,400, and provide accommodation for 750 persons, were laid on Friday. Messrs. Habell and Harrison are the architects, and Mr. C. Garlick is the builder.

A Masonic service was held in Rochester Cathedral on Saturday evening, in aid of the fund being raised for the erection of a new central tower for the cathedral. The sacred edifice was built by Freemasons, and the present commonplace tower was built from Cottingham's plans in 1827. Dean Hole, who is a Past Grand Chaplain of English Freemasons, desires to restore the original design.

A report is coming before the London County Council from the Public Control Committee, recommending that the Parliamentary Committee be instructed to include in one of the Bills to be promoted by the Council in the next session of Parliament a clause empowering the Council to acquire by agreement, or compulsorily, the freehold and other interests in Spitalfields Market.

On Saturday Messrs. Christie, Manson, and Woods sold the collection of family portraits from Bilton Hall, Rugby, formerly belonging to Joseph Addison and the Countess of Warwick. The day's sale also included pictures by old masters and of the early English school, of the late Mrs. Alexander Boyle (at one time these formed part of a collection of the late Mr. James Walker, F.R.S.), and properties from other sources. The Bilton Hall collection comprised 35 pictures, which realised a total of £4,067. The Marchioness of Townshend and Mme. Susan Jouenne, both of Romney, realised respectively 5,200 and 3,000 guineas, and a portrait of Mrs. Inchbald, by Hoppner, brought 1,000 guineas.

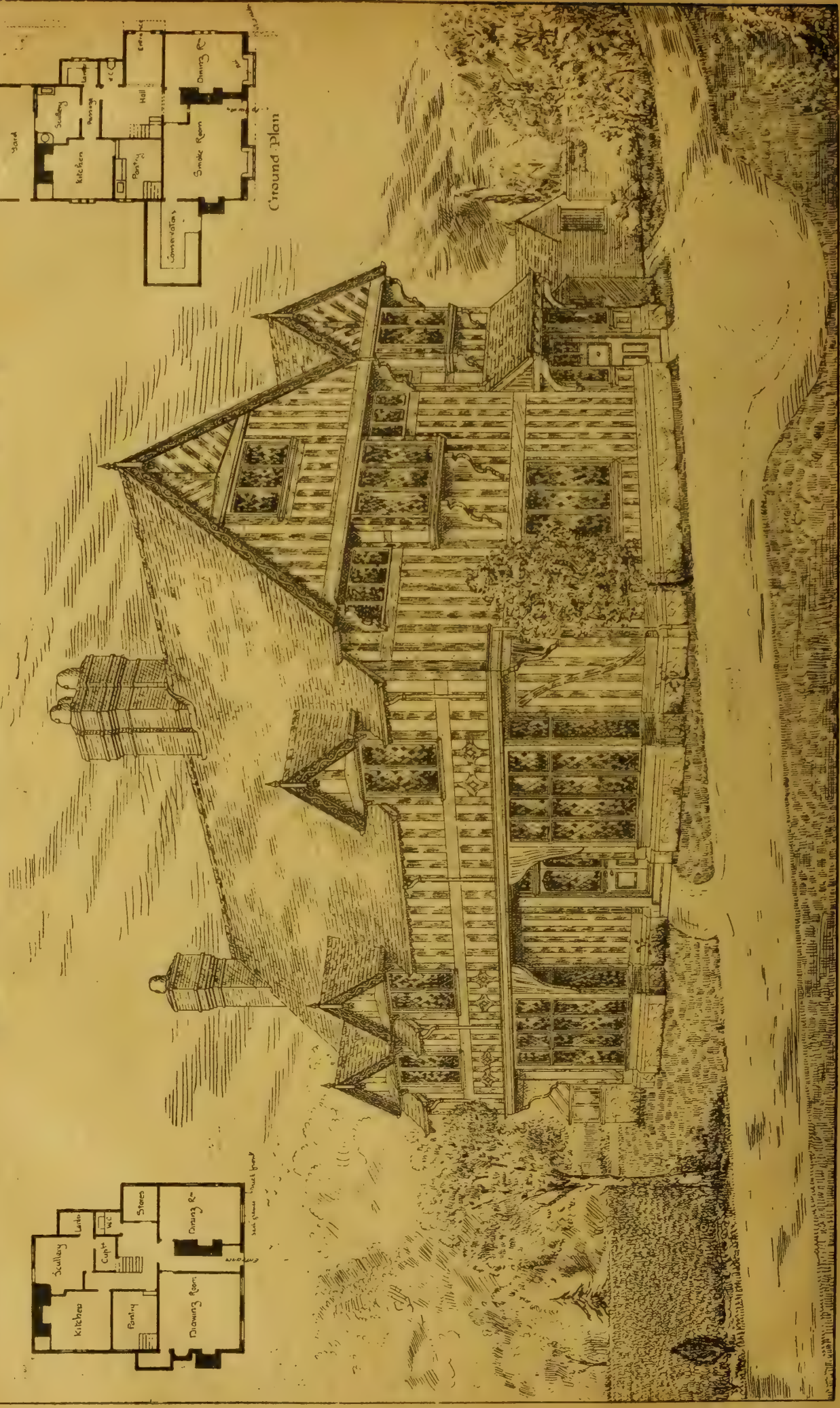


Belmont, Langley, Kent.  
Architects, Newmarket.

Ground plan, before alterations



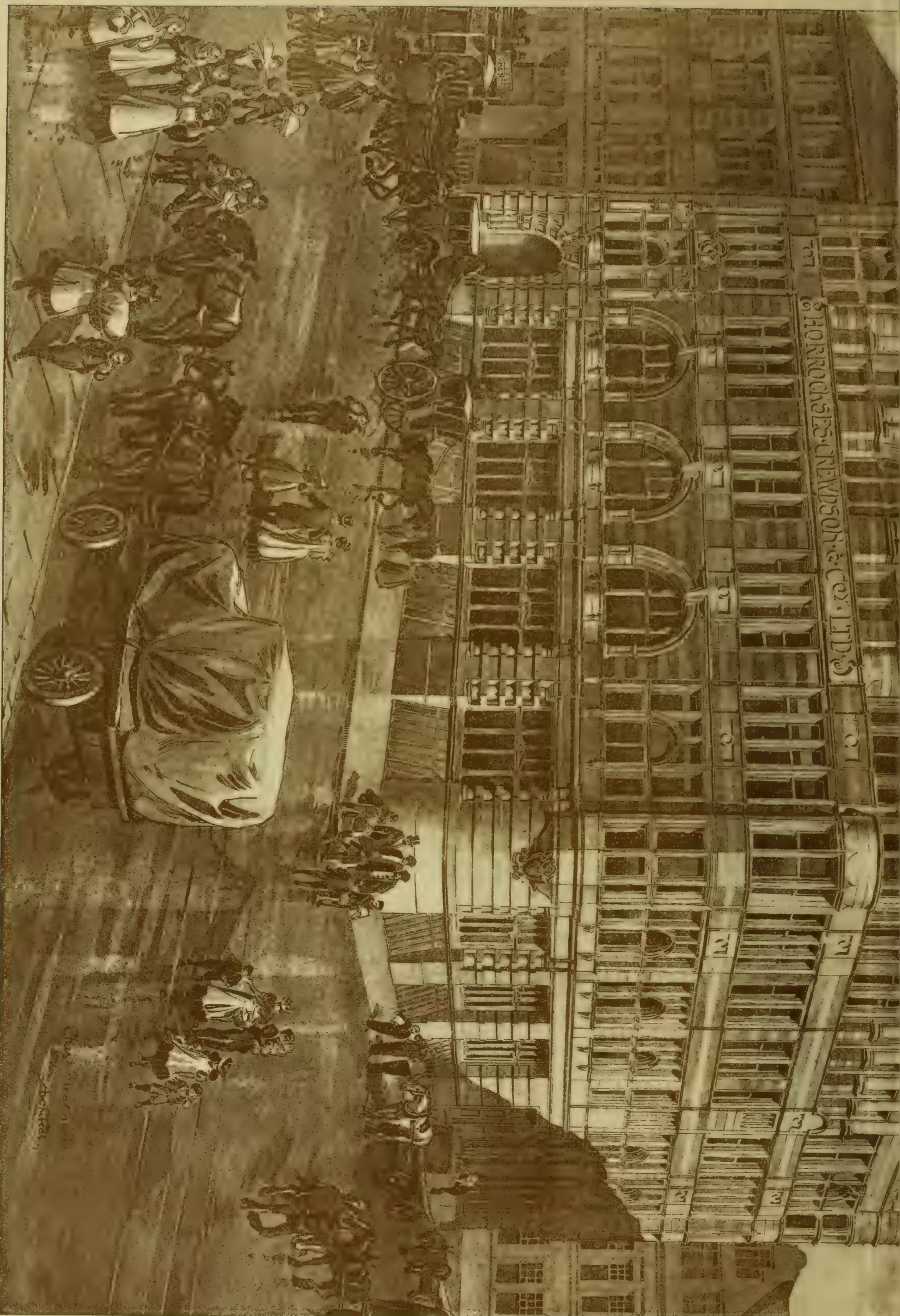
Ground plan











"PHOTO-TINT" by James Akerman. 1861. 11.5 x 11.5 in.

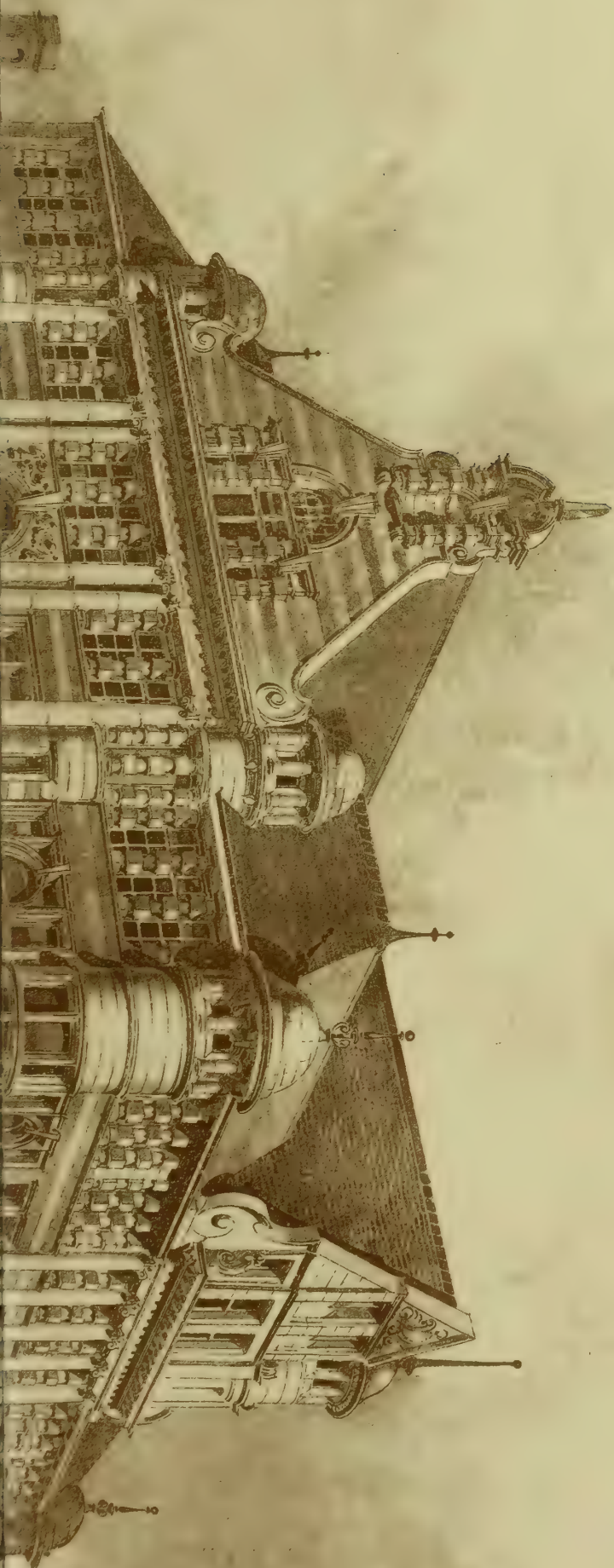


The Building News, July 1, 1898.



WIREWORKS FOR MESSRS  
FORROCKETS CREWDOOT  
& COMPANY LTD PICCADILLY  
MANCHESTER

CHARLES HENTHCOOTE  
ARCHT. MANCHESTER









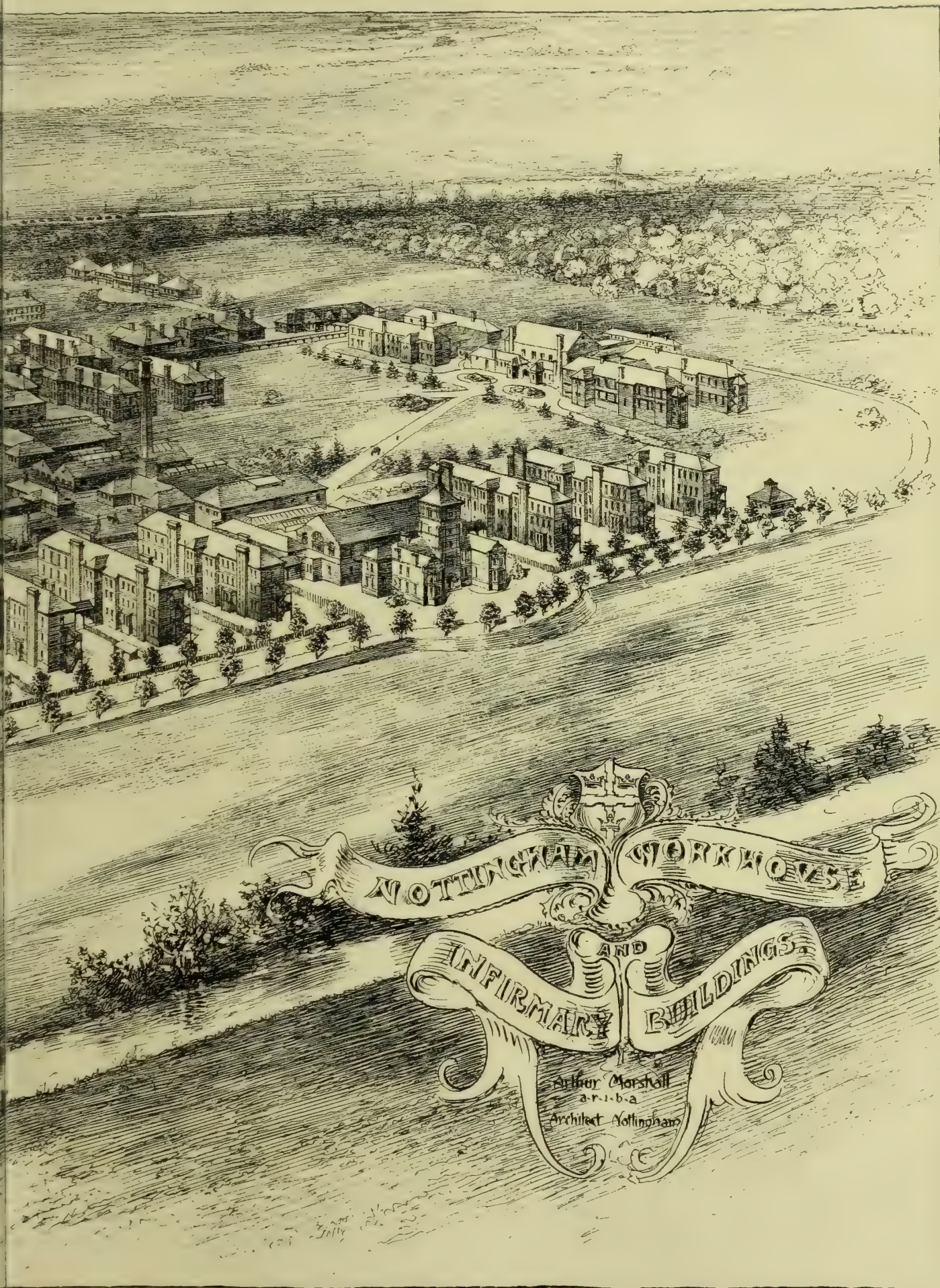








3. JULY 1, 1898.



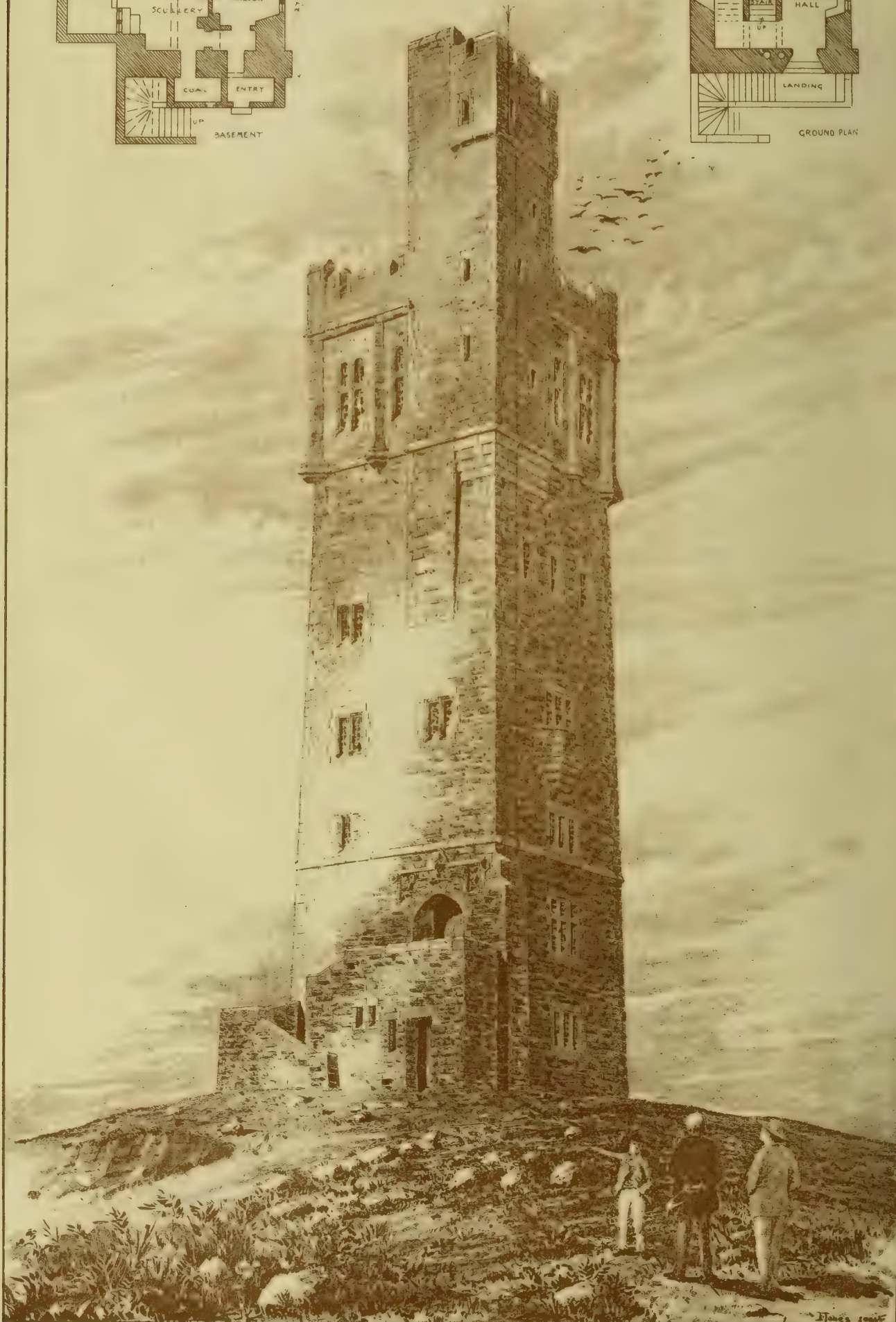
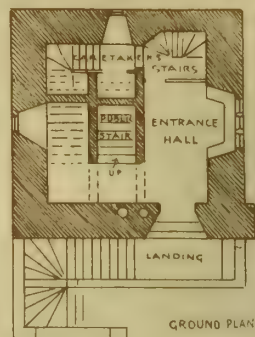
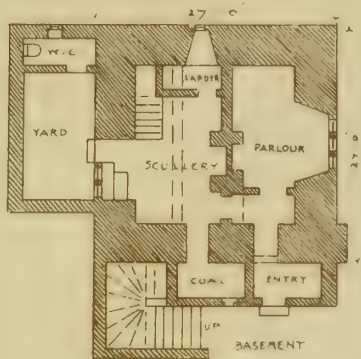












CASTLE HILL TOWER, HUDDERSFIELD.

ISAAC JONES, ARCHITECT.

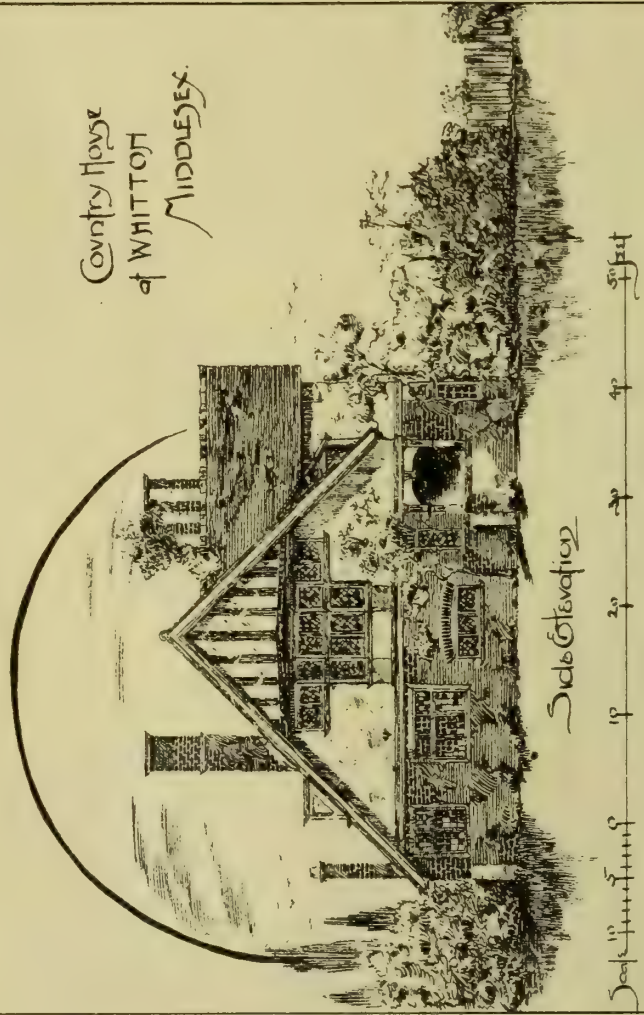
"PHOTO-TINT" BY JAMES ACERMAN, 11, JAMES SQUARE, LONDON, W.





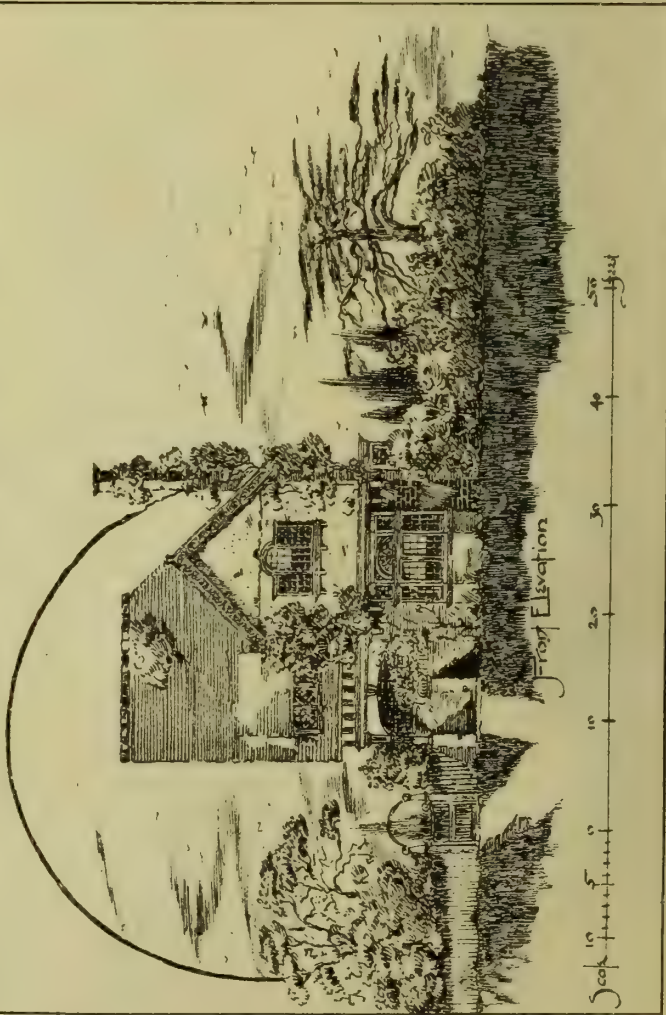


Country House  
of WHITTON  
MIDDLESEX.



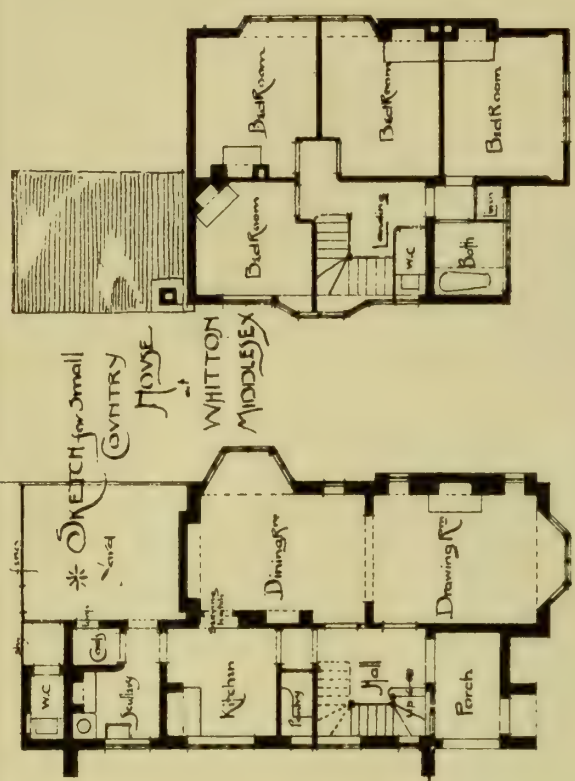
Side Elevation

Scale 1" = 5' 0" 1' 2' 3' 4' 5' Feet



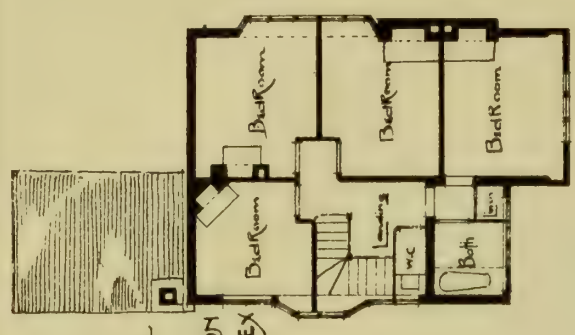
Front Elevation

Scale 1" = 5' 0" 1' 2' 3' 4' 5' Feet



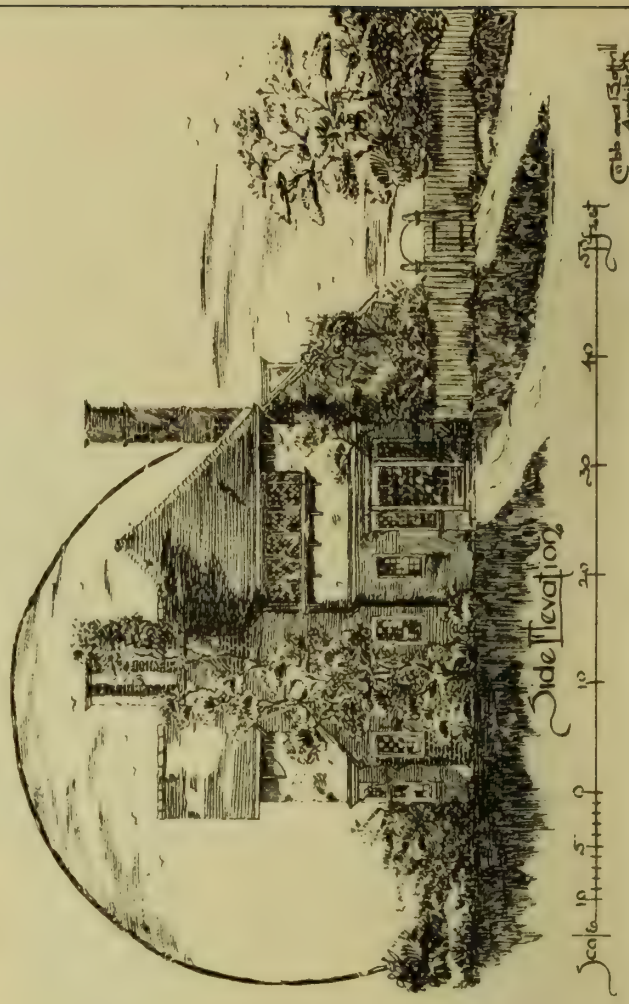
Ground Floor Plan

Scale 1" = 5' 0" 1' 2' 3' 4' 5' Feet



First Floor Plan

Scale 1" = 5' 0" 1' 2' 3' 4' 5' Feet

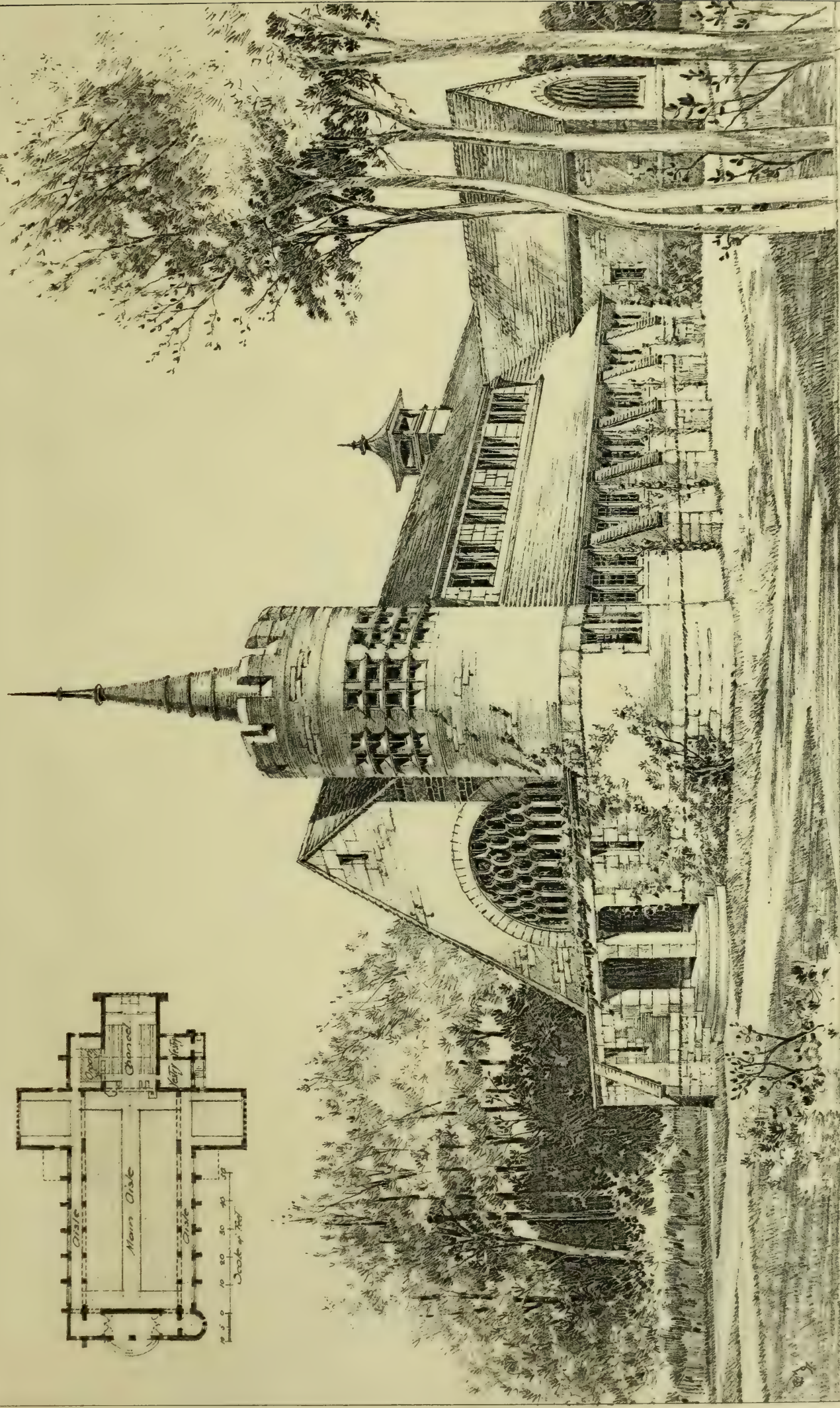
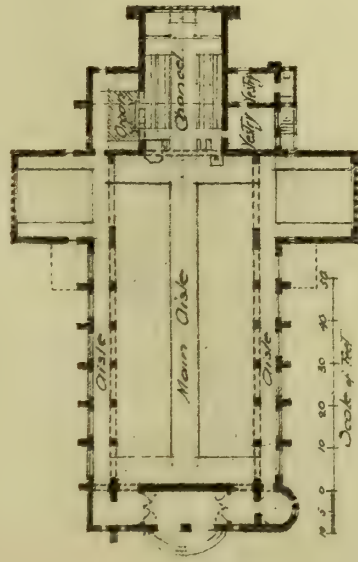


Side Elevation

Scale 1" = 5' 0" 1' 2' 3' 4' 5' Feet

W. & A. Smith





View from the South-West.

THE CHAPEL TO THE WORKHOUSE NOTTINGHAM

Arthur Marshall ARISA Ashfield.

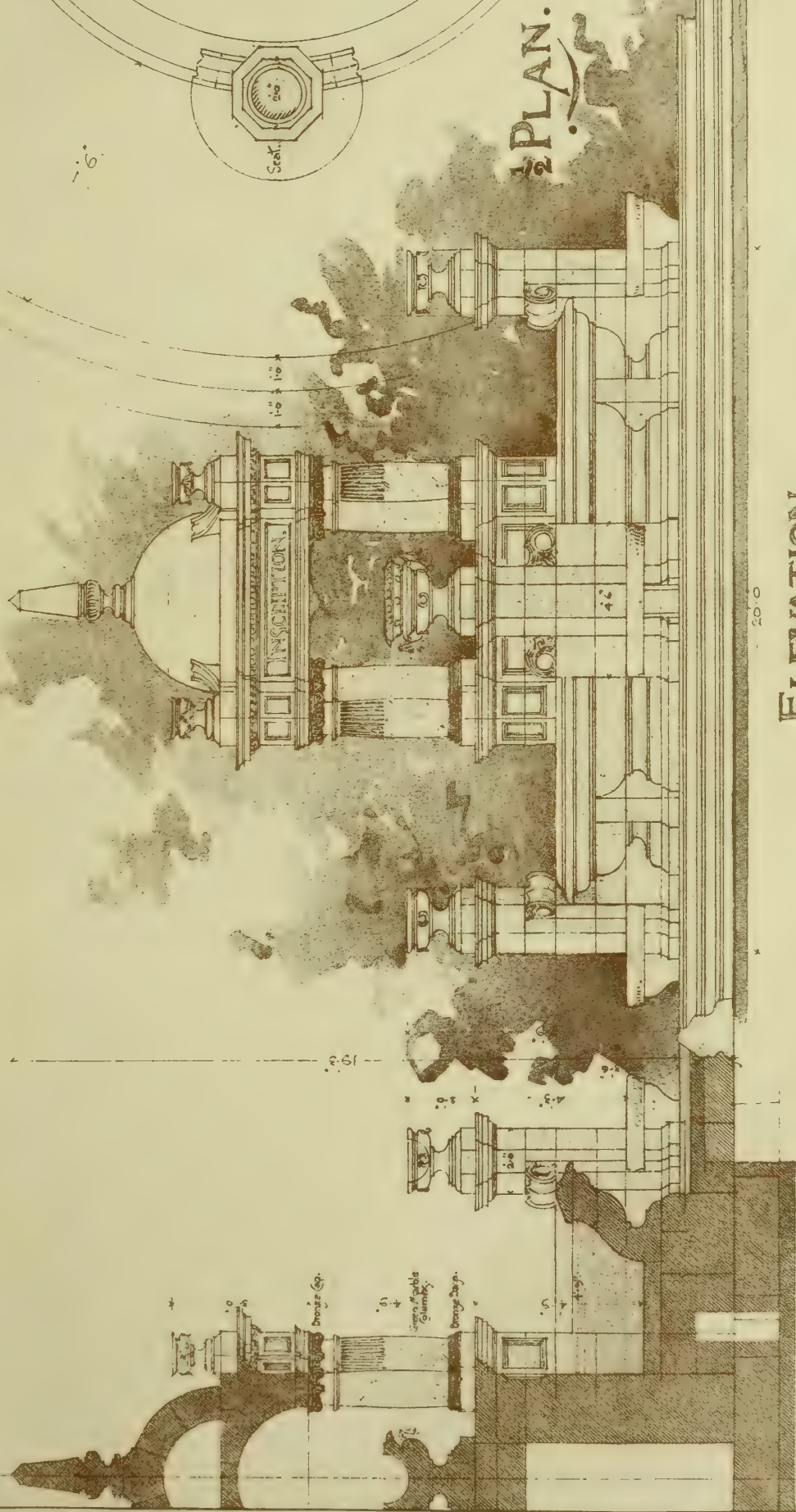






# PROPOSED FOUNTAIN, QUEEN'S PARK, BURNLEY.

SELECTED DESIGN



ELEVATION.

SECTION.

W. Boyd New, Archt.  
Newcastle-on-Tyne.







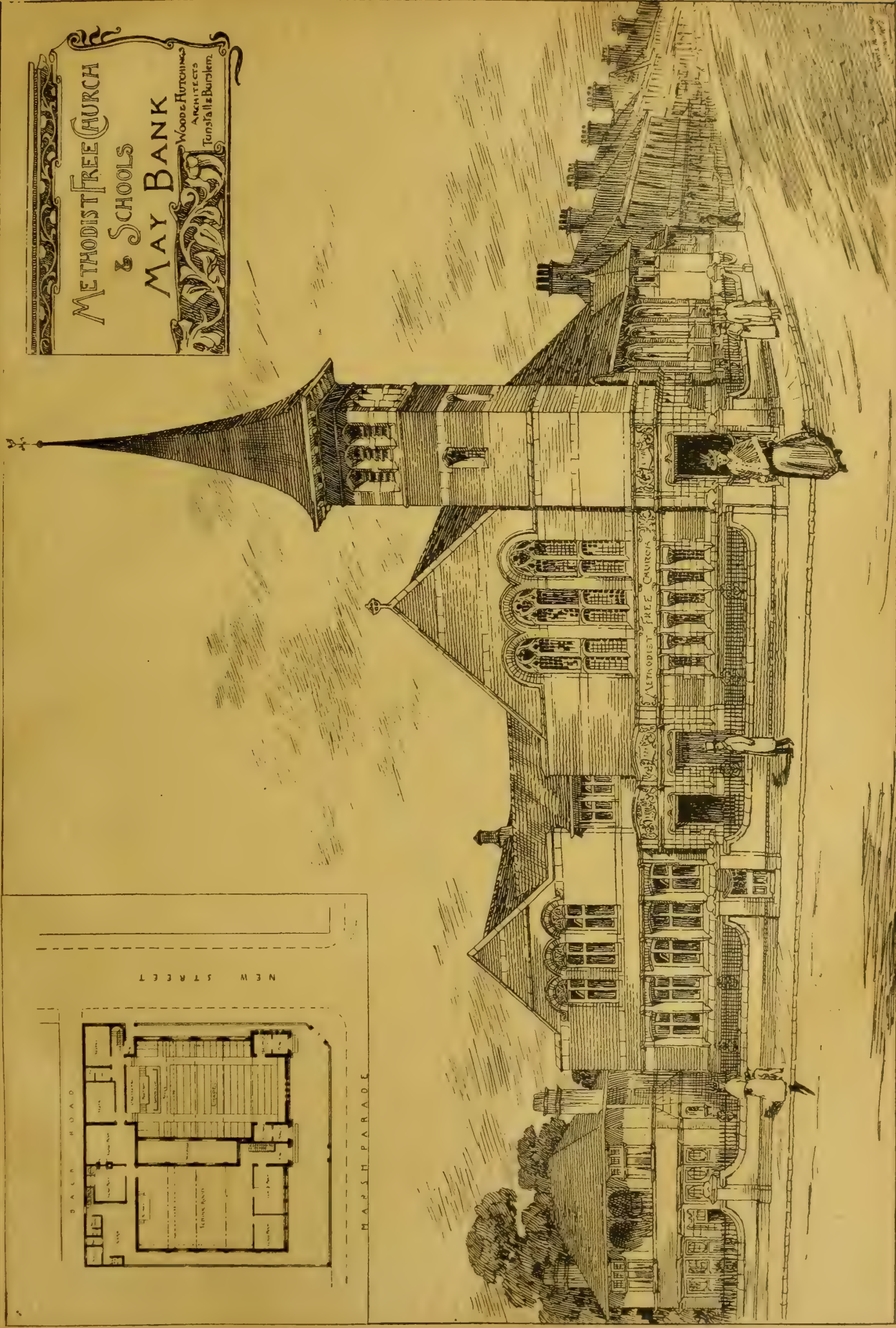
METHODIST FREE CHURCH  
& SCHOOLS  
MAY BANK

WOOD & HUTCHINGS  
ARCHITECTS  
TUNSTALL & BURLINCK



MARSH PARADE

NEW STREET





### PROFESSIONAL AND TRADE SOCIETIES.

**BRITISH ARCHÆOLOGICAL ASSOCIATION AT PETERBOROUGH.**—The Congress of the British Archæological Association will be held at Peterborough, from Thursday, July 14th, for a week. On the first day it is proposed that the members and visitors will assemble at the cathedral, where, at 2.30 p.m., the Dean, Dr. Ingram, will deliver an address upon its history, and conduct the company round the building. At 4.30 p.m., members and visitors are invited to a garden party at the palace. Dinner at the Grand Hotel at 7 o'clock, and in the evening the President, the Bishop of Peterborough, will deliver his inaugural address. On Friday the members and visitors will leave Peterborough by carriages for Glatton, where the church will be visited and described. Little Gidding Church, Conington Castle, Yaxley Church, and Fletton Church and Cross will also be inspected. Dinner at the hotel at 7 o'clock, and evening meeting, for the reading of papers, in the Assembly Hall at 8.30. On Saturday the programme is that members and visitors will leave Peterborough for Stamford. The five fine churches, ancient Bede houses, ruined priory, &c., will be inspected, under the guidance of Mr. J. C. Traylen, architect, of Stamford. After luncheon the party will walk to the park of Burghley House, which famous mansion will be inspected, and its history and architecture will be described by Mr. J. Alfred Gotch, F.S.A. The party will return to Peterborough in time for an evening meeting in the Assembly Hall, for the reading of papers, at 8.30. On Monday a visit will probably be paid to the ancient town of Spalding. On Tuesday members and visitors will leave Peterborough for Thorpe Hall, Castor Church, Wansford Church, Whittering Church, and Barnack Saxon Church. Return to Peterborough for dinner at 7 p.m., and evening meeting at Assembly Hall, for the reading of papers, at 8.30. On Wednesday members and visitors will leave Peterborough early, and visit the 13th and 14th-century Manor House of Woodcroft, Helpston Church and Cross, Maxey Church, Deeping St. James, Glington Church, Northborough Church, and Peakirk Church. Return to Peterborough in time for dinner at the hotel, at 7 p.m. The formal closing meeting of the congress will take place at the Assembly Hall at 8.30. On Thursday (extra day) arrangements have been made for visits to Fotheringhay Church and remains of Castle, Cotterstock Church, and Apethorpe Hall, calling at Stibbington Hall, which is a very charming Elizabethan house, on the return to Peterborough. The following papers have already been promised:—"Lathom Hospital and its Early Statutes," by Lord Melville; "The History of Ramsey Abbey, as Illustrated by the MSS. in the British Museum," by Mr. Dr. W. de Gray Birch, F.S.A.; "Yaxley and Fotheringhay Churches," by Mr. H. M. Townsend; "The Gentlemen's Society in Connection with Peterborough," by Mr. C. Dack, local hon. sec.; "Castor Church," by Mr. J. C. Traylen; "The Roman and Saxon Occupation of Peterborough," by Mr. T. J. Walker, M.D., J.P.; "Maxey Church," by Rev. W. D. Sweeting, M.A.; "Northborough Church and the Cromwells," by the Rev. H. J. D. Astley, M.A.; "The Crosses of Fletton and Helpston," by Mr. C. Lynam, F.S.A.; "Bury Church, Hunts," by Mr. J. A. Poulter; "Crowland and the Legend of St. Guthlac," by Miss Edith Bradley; "Notes on the Fenlands," by Professor T. McKenny Hughes. Papers will also be contributed by Mr. G. Patrick, A.R.I.B.A., hon. sec., Mr. W. Bodger, local hon. sec., and others.

### BUILDERS' CLERKS' BENEVOLENT INSTITUTION.

—A special general meeting of the donors and subscribers was held at the offices of the institution, 21, New Bridge-street, E.C., on Tuesday evening, when Mrs. Lydia Smith, being at the time the only candidate, was elected by show of hands to the Widows' Pension of £24 per annum. At the close of the business a vote of thanks was accorded to the treasurer, Mr. Edwin Brooks, who occupied the chair, in the unavoidable absence of Mr. R. C. Foster, of Rugby, the president of the institution.

**GLASGOW ARCHITECTURAL ASSOCIATION.**—The association held its annual excursion on Saturday, 18th inst. The object of the visit this year was the small but picturesque Priory of Inchmahome, situated on a wooded island in the Lake of Menteith, Perthshire, amidst beautiful mountain scenery. A party of members and friends took

train from Glasgow to Port of Menteith station, where carriages were in attendance to convey the visitors to the lake. On arrival on the island the secretary read a short descriptive sketch of building, and exhibited a plan. The priory, which was in the Diocese of Dunblane, was founded in, and evidently commenced about, 1238, for the Monks of the Augustinian order, and is an example of the best First Pointed work; it bears in plan and general detail many points of resemblance to Dunblane Cathedral, which was building at the same time. The buildings have suffered much at the hands of man since the Reformation, as much of it was taken away during the 17th century to build a castle on a neighbouring island.

**SCOTTISH SANITARY INSPECTORS' CONGRESS.**—The annual congress of the Sanitary Inspectors' Association of Scotland took place at Perth on Wednesday and Thursday in last week. The members were received and welcomed in the Commissioners' Hall by Lord Provost Dewar, who was supported by other members of the town council. The president (Mr. Kenneth Cameron, Chief Sanitary Inspector, Aberdeen) delivered his address, in the course of which he impressed upon the members to seek to raise the standard of their profession to as high a level as they possibly could, and strive against anyone receiving an appointment to the office of chief sanitary inspector in any county or burgh who did not possess all the necessary qualifications to perform the duties of the office. A paper on "Sanitation in Perth in 1868 and 1898" was read by ex-Bailie Alexander, Convener of the Public Health Committee, Perth. Mr. Henry Watt, District Sanitary Inspector, Glasgow, in a paper on "Workshop Legislation and Inspection," said that with the mass of legislation which existed it was questionable whether some of the home industries were not placed in a position of advantage where there was a strong competition with other countries in which legislation was not so exacting in the manufacturing of their goods. In all matters relating to the administration of the respective Acts dealing with public health and the regulating of trade premises, if their legislators would consult more with practical sanitary experts, there would be less friction in the administration of the Acts referred to. A resolution was passed to the effect that the meeting was of opinion that the time was ripe for the introduction of a Government measure to consolidate the various Factory and Workshop Acts, and amend the same with regard to their sanitary provisions. After luncheon, a paper on "Some Aspects of Modern Sanitary Work," by Mr. Wm. Watson, F.I.S.E., Perth, was read, and occasioned considerable discussion. On the invitation of Lord Provost Dewar, the members of the Association dined together in the Salutation Hotel in the evening of Thursday.

A new organ which has been erected in Stand Independent Church by Messrs. Jardine and Co., Manchester, was opened last (Thursday) night. The organ contains three manuals (compass C to G, 56 notes) and pedals (compass CCC to F, 30 notes). There are three composition pedals to the great, and four to the swell organ, with swell balance pedal. The case is of corbelled oak, with front pipes of "spotted" metal.

The annual meeting of the Incorporated Association of Municipal and County Engineers is being held at Edinburgh this week. The proceedings commenced yesterday (Thursday) with a reception of, and luncheon to, the members given by the Lord Provost and members of the Corporation, the former ceremony taking place in the City Chambers and the latter in the Royal Hotel.

The Rev. Dr. Alexander Whyte, Edinburgh, laid, on Friday, the memorial stone of Queen's Cross Free Church, Glasgow. The new edifice is situated at the confluence of Gairbraid-street, New City-road, Garscube-road, and Springbank-street. The site was secured for £1,880, and the building is expected to cost about £7,000.

The Right Hon. Evelyn Ashley presided on Friday at the fifty-fourth annual meeting of the Society for Improving the Condition of the Labouring Classes, held at the offices, in Southampton-row, Bloomsbury. The report stated that the purchase of property in Wild-court, Drury-lane, placed nearly all the dwelling-houses there in the hands of the society. From all sources £3,975 17s. 9d. had been received, and the balance of income over expenditure was £817 0s. 9d. The assets were valued at £31,398 1s. 5d., and the liabilities stood at £10,018 12s. 8d., leaving a balance of £21,379 8s. 9d. The report was adopted.

### COMPETITIONS.

**LISCARD CENTRAL HOSPITAL.**—From correspondence published in the *Birkenhead News*, it appears that two out of the four selected firms of architects who sent in competitive plans for the projected new central hospital, to be built at Liscard, complain that the selected plan of Messrs. Maxwell and Tuke, of Manchester, does not comply with the conditions which were laid down by the committee. These conditions and suggestions as published, and which, it was premised, would be strictly adhered to, include the following: "At least 1,500c.ft. and 144 superficial feet for each patient." In the selected plan set No. 3, the main wards are only 50ft. by 24ft., giving but 101 superficial feet per patient, while the width of the site is said to be shown in the selected design as 11ft. greater than it really is. At the end of the document it is stated: "The following will be deemed by the committee to be ground for disqualification: . . . (d) Any departure from or non-compliance with the above conditions, the whole of which will be rigidly adhered to." The architects protesting are Messrs. Harnett-Harrison and Harvey and Messrs. T. Mellard Reade and Son, both of Liverpool.

### CHIPS.

At the last meeting of the Harrogate Town Council, Mr. W. Hoffman Wood, of Leeds and London, was presented with a testimonial and honorarium in recognition of the able manner in which he had prepared the quantities for the Royal Baths at a cost of over £70,000, without any extras on the contract. The presentation was made by the mayor, who referred in his address to the satisfactory completion of the undertaking, and was suitably acknowledged by Mr. Wood.

At the meeting on Monday of the Bristol School Board, Mr. Dare Bryan, of that city, was appointed architect to the new school at Knowle, which is to provide accommodation for 750 children in three departments each, at a remuneration of 5½ per cent. upon the amount of the contractor's accepted tender.

The aggregate realisation at the Auction Mart last week was £228,851, a satisfactory result even in the height of the season, but less than might have been anticipated from the quantity and quality of the properties brought to the hammer. The tone of the market was, on the whole, remarkably healthy.

Sir David Gamble, Bart., laid, on Monday, the foundation-stone of a new mission school-church in Knowlesway-road, St. Helens. The new building is an adjunct to Eccleston Parish Church, and is to be the Parish Diamond Jubilee Memorial. The building will be of pressed brick, with red stone dressings, and will, with the site, cost about £3,100. The main room, which will be 60ft. square, will have two folding partitions, which will divide it into three sections for teaching purposes. Mr. Goodwin S. Packer, of Southport, is the architect, and Mr. Fred Brown the contractor.

In the Salford County Court on Monday some curious figures with regard to arbitration expenses were disclosed. A builder named Brookes brought an action against another builder for breach of contract, and was awarded by an arbitrator the sum of £98, but was made liable for the sum of £245 by way of costs! The action was brought to recover £248. His success in the arbitration ruined Mr. Brookes. His solicitor stated that "while the total liabilities were £400, £300 represented law costs."

Walker's Estate Bill has passed through the House of Lords. This Bill deals with the property of the late Mr. T. A. Walker, the contractor of the Manchester Ship Canal, and for large works on the Ribble, at Preston. It is a purely private measure, and has been rendered necessary by the complications that have arisen through the vast transactions which had to be wound up on Mr. Walker's death. The principal point of the Bill is the proposal to form a company to take over the business of the firm, and thus relieve the executors of further responsibility.

The contract for the erection of the art gallery and public library at Bury, Lancs, has been let to Messrs. Thompson and Brierley, builders and contractors, of Bury, the contract price being £21,259. The buildings will be erected from designs by Messrs. Woodhouse and Willoughby, of Manchester, which were selected in open competition, and were illustrated by us in our issue of Dec. 3, 1897.

Earl Nelson laid, on Monday, the foundation-stone of a new tower about to be erected in connection with St. Peter's Church, Derby, one of the oldest ecclesiastical buildings in the town. The structure had become so dilapidated that it became necessary to rebuild it, and the new tower forms part of the scheme, which is to cost about £6,000. The architect is Mr. W. H. Lloyd, of Birmingham.



## Building Intelligence.

**ACCRINGTON.**—The foundation-stone of the new Church of St. Mary Magdalen was laid on Saturday at the junction of Devonshire and Eccles streets. Internally, the building is designed in consonance with the requirements of a town church, and comprises a chancel, with an organ chamber adjoining, a nave, north and south aisles, with transepts of a minor kind, and a chapel for week-day services. Owing to the great slope of the ground from north to south, the vestries will be placed under the chancel, and when thrown together will form a parish room. It is intended to build the church of stone throughout. When completed it will afford accommodation for 530 adult worshippers, and the estimated cost is: for the structure £5,260, for the tower and spire £1,770, and for the boundary walls £270; the total amount required being not less than £7,800. It is proposed to commence operations at the east end, the present section comprising the chancel, its adjuncts, and part of nave. The second portion to be built will be the remainder of the nave and aisles with the western gables, and finally the tower and spire will be taken in hand. The height of the latter will be 158ft. from the ground. Mr. Ross, of Accrington, is the architect.

**BAMPTON, DEVON.**—The parish church of St. Michael was reopened last week after restoration at a cost of over £2,000. The work done includes the reseating of the nave and aisle; concreting the floors and laying of wooden blocks, and the setting up of the arcade. A new high-pressure heating apparatus has also been provided. The oak roofs have been restored, while the screen has been replaced in its original position by the rood loft, and lengthened with temporary extensions. The chancel has also received attention, but the organ chamber, windows, clergy and choir oak stalls will still require attention. It is also intended to restore the screen. The architect was Mr. C. H. Samson, F.R.I.B.A., of Taunton, and the contractors were Messrs. Bryant and Son, of Barnstaple, and Mr. J. G. Gardiner, Barnstaple.

**BIRMINGHAM.**—An important building, situated in Moor-street, Birmingham, and erected for Messrs. Coleman and Oldland, wholesale clothiers, is now completed. The structure has a good frontage, and is five stories in height. A large basement forms the "cutting-room"; the ground-floor the shop, which is elaborately fitted up, the remaining floors being the general workrooms. The front elevation is chiefly of best red brickwork, with ornamental cornice and strings, large cast-iron windows, two entrance doors and wide gates, stone heads, sills, columns, &c. The architect is Mr. John Statham Davis, of Cobden Buildings, Corporation-street; and the contractor, Mr. William Hopkins, of Thorpe-street, both of Birmingham.

**IPSWICH.**—The foundation-stone of the new church of St. John, Caldwell Hall-road, was laid on Friday. The new edifice will replace an unpretending structure built in 1856, on an adjoining site, which will be used henceforth as a schoolroom. Red brick will be utilised for both the outer and interior walls, with Monk's Park stone dressings, while the roof will be of pitch-pine, with Broseley tiles. There will be a nave and side aisles, a clergy vestry at the north-east corner, communicating with a choir vestry, and underneath will be a heating vault, for warming the church by means of hot-water pipes, passing under gratings in the wood-block floor. At the south-east angle will be the organ chamber. The east window, of five lights, will face the roadway. There will be four entrances—two at the west end on either side of the baptistery, one at the south-east corner, and one by the clergy vestry. The columns dividing the nave from the aisles, which are 91ft. by 12ft. 7in. in dimensions, will be of red brick, alternately circular and octagonal. The chancel, 36ft. by 25ft., will be approached from the nave, which is 91ft. long by 28ft. 6in. wide, by four steps, and will be paved with red and black tiles. There will be one step from the chancel to the communion table, on the south side of which will be sedilia, of Monk's Park stone with marble shafts. Cathedral glass will be utilised to fill in the windows. A four-light window at the west end will be placed immediately over the roof of the baptistery, and this portion of the facade will be completed by a bell-turret,

with provision for two bells and a weather vane. The organ chamber will be 18ft. by 11ft. 9in. The pulpit will be carved in oak, whilst the font will be of stone, with marble shafts. The benches, with which it is hoped to furnish the church, will seat about 800 people, but only a portion of the body of the church is to be constructed at first, providing seating accommodation for about 600. Sir Arthur W. Blomfield, A.R.A., is the architect, and the contract for the present section of the work was taken by Messrs. Cornish and Gaymer, of North Walsham, at £7,119.

**LOUGHTON, NORTH BUCKS.**—The Diamond Jubilee Memorial Cottages, erected at a cost of £500, were formally opened last week. The cottages face the old Watling Street road, on a site formerly occupied by a block of three old cottages bought originally for £25 by the parish and paid for out of the rates, and which had become unfit for habitation. They are built with red bricks and have Ellistown moulded and pressed dressings to door and window openings; stone sills, lintels, arches, bases to piers, weatherings to buttresses, and water tabling. The roofs are covered with tiles from the works of Messrs. Stanley Bros., of Nuneaton. In the front of the cottages are recessed openings fitted up with seats, where the aged tenants can sit and quietly enjoy themselves in the warm weather. The front gardens are inclosed by iron fencing on dwarf walls with piers, and wood gate. At the back are gardens, barns, and other conveniences. Each cottage has an entrance porch, living room, pantry with external window for air and light, bedroom, passage, fuel store, and wash-house with copper and sink. The architect was Mr. J. Hailey, of Stony Stratford, and the builder was Mr. W. Bird, of Loughton, Bucks.

**MORLEY.**—The Corporation Electric Lighting Works were opened on Friday. The generator has been constructed at a cost of £21,219, and is situate in Corporation-street, between the new public baths and the Corporation depot. The buildings were designed by the late borough surveyor (Mr. M. H. Sykes), and a considerable area of land is reserved for future extensions. The engine-house is 40ft. wide by 38ft. long, with switch-room at one end. At a height of 20ft. an overhead travelling crane runs along steel rails the full length of the engine-house. The test-room is situated at the east side of the switch-room, the floors of which rooms are laid with wood block flooring. The accumulator-room, 40ft. by 12ft. 6in., is placed over the switch-room and test-room, and is approached by a staircase near the main entrance. The boiler-house is placed parallel with the engine-house on the west side thereof, and is 68ft. long by 48ft. wide. Along the west side of the boiler-house are placed the coal bunkers, 10ft. wide, and the pump-room, 10ft. by 12ft. At present there are two Lancashire boilers, 30ft. by 8ft. diameter, and accommodation is provided for other two of equal size. The offices are situated over the work and store-rooms, and are approached by two staircases. The system adopted is the high pressure, alternating with slow-speed generating plant, and Mr. Robert Hammond, M.I.E.E., is the electrical engineer.

The Corporation of Huddersfield have decided to seek sanction to the borrowing of £14,140 for the purchase and laying-out of the Woodfield House Estate, Lockwood, as a cemetery.

The Roman Catholic Bishop of Birmingham has opened new schools which have been erected in Leveson-street, Willenhall, for the accommodation of 350 children, from designs by the Very Rev. Canon Scoles, Yeovil.

After delays extending over more than three years, the Local Government Board have signified their approval of plans submitted by the Metropolitan Asylums Board for a proposed infirmary for 750 imbeciles at Tooting, which, when completed, will provide further accommodation for infirm and bedridden patients who require special attention and treatment.

Mr. Justice Romer sanctioned on Friday the payment to the treasurer of Christ's Hospital of a sum of £34,000, the amount of the purchase price of No. 10, King Edward-street, City, which has been purchased by the Postmaster-General. The purchase money in question was to be devoted towards the cost of the new buildings at Horsham, the cost of which, exclusive of the site, is estimated at £294,243. The approval of the Charity Commissioners has been obtained for payment of the money to the treasurer of the hospital for this purpose.

## Engineering Notes.

**AVIEMORE AND STANLEY RAILWAY DOUBLING.**—Operations have been commenced in connection with the laying down of an additional set of rails on the Highland line between Blair Atholl and Dalnaspical, forming part of the projected doubling of the line between Stanley and Aviemore. The distance now to be covered is about eighteen miles, most of which is a very steep gradient over a difficult portion of the line known as the Struan Bank, and which passed through numerous large rock cuttings varying in depth up to 30ft. or thereby. The most important masonry undertaking will be the erection of a three-arch viaduct across the river Garry at Struan. The contract for the doubling of this portion of the line has been let to Mr. Bost. About 400 men all over are engaged at the work, which is to be completed in two years from now.

**WATERLOO AND CITY RAILWAY.**—The Duke of Cambridge will formally open this railway on Monday week, the 11th inst. Sir Francis Marindin has made an unofficial inspection of the permanent way, and at his suggestion the treads of the two staircases giving access to the City Station—one at the angle of the premises of Messrs. Mappin and Webb in the Poultry, the other in Walbrook fronting the Mansion House—have been increased in width so as to comply with the Board of Trade requirements. These staircases will afford ingress and egress to the City Station, pending the approaching completion of the public subway below the crowded crossing at the Mansion House, the Bank of England, and the Royal Exchange; and as soon as the subway is ready for use, a third means of approach to the new railway will be provided. It is hoped that the line will be available for traffic on the day following the opening ceremony.

### CHIPS.

The Marquis of Londonderry will open a new Unionist Club at South Shields on Wednesday, July 27. The club has cost £5,000.

Stained-glass windows, erected in Beaconsfield Church in memory of Lady Lawson, wife of Sir Edward Lawson, will be dedicated at a special service to-morrow (Saturday).

The urban district council of Harpenden, Herts, have appointed Mr. W. Walton, of Lambeth, as surveyor and inspector of nuisances.

The new line to London of the Great Central Railway Company, will be opened for coal traffic on Monday, the 25th inst.

The Bill promoted by the City Corporation for the construction of a light railway from Deptford Market to the South-Eastern Railway Company's line has passed both Houses of Parliament, and received the Royal assent on Tuesday. A committee of the Corporation has been authorised to carry out the undertaking forthwith. The Corporation have also authorised the City Lands Committee to spend £2,500 in carrying out improvements at the entrance to the Guildhall in Basinghall-street. The new works will include a new entrance gateway, a path and carriage-way, a new window and buttresses, a new building on the site of the Chamberlain's old parlour, and a new corridor connecting the library with the council chamber.

A monument to Charles Darwin, the work of M. Jef Lambeaux, of Brussels, has been placed in the Zoological Gardens at Antwerp. It bears upon a pedestal a bust of the distinguished naturalist, while a figure of a female holding a palm in her right hand leans against the pedestal at the right of the bust.

The foundation-stone of the Nurses' Home of Queen Charlotte's Lying-in Hospital, in the Marylebone-road, will be laid by Viscountess Portman on the afternoon of Wednesday next.

A new art and technical school is being erected at Kingston-on-Thames, and special consideration has been given to the ventilation, which will be carried out on the Boyle system.

A large building with a frontage of 250ft. is to be erected at Mazenod-avenue, Hampstead, to be called "Priory Court," and arranged as residential flats. The site is elevated about 1ft. above the road in front, and the building will be set back, with returning wings right and left. The elevation will be somewhat Georgian in style, with gauged brick arches and aprons, surmounted with a heavy stone cornice; while green Venetian shutters, ornamental garden-court, and fountain will have a quiet and refining effect. The architects are Messrs. Palgrave and Co., Westminster, S.W.



## TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the BUILDING NEWS, 382, Strand, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

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## ADVERTISEMENT CHARGES.

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Advertisements for the current week must reach the office not later than 8 p.m. on Thursday. Front-page Advertisements and alterations in serial advertisements must reach the office by Tuesday morning to secure insertion.

## SITUATIONS.

The charge for advertisements for "Situations Vacant" or "Situations Wanted" is ONE SHILLING FOR TWENTY-FOUR WORDS, and Sixpence for every eight words after. All Situation Advertisements must be prepaid.

## NOTICE.

Bound copies of Vol. LXXIII. are now ready, and should be ordered early (price Twelve Shillings each), as only a limited number are done up. A few bound volumes of Vols. XXXIX., XL., XLI., XLVI., XLIX., LI., LII., LVIII., LIX., LXI., LXII., LXIII., LXIV., LXV., LXVI., LXVII., LXVIII., LXIX., LXX., LXXI., LXXII. may still be had, price Twelve Shillings; all the other bound volumes are out of print. Most of the back numbers of former volumes are, however, to be had singly. Subscribers requiring any back numbers to complete volume just ended should order at once, as many of them soon run out of print.

RECEIVED.—J. W. T.—A. F.—C. G. R. and Son.—N. B.—S. M. A.—G. G. Co.

## Intercommunication.

## QUESTIONS.

[1976.]-Ingle Nook.—I should be glad of some particulars as to the usual way of treating old-fashioned fireplace openings and inglenooks when it becomes necessary to do away with the open hearth and substitute a modern grate. Is it necessary to carry up a new flue entirely in brickwork to reduce the size of the very large old-fashioned chimneys, or how is this usually managed? Also, how should the ceiling to the inglenook be formed when closed in?—INQUIRER.

[1977.]-Soundproof Walls.—I think floor-joists mainly responsible for conveying sound to adjoining houses; therefore, will a cavity wall, or rather two walls connected only at front and back, be effectual? Two gentlemen who have kindly sent replies seem to deal with houses already built; whereas I wish, in building, to avoid having to do anything afterwards to abate a certain nuisance, which an adjoining neighbour's noises certainly are.—M.

[1978.]-Damp-Wall Solutions.—Can any subscriber say from actual experience whether any of these are thoroughly effectual? I have a granite wall facing south which lets in the drift terribly.—J. C.

[1979.]-Architects' Charges.—A client instructed us to prepare plans, &c., which in due course were approved and passed by local vestry, quantities prepared, and tenders invited and received. After reducing estimate, our client decided to abandon the idea of building, and offers us a nominal sum both for our fees and for the quantities. What percentage are we legally entitled to charge for our architectural services? What percentage are we legally entitled to charge for the quantities (2½ per cent. was provided for and included in the builder's contract)? Client agrees to pay out-pocket expenses, lithographers, &c.—CHURCH END.

The Axe Bridge at Colyton, Devon, the foundations of which have shown signs of being washed away, is being underpinned and strengthened by Mr. E. Harris, builder, of Clythdyon. The bridge, a highway one, is of iron, and was erected by the Coalbrookdale Iron Company in 1837.

## WATER SUPPLY AND SANITARY MATTERS.

UNDERGROUND LAVATORIES IN BIRMINGHAM.—The construction of underground lavatories, &c., in High-street (Bull Ring) and Corporation-street (Old Square) has been commenced by the Birmingham Public Works Committee. The work will not be completed until about October. In each case there will be a department for ladies. The general plan of the subterranean areas is that of a triangle with the corners rounded off. The smaller end will be towards the upper part of the slops, and at this end will be the entrance to the ladies' room. This department will contain six water-closets and an attendant's room and lavatory. Hot and cold water will be provided. The men's department will communicate with the street at the wider end, with separate stairs for entrance and exit. Seven water-closets and other conveniences will be provided in this section, with two lavatories. The average depth of the floor below the street will be about 9ft., and the area will be covered with glass prisms on the ground level, forming a "refuge." The entrances will be provided with ornamental iron railings, and upon the refuge triple street lamps. The interior of the lavatories will be faced with ivory-white glazed bricks, and the steps will be of hard York stone. The wood fittings will be of teak, and the divisions of polished rouge Royal marble. The sanitary fittings will include closets, with siphonic discharge. A water-driven air-propeller will provide ventilation for both departments. In Corporation-street the lavatory is being constructed partly under the triangular refuge round which the tramcars pass and partly under the roadway of Corporation-street. The total cost of the two buildings will be about £4,000.

WOBURN, BUCKINGHAMSHIRE.—A detailed report has been submitted to the rural district council for a scheme of water-supply for the district of Wavendon, including Woburn Sands, by the engineers for the work, Messrs. D. Balfour and Son, civil engineers, London and Newcastle, which recommends a trial-shaft being sunk about 100ft. into the lower greensand, after which continuous pumping tests will be made for fourteen days at the rate of 10,000 gallons per hour. The site chosen is to the south of Woburn Sands, on land belonging to the Duke of Bedford, and sufficiently far from the escarpment of the Lower Greensand to obtain a good supply. It is probable, if the quantity of water found will allow, that several neighbouring places may be arranged to be supplied. At present the supply is got from wells of moderate depth, many of which are liable to pollution. The water will be pumped into an elevated tower on high land adjoining, from which it will gravitate in mains over the district. If the scheme is successful, Woburn Sands, with its almost highland scenery, will have an excellent water-supply.

The ceremony of laying the foundation-stones of the new theatre in the Birmingham-road, Dudley, took place on Monday. The site is close to the railway station and the termini of four tramway systems, and adjoining the boundary of the Castle. The cost is estimated at over £16,000, including nearly £3,000 for the land and £11,000 contract for the building. Mr. A. Ramsell is the architect, and Messrs. J. H. Whittaker and Co. are the contractors.

Foundation-stones of new building in connection with the Lyng Wesleyan Church, West Bromwich, were laid on June 22. The premises will consist of an infant's school and minister's vestry, and they are being erected at the rear of the present buildings. Accommodation will be provided for over 50 children at a cost of £350. Messrs. Lloyd and Brant are the builders, and Mr. E. Pincher is the architect.

At Ketley, near Wellington, Salop, on Tuesday, a new board school was opened by the chairman of the Wellington School Board. The school, which is under the Wellington Board, was built at a cost of £2,800, to accommodate 220 children, and the infants' school 140.

The Cheshire village of Minshall Vernon was en fête on Wednesday week on the occasion of the unveiling of a cross, which had been erected by public subscription in commemoration of the Diamond Jubilee. The memorial consists of a Celtic cross erected in a small copse at the junction of the Church Minshall-road with the Middlewich and Nantwich main road in Minshall Vernon. The base is formed by three steps of Yorkshire stone, standing on a foundation of brickwork set in Portland cement. The cross itself has been worked from a single block of Dumfries stone from the Corsehill quarries, and is upwards of 16ft. in height. The front is panelled and carved with interlaced ornaments and projecting bosses with the letters "V.R. 1837-1897" in relief, the Crown, and other Royal emblems. On the wheel of the cross are the words "She wrought her people lasting good." The lower panel bears an inscription. The architect is Mr. C. E. Davenport, of Nantwich, and the sculptor Mr. H. Harding, also of that town.

## Our Office Table.

FURTHER additions have been recently made to the National Gallery, including "A Landscape," by George Lambert, a painter of the English school of the last century. This picture, which was bequeathed by Miss Haines, is placed temporarily on a screen in Room XVIII. Another bequest left by Mrs. Charlotte Fisher, is "The Battle of Camperdown, 1797," by Thomas Whitcombe. This will shortly be placed in the entrance hall on the eastern staircase descending to the Turner rooms. The Right Hon. Sir Edward Malet, G.C.B., has presented a portrait of Adrian van der Werff, by himself. It is hung in Room XI. A "Madonna and Child," by Luigi Vivarini, another gift, is of interest as bearing the signature of the artist; but as the picture is not of sufficient value as a work of art to be placed in the Gallery, it is hung, with the consent of the anonymous donor, in the waiting-room to the offices. Dr. E. J. Longton has presented a water-colour copy by W. West of a portrait of a lady and child by Van Dyck, forming part of the series of copies presented by the same donor in 1886. The following have been purchased:—The two wings of the altar-piece, of which the "Vierge aux Rochers," now in the National Gallery, formed the central portion. They represent angels playing on musical instruments, and were painted by Giovanni Ambrogio de Predis in conjunction with Leonardo da Vinci, who did the central composition. One of these, No. 1661, was apparently begun by Leonardo himself and carried out by the pupil; the other, No. 1662, seems to be entirely the work of Ambrogio—they are temporarily framed and placed on a screen in Room No. VI. during the repairs which are going on in No. I.; a portrait by Hogarth of his sister, Mrs. Salter, hung in Room XIX.; and a picture by J. B. S. Chardin called "La Fontaine," placed in Room XVI.

The collection of the late Lord Leighton's drawings and sketches, now hanging on the walls of the house built for the artist from Professor Aitchison's designs, No. 2, Holland Park-road, has lately been enlarged by the addition of more than 500 drawings, presented by Mrs. Sutherland Orr and Mrs. Matthews, Lord Leighton's sisters. There are also on these walls a good many examples of Lord Leighton's painting. Mr. G. F. Watts, R.A., has added to the collection a painting much prized by him as having been presented to him by his friend many years ago. Mr. Brock, R.A., has given a fine reproduction of his bust in bronze of Lord Leighton, which is placed in the hall of the house; while Lord Davey, Mr. A. Henderson, the Fine Art Society, Messrs. Cassell, the proprietors of the *Graphic*, and others give reproductions of Lord Leighton's completed works. The Prince of Wales has presented to the collection the drawing "Summer Slumbers."

AN exhibition of students' work in the various crafts embraced by the Central School of Arts and Crafts (established by the Technical Education Board of the County Council, at 316, Regent-street, opposite the Polytechnic) will be opened to the public on Monday next, and will remain open daily throughout the week from 12.0 to 8.30 p.m. Specimens will be shown of book-binding, silversmiths', goldsmiths', and jewellers' work, chasing and engraving, enamelling, stained glass, leadwork, stonework, woodcuts in colour (by a method based on Japanese practice), also modelling and designs for various processes. The school, which is just completing its second year, has been very successful in the object for which it was established—viz., to provide for apprentices, journeymen, and others engaged in the more artistic trades such individual training in design and manipulation as each student may require in relation to his own particular craft. New classes are contemplated for next session, commencing Sept. 19, in writing and illumination, wood-carving and gilding, and tapestry and other weaving.

TO-DAY (Friday) the remaining portion, as yet unbuild upon, of the ancient camp at Uphall, midway between Ilford and Barking, will be offered for auction at the Mart, Tokenhouse-yard. It includes the frontage to the River Roding and the best preserved fragment of the earthworks. The remainder of the camp has been recently built on. Whilst excavations for brick-earth were being carried on at Uphall some 30



years ago, the fossil bones of many animals of prehistoric age were exhumed, among them those of rhinoceros, hippopotamus, lion, bear, including the huge hairy mammoth, with the only complete skull and tusks which have ever been discovered in Great Britain. This was carefully preserved under the direction of Sir Antonio Brady, and may now be seen in the Natural History Museum at South Kensington.

An ancient Roman hospital has been brought to light at Baden, near Zurich, the discovery having been made in connection with recent excavations at Windisch, the Roman Vindonissa. At Vindonissa the two great Roman roads met, the one leading from the Great St. Bernard along Lake Lemano, and then by Aventicum and Vindonissa to the Roman stations on the Rhine; the other leading from Italy to Lake Constance by the Rhetian Alps, the canton which is now Winterthur, Baden, and Windisch. The last point was the station of the seventh and eighth legions, and close by the Roman road the hospital has been discovered. It contains 14 rooms, supplied with many kinds of medical, pharmaceutical, and surgical apparatus, the latter including probes, tubes, pincers, cauterising instruments, and even a collection of safety-pins used in bandaging wounds. There are also medicine spoons in bone, and silver measuring vessels, jars, and pots for ointment, some still containing traces of the ointment used. The excavations have also revealed a large number of silver and copper coins, the former belonging to the reigns of Vespasian and Hadrian, and the latter bearing the effigies of Claudius, Nero, and Domitian.

### CHIPS.

The Metropolis Management Acts Amendment (By-laws) Bill passed on Monday through Committee of the House of Lords without amendments.

The lifeboat-house being erected at Eastbourne as a memorial of the late William Terriss will be opened on Saturday, the 16th inst., by the Duchess of Devonshire.

On Saturday four memorial-stones of a new Wesleyan chapel in Park road, Monton, near Eccles, were laid. The estimated cost of the building is £1,350, and seating accommodation will be provided for about 250 persons.

At the town-hall, Newton Abbot, Mr. Walter A. Ducat, inspector of the Local Government Board, has held an inquiry into an application of the urban district council for sanction to borrow £3,450 for purposes of sewerage and sewage disposal, and £1,500 for purposes of public walks and pleasure-grounds.

A fine monumental brass was unveiled on Tuesday last week at St. Michael's Church, Norwich, to the memory of the late vicar, the Rev. W. F. Greeny, whose work on monumental brasses is the standard authority on the subject. Representatives of archaeological societies from all parts of the country were present at the unveiling. The brass is 6ft. by 4ft., is surrounded by a black marble edging, and is fixed on the south wall of chancel. Within the main arch of the design is an inscription, and above it, within a trefoil medallion, a portrait bust of Mr. Greeny, vested in a surplice, stole, and hood, as M.A.

At a meeting held at the Guildhall, Lostwithiel, last week, steps were taken for making the town a centre for a school of art. A committee was appointed to prepare a scheme and report to a future meeting.

The will of Mr. John Thompson, of The Lindens, Peterborough, builder and contractor, who died on April 11, was proved on June 1 by Thomas John Thompson and George Gilbert Thompson, the sons, Walter Hill and Arthur Caster, the executors, the value of the gross estate being £80,296, and the net personal £59,246. The testator gives £500, the use for life of The Lindens, with the household furniture and effects therein, and an annuity of £750 to his wife, Mrs. Mary Thompson, and £100 each to his executors. The residue of his real and personal estate he leaves equally between all his children.

Mr. H. H. Bridgman, F.R.I.B.A., until recently a well-known figure in St. Pancras and City life, has, we regret to hear, been confined to his bed at his house, 1, Camden-square, for some weeks, and is now in a prostrate condition. During March and April, accompanied by Mrs. Bridgman, he spent about six weeks in the neighbourhood of Gibraltar and North Africa, in the hope that the voyage and sea air would prove beneficial. He returned home, however, on the 1st of May, without feeling improved, and has been laid aside most of the time since. The present trouble is the result of an abscess, formed when the internal operations took place a year and two months ago.

## Trade News.

### WAGES MOVEMENTS.

**MARAZON.**—The master builders have agreed from Monday in this week to pay by the hour instead of by the day. The terms are 56 hours in summer, 48 in winter, leaving work on Saturdays at 1 p.m.; masons 5½d. per hour, carpenters 5½d.

**NEWPORT, MON.**—The Bricklayers' Society have informed the Master Builders' Association that they take no part in the carpenters' dispute, and that they would abide by the rules established in 1892 for the building trades. A meeting of the General Builders, Ltd., an employers' concern, was held at the headquarters of the Carpenters' Society on Friday evening to adopt the rules of the association preparatory to registering the society. It was reported that there were 108 members.

**NOTTINGHAM.**—The strike of the bricklayers continues, and has extended to the stonemasons, so that the other trades are necessarily being thrown out of employment. It is stated that nearly forty employers have offered to give the labourers an advance of a halfpenny, from 6d. to 6½d. per hour.

**SHREWSBURY.**—For eight weeks the bricklayers' labourers of the town have been on strike, and the building trade has been paralysed in consequence. The men asked for what they assert was a promised rise of 5d. to 5½d. per hour. The masters offered 5½d., which the men refused, and the offer has since been withdrawn. Builders who have contracts on hand have introduced machinery and horse power, and have got their apprentices to do the labourers' work; but the bricklayers themselves are now taking part in the dispute, and have decided to have no assistants except society men.

**SWANSEA.**—A private meeting of the members of the Swansea Master Builders' Association has been held at the Young Men's Christian Association Rooms, Dynevor-place, Swansea, Mr. George Williams (of Thomas, Watkins, and Co.) presiding. It was reported that the masons had refused the offer to resume work on the old terms. In the subsequent discussion the general opinion was that, whilst the association could not recede from the position taken up, they were willing to agree to arbitration. The men will, therefore, be offered this course in order to bring about a settlement.

**YORK.**—No general settlement of this dispute has been arrived at between the masters and men, and many of the latter are leaving the city in the hope of improving their position. A small minority have meantime accepted the advance of ½d. made by the masters a week or two ago, and are now working at 8d. per hour.

The open space before the west front of York Minster has been inclosed with iron railings.

The National Swiss Museum, established in Zurich for the reception of the Swiss collections of ancient art which have been brought together by the Confederation, was formally inaugurated on Saturday in the presence of the Federal Council, the Diplomatic body, the Federal Assembly, and the cantonal and municipal authorities.

The General Power Distributing Company's Bill, which is for the supply of electrical energy for lighting, traction, manufacturing, and other purposes over an area of about 2,000 square miles, including many large towns, was further considered on Tuesday by a committee of the House of Lords, who found the preamble proved. Counsel representing several municipal corporations who oppose the Bill thereupon intimated that they would renew their opposition in the House of Commons.

At the Mart, Tokenhouse-yard, Messrs. Debenham, Tewson, Farmer, and Bridgewater offered for sale by auction on Tuesday the freehold estate of the late Sir T. Spencer Wells, known as Goldenhill, Hampstead Heath. The estate comprises a residence, with gardens and grounds having an area of over 36 acres, immediately adjoining the West Heath. The biddings started at £25,000 and rose to £38,500, at which price the property was declared sold. It is highly satisfactory to learn that it was purchased on behalf of a syndicate of residents who have made themselves responsible for the cost, and who propose to add the estate, wholly or in part, to Hampstead Heath. Towards the required amount about £6,000 has already been promised in the locality.

Princess Christian attended the service at Windsor Parish Church on Sunday, when an oak screen, which has been erected as a memorial of the Queen's reign, was dedicated by the Bishop of Oxford. Beneath the cross surmounting the screen are the words, "Gloria in Excelsis," flanked by representations of the instruments of the Passion. Two shields bear the inscriptions, "V.R., 1837," and "V.R.I., 1897," and a dedicatory tablet has also been affixed. The screen was designed by Sir Arthur Blomfield, A.R.A., and has cost about £350.

## LATEST PRICES.

### IRON, &c.

	Per ton.	Per ton.
Rolled-Iron Joists, Belgian.....	£6 0 0 to	£8 10 0
Rolled-Steel Joists, English.....	6 10 0 "	7 0 0
Wrought-Iron Girder Plates.....	5 15 0 "	6 10 0
Bar Iron, good Staffs.....	7 0 0 "	8 0 0
Do., Lowmoor, Flat, Round, or Square.....	17 0 0 "	17 5 0
Do., Welsh.....	5 15 0 "	5 17 0
Boiler Plates, Iron—		
South Staffs.....	7 17 6 "	8 5 0
Best Snedshill.....	10 0 0 "	10 10 0
Angles 10s., Tees 20s. per ton extra.		
Builders' Hoop Iron, for bonding, &c., £8 15s.		
Builders' Hoop Iron, galvanised, £15 10s. 0d. per ton.		
Galvanised Corrugated Sheet Iron—		
No. 18 to 20. No.		
6ft. to 8ft. long, inclusive gauge.....	£10 15 0 "	£11 0 0
Best ditto.....	11 5 0 "	11 10 0
Cast-Iron Columns.....	£8 0 0 to	£20 10 0
Cast-Iron Stanchions.....	8 0 0 "	8 10 0
Rolled-Iron Fencing Wire.....	7 0 0 "	8 0 0
Rolled-Steel Fencing Wire.....	7 6 0 "	7 10 0
" " Galvanised.....	10 10 0 "	11 10 0
Cast-Iron Sash Weights.....	4 0 0 "	4 2 6
Cut Clasp Nails, 3in. to 6in.....	8 15 0 "	9 15 0
Cut Floor Brads.....	8 10 0 "	9 10 0
Wire Nails (Points de Paris)—		
0 to 7 8 9 10 11 12 13 14 15 B.W.G.		
8/6 9/0 9/6 10/3 11/0 12/0 13/0 14/9 16/9 per cwt.		
Cast-Iron Socket Pipes—		
6in. diameter.....	£5 10 0 "	£5 15 0
4in. to 6in.....	5 5 0 "	5 10 0
7in. to 24in. (all sizes).....	4 15 0 "	5 0 0
[Coated with composition, 2s. 6d. per ton extra; turned and bored joints, 5s. per ton extra.]		
Pig Iron—		
Cold Blast, Lilleshall.....	105s. to 110s.	
Hot Blast, ditto.....	57s. 6d. to 62s. 6d.	
Wrought-Iron Tubes—Discount off Standard Lists f.o.b.		
Gas-Tubes.....	75p.c. Fittings 77p.c.	
Water-Tubes.....	70 "	72 "
Steam-Tubes.....	62 1/2 "	65 "
Galvanised Gas-Tubes.....	60 "	62 "
Galvanised Water-Tubes.....	55 "	57 "
Galvanised Steam-Tubes.....	45 "	47 "
10cwt. casks. 5cwt. casks.		
Sheet Zinc, for roofing and work- ing up.....	£22 10 0 to	£23 0 0
Sheet Lead, 3lb. per sq. ft. super.....	15 10 0 "	16 10 0
Pig Lead, in 1cwt. pigs.....	14 10 0 "	15 10 0
Lead Shot, in 28lb. bags.....	17 10 0 "	18 10 0
Copper Sheets, sheathing and rods.....	60 10 0 "	61 10 6
Copper, British Cake and Ingot.....	51 15 0 "	52 15 0
Tin, Straits.....	70 10 0 "	71 10 0
Do., English Ingots.....	72 5 0 "	73 5 0
Spelter, Silesian.....	18 0 0 "	19 0 0

### TIMBER.

Teak, Burmah.....per load	£13 0 0 to	£14 5 0
" Bangkok.....	5 5 0 "	14 0 0
Quebec pine, yellow.....	2 18 0 "	4 18 0
" Oak.....	3 15 0 "	5 0 0
" Birch.....	3 0 0 "	4 13 6
" Elm.....	4 3 0 "	5 3 0
" Ash.....	3 18 0 "	5 3 0
Danish and Memel Oak.....	2 0 0 "	8 0 0
Fir.....	2 13 0 "	4 3 0
Wainscot, Riga p. log.....	4 18 0 "	5 18 0
Lath, Danish, p.f.....	4 10 0 "	5 10 0
St. Petersburg.....	5 0 0 "	6 10 0
Greenheart.....	8 0 0 "	8 10 0
Box.....	4 0 0 "	15 0 0
Sequoia, U.S.A. ....per cube foot	0 1 8 "	0 1 10
Mahogany, Cuba, per super foot		
lin. thick.....	0 0 5 "	0 0 6 1/2
" Honduras.....	0 0 4 1/2 "	0 0 6 1/2
" Mexican.....	0 0 4 "	0 0 5
Cedar, Cuba.....	0 0 4 "	0 0 4 1/2
" Honduras.....	0 0 3 1/2 "	0 0 4 1/2
Satinwood.....	0 0 5 "	0 1 0
Walnut, Italian.....	0 0 3 "	0 0 7
Deals, per St. Petersburg Standard, 120—12ft. by 1 1/2 in. by 1 1/2 in. :—		
Quebec, Pine, 1st.....	£18 15 0 to	£21 15 0
" 2nd.....	13 5 0 "	15 10 0
" 3rd.....	5 15 0 "	9 5 0
Canada Spruce, 1st.....	10 15 0 "	12 5 0
" 2nd and 3rd.....	8 5 0 "	9 5 0
New Brunswick.....	7 5 0 "	8 5 0
Riga.....	7 5 0 "	7 15 0
St. Petersburg.....	9 5 0 "	13 5 0
Swedish.....	9 15 0 "	16 5 0
Finland.....	8 15 0 "	9 5 0
White Sea.....	9 15 0 "	16 5 0
Battens, all sorts.....	5 0 0 "	18 0 0
Flooring Boards, per square of lin. :—		
1st prepared.....	£0 9 6 "	£0 17 9
2nd ditto.....	0 8 0 "	0 13 6
Other qualities.....	0 6 3 "	0 7 0
Staves, per standard M :—		
Quebec pipe.....	—	—
U.S. ditto.....	£35 0 0 "	£42 10 0
Memel, cr. pipe.....	220 0 0 "	230 0 0
Memel, brack.....	190 0 0 "	200 0 0

### OILS.

Linseed.....per ton.	£16 12 6 to	£17 2 6
Rapeseed, English pale.....	23 10 0 "	23 15 0
Do., brown.....	23 10 0 "	24 0 0
Cottonseed, refined.....	15 15 0 "	16 5 0
Olive, Spanish.....	32 10 0 "	33 0 0
Seal, pale.....	20 0 0 "	20 10 0
Cocanut, Cochin.....	29 0 0 "	29 10 0
Do., Ceylon.....	24 5 0 "	24 10 0
Palm, Lagos.....	23 10 0 "	24 0 0
Oleins.....	18 15 0 "	19 15 0
Lubricating U.S.....per gal.	0 6 3 "	0 7 6
Petroleum, refined.....	0 0 4 1/2 "	0 0 4 1/2
Tar, Stockholm.....per barrel	1 0 0 "	1 5 0
Do., Archangel.....	0 12 6 "	0 15 0
Turpentine, American.....per ton	23 15 0 "	24 0 0



## LIST OF COMPETITIONS OPEN.

Warrington—Police Station, Court House, &c.	£100, £50, £25	J. Lyon Whittle, Clerk, Town Hall, Warrington	July 2
Beverly—Extension of East Riding County Council Offices	£30 (merged), £20, £10	J. Bickersteth, Clerk, County Hall, Beverly	" 18
West Hartlepool—Refuse Destructor, Burn-road		J. W. Brown, Borough Engineer, Municipal Bldgs, W. Hartlepool	" 27
Wivenhoe—Water-Supply and Drainage Schemes		C. W. Denton, Clerk, East Stockwell-street, Colchester	" 27
Glasgow—Exhibition Buildings (£60,000 limit)	£210 (merged), £156 10s., £105	H. A. Hedley, Secretary, 141, Buchanan-street, Glasgow	Aug. 15
Pendlebury—Three Chapels, Offices, Lodge, Entrance Gates, and Boundary Wall, at proposed Cemetery			
Glasgow—City Improvements between King-street, City, and the N-w Wynd	£50 (and 5 per cent. com.), £30, £20	Samuel Brown, Town Clerk, Town Hall, Salford	" 16
Stockholm—City Railway Stations and Junctions	£100, £50, £25	J. D. Marwick, Town Clerk, City Chambers, Glasgow	" 31
Liverpool—New Buildings for Royal Institution	£656, £438, £219	Consulate General, 27, Great Winchester-street, E.C.	" 31
Godalming—Football Stand (150 seats—£160 limit)	50gns., 20gns.	Harold Waterhouse, Hon. Sec., 3, Cook-street, Liverpool	" 31
	£3 3s.	Secretary, Recreation Club, Godalming	" 31

## LIST OF TENDERS OPEN.

## BUILDINGS.

Canton, Cardiff—Hotel, Lansdowne-road	Hancock and Co.	Veall and Sant, Architects, Cardiff	July 2
Leeds—Warehouse, Kirkstall-road	Walter Wainwright	W. S. Braithwaite, Architect, 6, South-parade, Leeds	" 2
Linthwaite—Alterations to National Schools		John Kirk and Sons, Architects, Huddersfield	" 2
Bideford—Rebuilding Old Ring o' Bells	F. Catland	R. T. Hookway, Architect, 12, Bridgeland-street, Bideford	" 2
Kemmare—Additions to Workhouse	Guardians	D. E. O'Sullivan, Clerk, Kemmare	" 2
Palmouth—Additions to Trevethan Schools	School Board	W. Jenkins, Clerk, Falmouth	" 2
Llandaff—Two Villas		D. Pugh Jones, P.A.S.I., Architect, Tynmawr-road, Llandaff	" 2
Seaton—Alterations to the Royal Oak Inn	Workington Brewery Co.	Jas. Howes, Architect, 23, Curwen-street, Workington	" 2
Chester-le-Street—Administrative Block at Isolation Hospital	Rural District Council	H. Henderson, Pelton Cottage, Chester-le-street	" 2
Abbots Bromley—New Clockroom at Boys' School	School Board	T. S. Wilkins, Clerk, Uttoxeter	" 2
Horton, near Epsom—Superstructure of Lunatic Asylum (for 2,000 Patients and Staff)	Asylums Committee	G. T. Hine, Architect, 35, Parliament-street, S.W.	" 4
Hornby—New Buildings, Hunter's Hill Farm	Guardians	S. T. Jones, Estate Office, Hornby Castle, Bedale	" 4
Kingston-on-Thames—New Offices adjoining Workhouse		William H. Hope, Architect, Portsmouth-rd., Kingston-on-Thames	" 4
Sutton-in-Ashfield—Free Library		J. P. Adlington, Architect, High-pavement, Sutton-in-Ashfield	" 4
Belfast—Extension, Electric Light Station, Abercorn Basin	Harbour Commissioners	W. A. Currie, Secretary, Harbour Offices, Belfast	" 4
Arthurs-town—Coastguard Station	Committee	Office of Public Works, Dublin	" 4
Cwmtygh—Sunday-school	Corporation	R. Lloyd Jones, Architect, 14, Market-street, Carnarvon	" 4
Edinburgh—Additions to Central Electric Station		T. Hanter, Town Clerk, City Chambers, Edinburgh	" 4
Eaglescliffe Junction—House	Urban District Council	Geo. Robson, 23, Linthorpe-road, Middlesbrough	" 4
Aston Manor—Additions, Fever Hospital		H. Richardson, Surveyor, Council House, Aston	" 4
Warminster—Alterations, Common British School		W. H. Hardick, Architect, High-street, Warminster	" 4
Somersham—Addition to School	Blakenham U.D. Board	Henry J. Wright, M.S.A., 4, Museum-street, Ipswich	" 4
Otley—Alterations to the Black Horse Hotel	Corporation	Harold Chippindale, Architect, Guiseley	" 4
Gloucester—Public Library, &c., Brunswick-road		Waller and Son, Architects, 17, College-green, Gloucester	" 4
Belfast—Additions to Belmont Church	Llanwnda School Board	Vincent Craig, Architect, 5, Lombard-street, Belfast	" 4
Rhosgafan—Infant School	J. Watt	R. Lloyd Jones, Architect, 14, Market-street, Carnarvon	" 4
Foveran—House, Mill of Minnes	Corporation	Wilson and Duffus, Advocates, 146, Union-street, Aberdeen	" 5
Wallsend—Six Self-Contained Dwelling-Houses	School Board	Secretary, Industrial Co-operative Society, Wallsend	" 5
Southampton—Cart Shed	J. Bruce	George B. Nalder, Town Clerk, Municipal Offices, Southampton	" 5
Burreilton, N.B.—Additions to School	Joint Hospital Board	I. and J. Falconer, Architects, Blairgowrie	" 5
Foveran—Alterations at Offices, Milltown of Minnes	Guardians	Wilson and Duffus, Advocates, 146, Union-street, Aberdeen	" 5
Halifax—Shops, Offices, &c., Southgate	Cork and Bandon Railway Co.	C. H. Marriott and Son, Architects, West Park-street, Dewsbury	" 5
North Bierley—Porter's Lodge, &c.	J. Smart	Enoch Priestley, Holly Bank, Wibsey, Bradford	" 5
Southampton—Cement Floor in Workhouse	Board of Guardians	David P. Gwillim, Clerk, Southampton	" 5
Rhosgafan—New Infant School	Llanwnda School Board	Rowland Lloyd Jones, Architect, 14, Market-street, Carnarvon	" 5
Foveran—Alterations at Cottar Houses, Milltown of Minnes		Wilson and Duffus, Advocates, 146, Union-street, Aberdeen	" 5
Haverfordwest—Vagrant Wards at Workhouse	Guardians	John James, Clerk, High-street, Haverford	" 5
Bandon—Six Pairs of Cottages	Cork and Bandon Railway Co.	R. H. Leslie, Secretary, Albert Quay, Cork	" 5
Rathen—Additions to Offices, Greenhills	J. Smart	Wilson and Duffus, Advocates, 146, Union-street, Aberdeen	" 5
Slithwaite—Four Dwelling Houses, Wood-street	Board of Guardians	J. Berry, Architect, 9, Queen-street, Huddersfield	" 6
Cheltenham—Repairs to Workhouse		R. Tiehurst, Clerk, Essex-place, Cheltenham	" 6
Harrington—Additions to Church-road Board Schools	Metropolitan Asylums Board	J. B. Tolson, Harrington	" 6
Tottenham—North Eastern Hospital, St. Ann's-road	E. V. Sewell	T. Duncombe Mann, Clerk, Norfolk-street, Strand, W.C.	" 6
Ramsey—Villa, Bury-road	School Board	James Ruddle, Architect, Boroughbury, Peterborough	" 6
Griffithstown—Additions to Schools	Board of Guardians	Lansdowne and Griggs, Architects, Newport, Mon.	" 6
Birtley—Primitive Methodist Chapel and Schools	Town Council	E. C. Clephan, Architect, St. Nicholas Chambers, Newcastle-on-T.	" 6
Edmonton—Workhouse Infirmary	Corporation	T. E. Keightley, Architect, 106, Cannon-street, E.C.	" 6
Kingston-on-Thames—Electricity Sub-Station, Coombe-road		Harold A. Winsor, Town Clerk, Clatter, Kingston-upon-Thames	" 7
Sheffield—Lodge at High Hazels Park	Jas. Watt	Charles F. Wike, C.E., City Surveyor, Town Hall, Sheffield	" 7
Torquay—Steam Laundry, Newton-road	Llanbadrig School Board	E. Richards, Architect, 3, Park-crescent, Torquay	" 7
Carlisle—Warehouses, Victoria Viaduct	Johnson Bros., Ltd.	J. H. Martindale, Architect, Viaduct Chambers, Carlisle	" 7
Garreglefa—School and House	Metropolitan Asylums Board	Rev. R. W. Davies, Clerk, Cemaes, Anglesea	" 7
Hanley—Additions to Trent Pottery		R. Scrivener and Sons, Architects and Valuers, Hanley	" 7
Winchmore Hill, N.—Repairs to Central Stove Flues at the Northern Fever Hospital			
Burn of Kibry—Farmhouse	T. Duncombe Mann, Clerk, Norfolk-street, Strand, W.C.		" 8
Bangor, Co. Down—Swimming Bath	A. Reid, Architect, Blairgowrie		" 8
Belfast—Manse, Parkgate Church	Russell and Lockwood, Architects, 16, Waring-street, Belfast		" 8
Bury St. Edmunds—Chapel at Thingoe Workhouse	Young and Mackenzie, Architects, Donegal-square, E., Belfast		" 8
Abertillery—Twenty-eight Cottages, Glandwr-road	T. D. Atkinson, Architect, St. Mary's-passage, Carlbridge		" 9
Canterbury—Additions, Purifying House	W. Thomas, Brynawel, Aberdare		" 9
Woolston—Church House and Institute	J. Burch, Secretary, 32, Castle-street, Canterbury		" 9
Dromore—Enlargement of Cathedral	Colson, Farrow, and Nisbett, 45, Jewry-street, Winchester		" 9
Grangemouth—Three Double Cottages	Henry Hobart, Architect, Dromore, Co. Down		" 11
Armagh—Dispensary	J. P. Mackenzie, Solicitor, Grangemouth		" 11
Kingston-on-Thames—Disinfecting-Chamber at Workhouse	W. Calvert, Clerk, Workhouse, Armagh		" 11
Birkenhead—Extension to Hospital	Jas. Edgell, Solicitor, Clerk, Union Offices, Kingston-on-Thames		" 11
Muswell Hill, N.—Fire-Engine Station	E. Kirby, Architect, 5, Cook-street, Liverpool		" 11
Tiverton—New Isolation Hospital Buildings	F. D. Askey, Clerk, Southwood-lane, Highgate, N.		" 11
Bethnal Green, E.—Two Blocks of Dwellings on Boundary-street area	C. M. Hole, Clerk to the Board, Tiverton		" 11
Huddersfield—Isolation Block, Sanatorium, Mill Hill	London County Council	C. J. Stewart, Clerk, Spring Gardens, S.W.	" 12
Shotley Bridge—Cottage Homes	Corporation	F. C. Lloyd, Town Clerk, Town Hall, Huddersfield	" 12
Halifax—Boiler-Houses, &c., North Dean	Guardians of Gateshead Union	W. Lister Newcombe, F.R.I.B.A., 89, Pilgrim-street, Newcastle	" 12
Dartford—Destructor House and Pair of Destructors, Gore Farm Hospital	Lumby, Son, and Wood	R. Horsfall and Son, Architects, 22A, Commercial-street, Halifax	" 12
Abercynon—Twenty-four Houses	Metropolitan Asylums Board	T. D. Mann, Clerk, Norfolk House, Norfolk-street, Strand, W.C.	" 14
Rochester—Schools (760 children), Gordon-road, Strood	Mountain Ash Navigation Bldg Club	G. A. Evans, F.R.I.B.A., 11, Mountain Ash	" 14
Gouthlad—Villa	School Board	Apeley Kennette, Clerk, Guildhall, Rochester	" 14
Bradwell, Essex—Coastguard Buildings	Admiralty	E. H. Smales, A.R.I.B.A., 5, Lowergate, Whitby	" 15
Colne—Technical Schools and Public Library, Albert-road	Corporation	Director of Works Department, Northumberland-avenue, S.W.	" 15
Salisbury—Nursing Staff House		Alfred Varley, Town Clerk, Town Hall, Colne	" 16
Miss Side—Extension of Two Schools		S. Buchanan Smith, Secretary, Crown Chambers, Salisbury	" 16
Alecdon—Board Schools	School Board	W. E. Rowcliffe, Clerk, 30, Cross-street, Manchester	" 16
Abingdon—Block of Three Houses, Albert Park	Governors of Christ's Hospital	J. R. Thompson, Clerk, 18, Scotch-street, Whitehaven	" 17
Shepton Mallet—School	Governors of Grammar School	J. T. Morland, Clerk, 33, Bath-street, Abingdon	" 18
Hendreforgan—Cottage	Great Western Railway	A. E. Nalder, Solicitor, Shepton Mallet	" 18
Honley—Additions to Cottage, Offices, &c.	Joint Sewerage Board	G. K. Mills, Secretary, Paddington Station, London	" 19
Cushendall—Presbyterian Church		Alfred J. Slocombe, Clerk, Town Hall, Huddersfield	" 19
Swindon—Post Office Sorting Room		W. J. Fennell, Architect, 11, Chichester-street, Belfast	" 19
Guayaquil—Custom House	Great Western Railway	G. K. Mills, Secretary, Paddington Station, London	" 19
Belem—Cattle Pens, Abattoir, and Two Markets	Government of Ecuador	Chief Ecuadorian Consulate, Liverpool	Aug. 31
Colchester—Villa Residence, Maldon-street	Municipal Authority	The Brazilian Legation, London	Oct. 24
Elland—Additions to South-end Schools		Chas. E. Butcher, Architect, 3, Queen-street, Colchester	"
London, W.—Pulling-down Mansion, No. 35, Dover-street	Elland-cum-Greetland School Board	Herbert W. Booth, Architect, King Cross, Halifax	"
Castleton—Eight Shops with Houses and Three Lock-up Shops	W. H. Lawton	Wimperis and Arber, Architects, 25, Sackville-street, Piccadilly, W.	"
Greenmount—Two Semi-detached Houses	Mrs. Wood	George A. Hammond, Architect, Rochdale	"
Wigton—Barn		D. Hardman, Architect, Silver-street, Bury	"
		Joseph Hall, Parkgate, Wigton, N.B.	"



## THE BUILDING NEWS

AND ENGINEERING JOURNAL.

VOL. LXXV.—No. 2270.

FRIDAY, JULY 8, 1898.

## THE REVISED SCHEDULE OF CHARGES.

LAST week we gave the revised schedule of professional charges as finally approved by the Council of the Royal Institute of British Architects. By comparing the clauses with the draft clauses we gave a week or two previously, it will be observed the revisions made are few. We have already commented on the first three clauses of the schedule, and we may now make a few remarks on other portions of the document. Clause 4 is an important one, for it deals with the remuneration of the architect in cases where his design is repeated, as in the planning of estates, villa designs, pavilions, labourers' cottages, flats, and a variety of other buildings. We are not quite sure that the wording of the clause is satisfactory, or that it does not cover buildings which, though distinct in themselves, ought to be charged for as a whole. Does it exclude, for instance, the separate pavilions or detached cottages or wards of a large infectious hospital? From the first portion of this clause, it may be inferred, this arrangement applies to all those schemes of buildings like hospitals, schools, barracks, and the like, which comprise many units which are repetitions of each other. A committee, for instance, might say: We pay you for designing the administrative block, the medical officers' quarters, infectious blocks, laundry, and for one design of the pavilions which are repeats; but we refuse to pay you at the same percentage on all. Whether the second sentence of the clause sufficiently differentiates or excludes this view of the case we have some doubt. Let us quote the clause. "When several distinct buildings, being repetitions of one design, are erected at the same time from a single specification, and one set of drawings, and under one contract, the usual commission is charged on the cost of one such building, and a modified arrangement made in respect of the others; but this arrangement does not apply to the reduplication of parts in one building undertaking, in which case the full commission is charged on the total cost." The italics are ours. The term "reduplication of parts" may be applied to schemes or designs like we have instanced just as much as it applies to parts of one design. A more distinct and clear meaning, we think, would have been conveyed if the clause ran: "But the arrangement does not apply to a repetition of the unit of a design (plan or elevation), or to the multiplication of the parts of one scheme." The clause, as revised, is at least open to misunderstanding. So many of the designs of the architect are now distinguished by "reduplication of parts" that it seems desirable to make the exception clear and definite. In plan we often have to repeat arrangements more or less;—blocks of buildings are often duplicated, and in elevation one feature may be repeated scores of times, and these may not be all carried out under one building contract, yet are parts of one whole.

Clause 5 remains practically the same as the old clause of the first schedule, which stated that plans, elevations, &c., approved should be paid for at the rate of  $2\frac{1}{2}$  per cent. upon the estimated cost, and if tenders are procured an additional  $\frac{1}{2}$  per cent. is charged. The revised clause adds: "Two and a half per cent. is charged upon any works originally included in the contract or tender, but subsequently omitted in execu-

tion," which is a fair charge. Why should an architect who has taken the trouble to design, say, a tower, which is not carried out, be compelled to forego his commission upon it, owing to cost or change in the views of his clients? And it is also just that preliminary sketches and interviews should be charged for according to the trouble and time expended. The next clause is also reasonable, which is to the effect that the architect should receive a fair remuneration for any alterations made by the client. The time occupied in making such alterations is the basis for the charge—not percentage on cost, which, in some circumstances, would be quite inadequate to pay for the labour. In the old clause there was a qualification which ran: "Unless such alterations are rendered necessary by an unreasonable excess in the builder's tender beyond the architect's approximate estimate." As a matter of fact, such excesses are not always or even often to be placed to the architect's fault, but to mistaken tendering. Why should the architect be made to suffer for an unreasonable excess in the builder's tender? This is one of the weak points in the old schedule. As to payment during progress of work, clause 7 embodies the old clause 6; but instead of the percentage of 5 per cent. being on the instalments paid, the revised clause is, "on the amount of the certificates when granted." This will prevent the client making any excuse for not paying the architect should the former withhold payment from the builder.

The remuneration for estate planning (clauses 9 to 12) depends on the time, skill, and trouble involved: no definite rate could be fixed. The rate of 2 per cent. on the estimated cost is now fixed for laying-out the roads, taking levels, and preparing drawings for roads and sewers, and applying for the sanction of authorities, &c.; and for making working drawings and specifications of roads and sewers, obtaining tenders and superintending works, passing accounts, &c., the charge is 4 per cent. in addition. The old clauses were unsatisfactory and indefinite, as no charge was stated. These clauses we commend to the attention of our surveyor readers. For valuing freehold, copyhold, or leasehold property the old schedule is practically endorsed. The scale given for valuing and negotiating the settlement of claims under the Lands Clauses Consolidation Act or other Acts for compulsory purchase, is that of Ryde's; but this is exclusive of attendances on juries, on umpires, or arbitrations, preparing plans, &c. Reporting on the sanitary condition of premises is a service which cannot be assessed. It may be objected that no clause should be inserted for an item which cannot be assessed. We do not see any allusion to the ownership of drawings and specifications, and no doubt the old clause, to the effect that architects were to be paid for their use only, in the face of recent decisions, has not helped the profession much.

## MODEL SPECIFICATIONS.—XX.

## SPIRES AND ORNAMENTAL DETAILS.

WE here resume our clauses referring to stone towers and spires. The importance of a solid foundation and of substantial construction of tower calls for remark. The belfry stage also should be massive in design, to lessen as much as possible the vibration caused by bell-ringing, and the walls should not be pierced by wide windows, which reduce the mass of supports. Wide angle piers are desirable, and if there is a spire this thickness may be further increased with advantage, giving room at one angle for a turret stair. The internal area ought to be about half that of the external area of tower. The spire construction ought to be carried down below the springing by

means of squinch arches, or by a series of projecting corbels of stone, as may be seen in many church towers. We prefer the latter, or projecting course method, as it has no tendency to thrust out the walls. Chain bond or riveted bars or links, one to each side of the octagon, might be inserted in the octagonal base thus formed. The weight of the spire is better concentrated on the inner part of the tower walls unless there is a broach—a plan which is followed largely in the examples of spires which have parapets and angle masses of masonry like pinnacles and flying buttresses, as at Caythorpe. The broach spires are seen to perfection at Stamford, and at other churches in Northamptonshire. The advantage of placing the spire on the inner part of the tower is that the weight and thrust are thrown lower down the walls. A properly constructed spire, with cramped courses at intervals, and with horizontal bedding to the stones of each course, can have little, if any, thrust, and the octagon spire may be regarded as a homogeneous shell of stone resting on the walls.

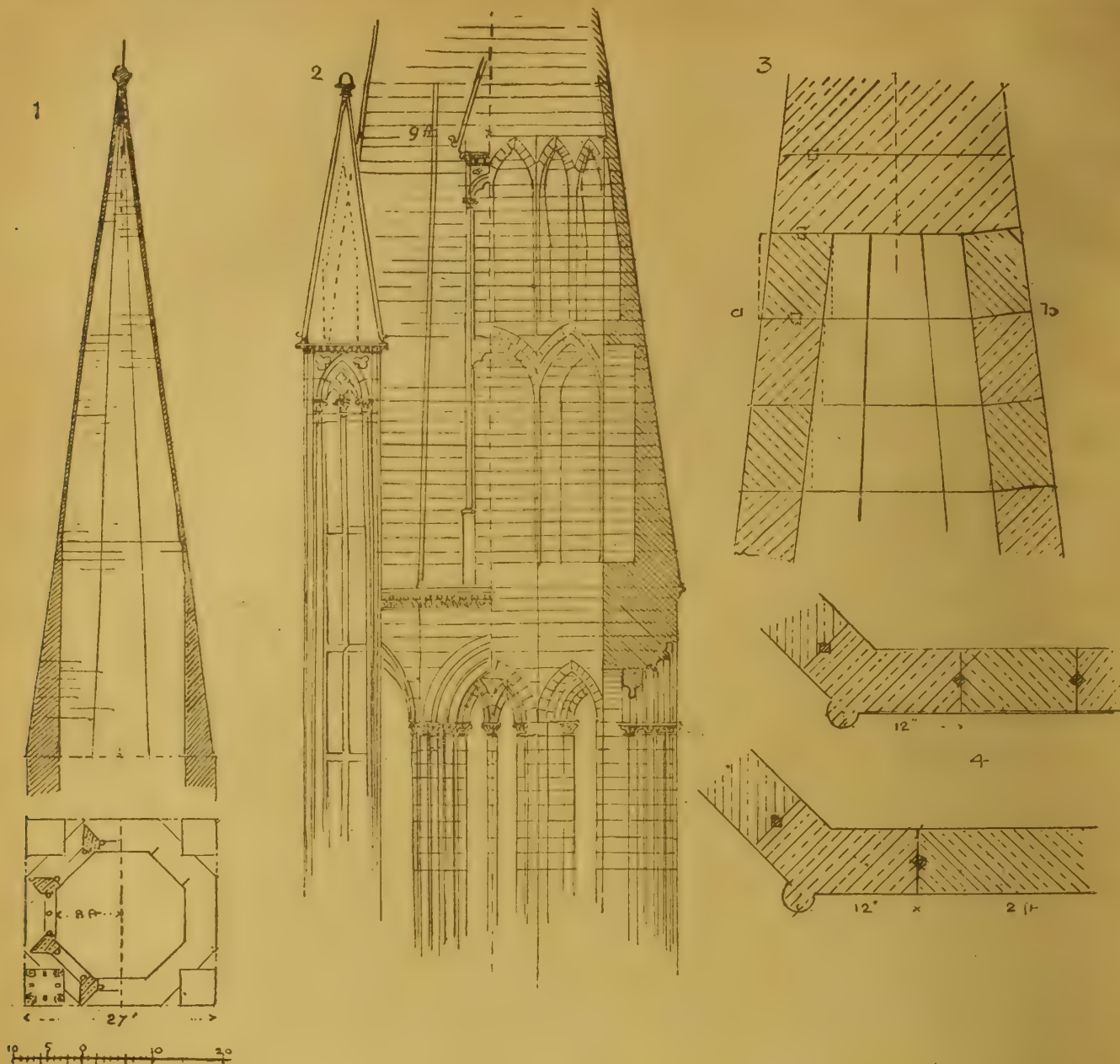
On the stability of stone towers and spires we refer the reader to a series of articles in the "BUILDING NEWS" which appeared in 1887 (Feb. 4, March 18th, &c.) In small spires, joggle-jointing, dowelling, or cramping is not necessary, though either of these means are desirable in spires of considerable dimensions. For an octagonal spire rising from a square base of, say, 26ft., to a height of  $3\frac{1}{2}$  diameters, dowels of metal or slate run in with cement or brimstone are desirable to resist the shearing stress of a violent gale of wind. Bedding joints, laid at right angles to the slope (see sketch 3b) are stronger than horizontal beds (sketch 3a), though the latter are generally adopted. There is more stone used if faces are bevelled or sunk in the horizontal bed plan, as in section, than if the inner faces of the stones are left square, as shown by dotted lines *a*, as the inside sunk work is saved, and the stone shell is increased in weight and stability by the additional thickness. When the beds are horizontal, the bonding of the quoin stones at angles of spire becomes rather difficult and troublesome.

As to the thickness of stone spires, there is not much information to guide the architect, except that deduced from mathematical calculation. As the two factors in determining the overturning effect due to wind force—viz., the weight per cubic foot and wind pressure per square foot are uniform, therefore, a uniform thickness agrees with theory; in other words, a resistance to overturning, to be uniform throughout the height, suggests a uniform thickness of shell. Nevertheless, for the sake of stability and economy of hoisting it appears reasonable to diminish the thickness in lofty spires.

The specification should state the details and dimensions not given in the working drawings—such as the thickness of the stone spire at the bottom and at other stages of the height; the way the masonry is to be bedded, whether with horizontal beds or with beds at right angles to the face of spire; if cramped, the size of cramps or dowels, the height of courses; how the apex is to be constructed; if solid for several courses, and how the vane is to be secured; also the ornamental bands, mouldings, spire lights, &c.

Our drawings show the section of spire of Coutances Cathedral, which is 96ft. in height, and stands on a tower of 27ft. square at base, and sections, and plans, to an enlarged scale of the methods of jointing. It will be seen the base of spire for a considerable height from base is graduated in thickness from 5ft. at base to 7in. at a height of 31ft. The base is also pierced by lights, so that the angle piers carry the main weight. In the plans, Fig. 4, we show V-shaped grooves for slate dowels. Sketch 5 shows the turret and spire construction





of the turrets which flank the great hall of the Royal Courts of Justice in the Strand. The other sketches explain themselves. Fig. 6, *a* and *b*, show two arch mouldings characteristic of the Decorated style. Moulding *a* is chiefly composed of the roll-moulding and the quarter-round with fillets between; the section given at *b* illustrates sunk chamfers with deep hollows; the outer dotted line shows how the moulding can be cut out of a stone splayed to a certain angle. Sketch 10 represents a cusped quatrefoil; the foils or cusps grow out of the hollow forming the larger circle; in *c* the cusp springs from the soffit of the main foliation abruptly, as if it were stuck on the flat soffit, a mode adopted in the earlier styles.

61. *Turret Spire*.—(See sketch 5.) The circular turret to have a conical spire of the height and thickness shown in drawings, each stone to be wrought to the height, curve, and thickness, or bed shown, breaking joint (or be not less than 9in. or 15in. high and 7in. thick), and to be dowelled with slate square-cut dowels 1in. square, run with lead. Or—

The apex to be in one solid stone (or in three or more courses going through), mortised for copper rod to fix vane or finial. The spire lights at base to have solid stone sills and traceried or cusped heads, as shown, with jambs grooved for louvres. The carved finial to be cut out of solid stone, and be mortised for copper bar 1½in. diameter, as shown.

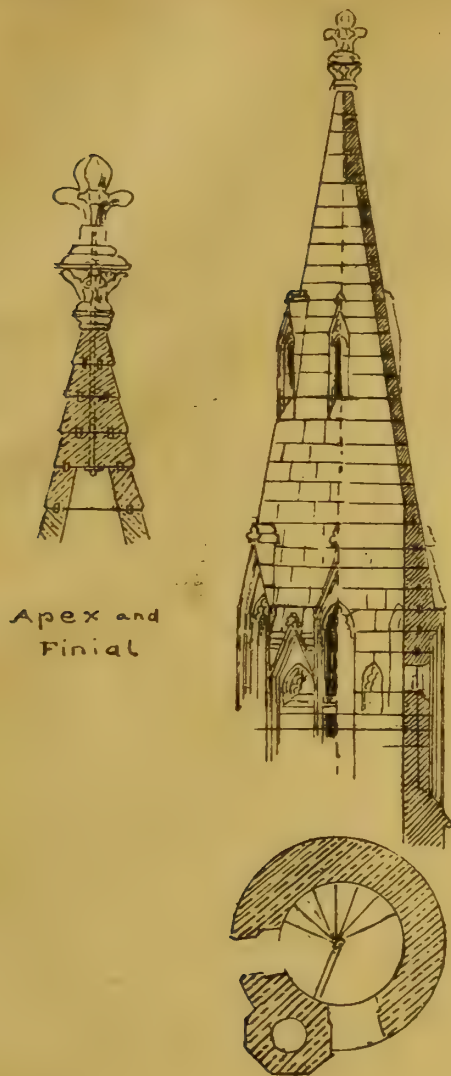
62. *Spire*.—The spire to be constructed in accordance with the working drawings and details, and to be of selected Bath "Box Ground" stone supplied by the Bath Stone Firms, Limited (or Monks Park or Darley Dale stone, best quality, supplied by the Darley Dale and District Stone Co., Limited). The spire to spring from squinch arches across the angles of tower, and the stones of each course to be of varying lengths to suit the bond, and be of varying heights not less than 9in. (or 15in.), and wrought and cut to its bed and inclination, and 7in. in thickness (or to be of graduated thickness from 12in. at the bottom to 6in. at the top), carefully set in mortar and bonded. The stones in every course to have level beds (or at right angles to face of spire), and at intervals in the height (state the same), to be dowelled with slate dowels 1½in. square, sawn square, and accurately fitted into V-grooves (see sketch), and run with brimstone or flushed with cement. The quoins at the angles of the octagonal spire to be carefully and accurately wrought to the inclination of spire. The spire-lights to be of the heights and dimensions shown, and to have solid splayed sills, heads, and with jambs grooved for louvres. The apex of spire to be formed of a solid stone (or in three or more), solid courses, with hole for copper rod 1½in. in diameter, securely fixed with screw and nut end. Or—

The spire to be constructed on six (or seven) courses of projecting stone at the angles of tower, the upper one arranged to form a true octagon with the four walls of tower. Insert in a groove prepared to receive it an iron (or copper) chain or bar of eight lengths to coincide with each side, strongly riveted at the angles, and grouted with cement. The lower courses of spire to be of the thickness of walls of tower, and diminish gradually

on the outer faces till the thickness of spire (7in.) is reached. This course to be well cramped with copper cramps 10in. long, or dowelled with copper or slate dowels run in with brimstone or cement, and every course (or every sixth course) in height to be dowelled in the same manner. The stones of every course are to be wrought and cut to their proper horizontal bed and inclination, and to vary in length and height to break bond. No stone to be of less height than 12in., or of less length than 12in. The stones to be carefully bedded and jointed in mortar. Form the spire-lights of the heights and widths shown, with solid splayed sills and heads, and the angle-quoins to be accurately cut and bonded. The apex to be in solid stone courses (or in one stone) 4ft. in height, and to be mortised for copper rod 2in. diameter, securely fixed.

63. *Vaulting*.—The groined vaulting to be constructed according to the plans and sections and details prepared to a large scale. The cross and diagonal ribs (10in. by 6in.) to be set out full size to the proper span, height, and curved from centres, and to be approved by the architect. The springing stones of the vaulting to be solid, are to be built in at the time of the erection of the wall, to the full thickness of the wall, and with horizontal beds to the level shown, and the beds of the ribs prepared, each rib to be bonded to the solid masonry of wall as high as possible. Above this level (noted on section) the ribs are to be built of separate stones with their beds inclined to the axis of curvature of the ribs. The cross and groin ribs to be set out at the springing or abacus of wall shaft accurately; the keystone or boss stone, to be 18in. square by 12in., to be fixed on the centring before the arch stones are laid. Care to be taken





to separate the ribs at the proper level, and to group them regularly at the springing. The filling in of the vault to be in narrow bands of stone 5in. (or 6in.) wide, with radiating beds, and are to be 4in. (or 6in.) thick, and in parallel courses, with properly-cut key-blocks at the apex of vault. Or—

The groined vaults to be set out full size from drawings of the architect upon properly constructed timber centring. The cross and groin ribs to be worked out to the proper curvature and height. Provide and fix the springers during the erection of the walls: these are to be of solid stone, built into the wall, at least equal to the projection of ribs, and of three (or five) courses, to the level shown, where the ribs separate. The ribs to be of the section shown (8 or 10 by 5in.), moulded, rebated for filling, and bed-jointed (state if plugged), and the stones to be not less in length than 18in. The beds to be worked to the proper centres, and to be perfectly true. The boss-stones to be (12 or 15in. by 15in.), and to be properly cut with seatings to receive the ribs. The filling-in to be in straight courses of stone (state width), and 4in. (or 5in.) thick, to bond with key-blocks at the crown of vault.

64. *Shafts to Piers.*—The shafts to piers where indicated to be of Devonshire or Purbeck marble (or Peterhead granite); state quarry, 6in. in diameter, free from all defects and selected by the architect, well polished, in one (or three pieces) and to have two beds dowelled with copper or slate dowels, and secured to caps and bases. Or—

The jambs of entrance-porch to have Purbeck (or Peterhead granite) shafts from approved quarry, polished, sunk, and dowelled, and secured to caps and bases in single lengths.

65. *Arches.*—The arches of arcading to be constructed in accordance with the detail drawings from centres shown, and upon properly constructed wooden centring. Each voussoir to be worked out of a solid stone (or two stones), measuring on the bed 18in. by 16in., and of the number shown in elevation. The beds to be true and even, and square with the curve of arch, and to be jointed in stone-dust (or other mortar).

66. *Generally.*—The joints of the masonry throughout the jambs, piers, traceried windows are to be where shown in the detail drawings, except where more desirable places can be found for them, with the architect's approval. Provide all necessary joggles, dowels, rebates, moulded, sunk, and throated work, grooves, chases, &c., that may be necessary in the execution of the mason's work not particularly mentioned under their proper heads, and the work to be cleaned off before delivering it up. Any damage that may occur from frost or settlement within — months or — years after completion is to be repaired, under the architect's direction, at the sole expense of the contractor. The caps and bases and other details, with different projections, are to be worked from single solid stones, and not to be taken out of two or more stones, and the arch-moulds are also to be worked out of one (or two) solid stones jointed where approved or shown. All shafts of piers to be bedded level without concavity.

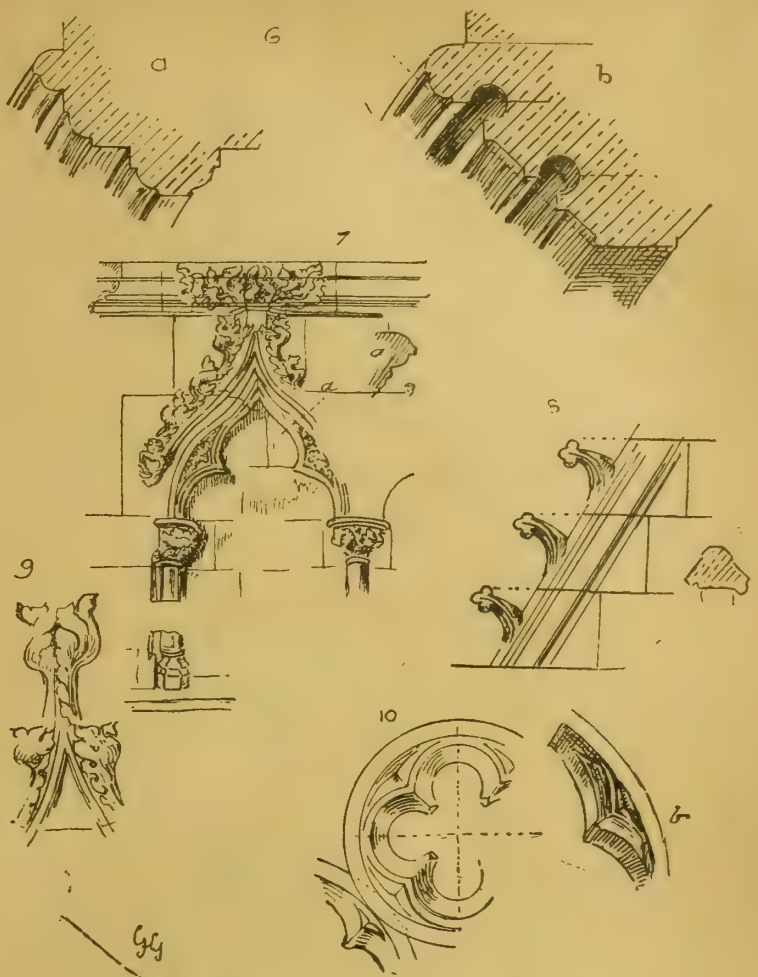
#### "BUILDING NEWS" DESIGNING CLUB.

A COTTAGE HOME FOR WAIFS AND STRAYS.

FOR this competition the following were the conditions issued for setting the subject:—  
"A cottage home for waifs and strays on a level site in the country. This dwelling is to be designed to accommodate 24 poor boys, with rooms for a matron, a nurse, and two servants. There is to be a day-room, 20ft. by 16ft.; dining-room, 24ft. by 18ft.; two dormitories of 12 beds each; a bath-room, with two baths; four water-closets and urinals in an annexe adaptable for day or night use, a box-room, a boot-room, kitchen and scullery, lamp-room and oil-shed. A sitting-room for matron to be provided, and on first floor three bedrooms for the staff and a sick-room for two boys; a bath-room and w.c. also on first floor; servants' w.c. in house yard; pantry and larder; a small play-shed on the south side of the building is to be contrived. The dimensions given may be varied provided the superficial areas in each case are not less

than those mentioned herein. Materials: red brick and stone sparingly used, roofs to be tiled, and upper walls may be plastered or tile-hung. Scale, 8ft. to the inch. Plans may be smaller. Sufficient drawings to illustrate the proposed, including a sketch view."

To-day we publish illustrations of the three best designs. The mottoes in the order of merit are as follows:—"Centaur," 1; "McGilligan," 2; and "Pantile," 3. This is a more uncommon subject than some which we have set for our Club, and its requirements are more complicated. Such an institution, though not really a show place, would be, as a matter of fact, visited by subscribers and others whose sympathy with the prosperity of the home would naturally enough be affected by seeing an attractive and well-ordered entrance. Thus a distinctive hall is an actual advantage and a well-ventilated corridor, too, serving as a lung to the building, is a point not to be overlooked. The first design makes perhaps too much of the hall by extending it so far back into the building, and by so doing he severs his cross corridor and renders the dormitory side of it somewhat needlessly confined. The dining-room is on the north side and the kitchen is on the south. The rule, however, is to give inmates as much sun as possible, and a small kitchen usually is best placed in a cool corner. The day-room being lighted from one end is not a good arrangement. The middle of the most valuable side is occupied too much with administrative departments, which would be better located elsewhere to make room for the second dormitory. The lavatory is too cut off from the bedrooms. The three basins in the w.c. building are more applicable to day use. There is no boot-room for the boys, which is a serious oversight. "Centaur," for all these defects, has lost points, but still he is the best, and he seems to have made a study of plans which have been published of similar buildings. He has not copied any, but he has gained by hints thus very properly obtained. His elevations are well-balanced and fairly picturesque. The play-shed





is too much of a verandah. "McGilligan," the second man, needlessly contrives his plan in such a way as to make internal areas a necessity, and there should be no need to divide the w.c.s and baths into two distinct blocks in this way. Their use during the day has not been properly considered. The boys at all hours would have to be in and out traversing the main corridors, and, besides, would not be so decidedly cut off from the dormitories as they should be during the daytime. The matron's sitting-room commands the entrance, but it does not control the kitchen very well. The absence of a boot-room is here to be noted, and the oil-shed is inadequate for the space necessary for trimming several lamps, and thus a separate lamp-room has had to be provided. Externally the design is picturesque enough, and suggests an institution, though its cottage-like character is not so marked as we intended. The dormitories are only 10ft. high, instead of allowing the ceiling to run up to the collar level. At present much space is lost in the roof, a remark also applicable to the first-floor rooms. "Pantile," the third man, makes the same mistake, but his exterior has a home look and is cottage-like; indeed, it is mainly for this quality that he wins this position. His plan is disjointed and not really good, cramped in parts, and wasteful in others. The boots' place is near the entrance, as it may well be; but, instead of being adjacent to the main doorway, the boys should have a second entrance, close to which the boots' room ought to be located, with ample ventilation and space for boot-cleaning. In "Pantile's" plan this work would be very objectionable close to the front doorway. The dining-room and day-room should by preference be put in juxtaposition, and for special occasions it is an advantage to be able to throw them into one by a pair of running doors, or even folding ones. The lavatory block is not particularly well managed, and four basins for twenty-four boys is very inadequate.\* "Hotspur" has a very compact plan, but this is mainly due to the fact that the dormitories are on the first floor, an arrangement not contemplated, though not actually excluded. The author of this plan, however, has not gained undue advantage by adopting it. There is much that is meritorious in his proposal, which is very well worked out. The exterior is not specially attractive, lacking as it does individual accentuation and point. "Hotspur" ought to do better, having done in many ways so well. The criticisms offered on the previously-mentioned plans in some particulars equally apply to this, and its author would do well to notice the points in which they do apply. "Dachs" is being taught the value of breadth and simplicity, but he has yet to learn the charm of sweet proportion, a matter no doubt on which tastes will differ. We object in this front of his to the crowding of vertical lines. If three defined projections are necessary in so short a façade—and we do not think they are necessary—then the end wings should have been plain walling, if possible, and, anyhow, the broken caves line, by the three dormers rising through it, should have been omitted. Practically, the windows must be there, consequently there is something radically wrong in thus cutting up the elevation into a central pavilion on plan. We asked for a cottage home, and we can do no other than condemn absolutely "Dachs's" plan, for it is very poor for such a contributor. The cross corridor is simply windowless, and yet we have occupied space in discussing his elevations. We do this in order that other contributors may follow the trend of our remarks. "Dachs" is too ambitious, and not thorough enough. He will not succeed as a good architect without more attention to detail. Let him see the folly of wasting so much space as he has here done over the w.c. by the side of his recreation-room. It would be difficult to find a more public position for the w.c. door. "Gib" is neat and clever. His plan is one of the best, and he nearly reaches a success. The economy of placing the dormitories side by side is to be commended; but it is not so manifest as to how he gets the water in the valley away beyond the chimney midway between the two roofs. The disadvantage of mixing up the day-rooms with the dormitories is a fault in this plan, and there are no boot, box, or lamp rooms. The little place for oil is not large enough for more than a big cask. The lavatory block is properly contrived for

day use, and yet is sufficiently near to the dormitories. The lighting to the dormitories, mainly by a big window at one end, is a great fault. The drawings of this design are painstakingly done and sufficient, but they want a little more spirit imparted into their delineations. "Notts" puts one dormitory over the other, so that the upstairs boys will have to come down to use the lavatories. The servery is wedged in between the dining-room and day-room, and cutting off the matron from looking after the servants in an objectionable way. The boot-room should not be cut off from the lavatory in the manner adopted by "Notts." His elevation is better, but his perspective is ineffective and poor. "Glaour" has not scored a success, but he has made a try at one. His plan is wasteful in passage spaces, which on the ground-floor would be perfectly dark. "Oak" is more wasteful still with corridors, landings, and halls, for of halls there are two. The elevations are commonplace. "Jeddah" sends a half-timbered design calling for little remark, while the last to mention is "Excelsior," who, in doing his best, has not distinguished himself. He has made a good try, and will be all the better for the effort. Let him try again.

#### THE ARCHITECTURAL ASSOCIATION ANNUAL EXCURSION, 1898, WARWICKSHIRE.

THE final details of the forthcoming outing of this society are not exactly settled, but we may mention the places which will be visited in all probability. The hon. secretaries, Messrs. Talbot Brown and A. W. Hennings, are busily occupied in arranging with the various owners and authorities for permissions before completing the actual details of the programme. Warwickshire, with Warwick, formed the field for one of the most enjoyable of these excursions years ago, when some of the buildings again to be seen this year were included in the list. The late lamented Bowes A. Paice, one of the most indefatigable workers which the A.A. ever had as hon. sec., was then (1877) the president. Very few of the excursionists present on that occasion now remain among the party, which in the natural order of things has very materially changed. It would be difficult, perhaps, to name a better or a richer district for an architectural trip of this character than the country round Warwick; and even if, as we have said, some of the ground covered on the previous excursion is again comprised in the programme, much of the work to be seen will repay a second investigation. To most of the members, no doubt, the buildings will be entirely fresh, and we wish the proceedings every success. The secretaries are urging members intending to join to send in their names without delay, and it is only by the co-operation of numbers that these excursions year by year can be prosperously maintained.

The headquarters will be at the Regent Hotel, Leamington, and the following places are furnished in the official preliminary programme: Wroxall Hall and Church, Baddesley Clinton, Knowle Village and Grimshaw Hall, Temple Balsall, Ram Hall, Berkswell, Stratford-on-Avon, Little Woolford, Honington, Solihull, Hampton-in-Arden—Maxstoke Castle, Coleshill, Castle Bromwich, Salford Priors, and Bidford. Warwick, with its various attractions, will probably occupy a day, and it is possible that Kenilworth and Stoneleigh may be visited.

#### PASSMORE EDWARDS CONVALESCENT HOME, PEGWELL BAY.

THE Passmore Edwards Convalescent Home at Pegwell Bay was opened by Mr. Passmore Edwards on Saturday last. Special trains were run from Charing Cross, some 8,000 tickets being issued for the occasion by the Working Men's Club and Institute Union, to whom the home belongs, and at whose expense the new buildings have been erected. The original premises formed an hotel, and these having been altered and adapted as a convalescent home, were given by Mr. Edwards to this great co-operative society of working men. The demands for accommodation proved so numerous that the Union decided to enlarge the home, and Mr. Edwards increased his original gift by handing over the freehold of the adjacent land for the site of the extensions. Arrangements were made with the Ramsgate Corporation also for the widening of the

Ramsgate and Minster road along the frontage skirting the bay. The land to the rear of the home has been bought, too, by the Union for gardens and grounds in conjunction with the home. The work now finished includes boundary walls and gateways, and several alterations to the original buildings, such as the extension of the dining-room and new extra kitchen. The new wing itself was illustrated in the BUILDING NEWS for July 2nd, 1897. The crowning stage of the central tower forming the belvedere is now in course of building at the cost of Mr. Passmore Edwards. The builders are Messrs. Jarman and Sons, of Ramsgate. Messrs. Cliff and Son supplied the glazed bricks. Messrs. Hayward, Son, and Eckstein made the external iron staircase for use as an escape in case of fire. The baths, closets, &c., were furnished by Messrs. Doulton and Co., the chimneypieces by Messrs. Easley, Limited, and the wood-block flooring was very satisfactorily laid by Mr. Ebner. Messrs. Jeffery and Co., and Messrs. Essex and Co., supplied the wall-papers, and Messrs. Aldam Heaton, and Co. the quarry glazing. Messrs. Mark Fawcett and Co. constructed the fireproof floors. On Saturday, representatives from a large number of clubs attended, and on Sunday about three thousand club members inspected the premises. Mr. Maurice B. Adams, F.R.I.B.A., is the architect.

#### FRESCOES IN THE HOUSES OF PARLIAMENT.

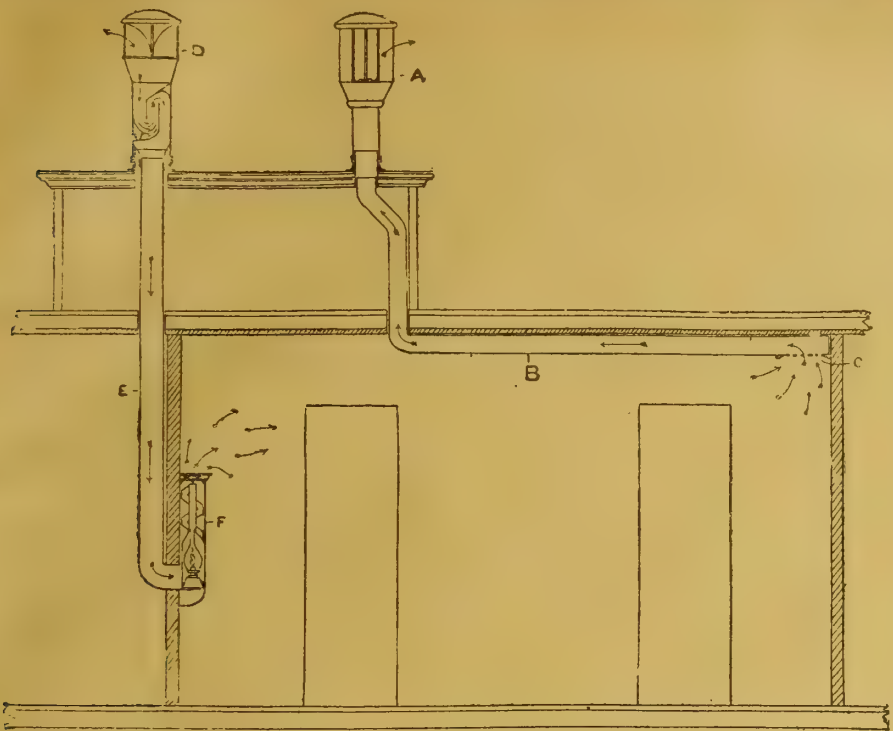
A PARLIAMENTARY paper which has just been published contains further memoranda by Professor Church, F.R.S., concerning the wall-paintings in the Palace of Westminster. In a prefatory note, Mr. Akers-Douglas states that the Government and the public are much indebted to Professor Church for the great amount of trouble and skill which he has gratuitously bestowed upon these paintings. The First Commissioner of Works adds that he proposes now to ask Professor Church to advise as to the steps to be taken to carry out his further recommendations.

Writing on December 14, 1897, Professor Church informed Mr. Akers-Douglas that no further treatment of the wall-paintings in the Palace of Westminster was carried out during 1896; but he considered it advisable, in the autumn of 1897, to deal once more with the two large water-glass pictures by Maclise in the Royal Gallery, as well as the five frescoes by Dyce in the Queen's robing-room. The operations were carried out to his complete satisfaction by Messrs. Redhead and Turner, employees of the firm of Messrs. Shrigley and Hunt, of Lancaster and London. On July 22, 1897, he addressed a letter to Sir John Taylor, the chief surveyor of her Majesty's works and buildings, calling attention to the fact that four of the glazed paintings in the Peers' and Commons' corridors—"The Burial of Charles I.," "Charles I. Erecting his Standard at Nottingham," "The Parting of Lord and Lady Russell," and "The Last Sleep of Argyll," had become disfigured, since they were brought under his more particular observation through the formation of dark stains, or through efflorescence and scaling. The First Commissioner was good enough to approve of his proposal; but there proved to be practical difficulties in removing and replacing the glasses of these paintings, so that their treatment, expedient as he still believed it to be, had been deferred. Professor Church states that in his letter of July 22, 1897, he made mention of an apparatus then being constructed to his order for producing a powerful air-jet, charged with bread-crumbs, to be employed in the cleansing of the Westminster paintings. This apparatus was delivered in the Royal Gallery at the end of September, 1897, but had to be returned to the makers for some alterations, and he hoped that, after further modifications, he might be able to bring it into use. Two memoranda are annexed, in which Professor Church describes in detail the method which has been adopted, under his direction, for the restoration and preservation of the wall paintings in the Palace of Westminster.

The Alexandra Hall, Clifton, now the property of Messrs. John Cordeux and Sons, Bristol, is in the builders' hands. Messrs. J. A. Ridd and Sons have secured the contract under Messrs. Foster and Woods, architects, and the whole building is to be transformed into a sumptuous "furnishing hall," with 160ft. frontage. This will make the total length of frontage owned by the company 690ft.

\* Owing to the issue of the Index this week, we are prevented from illustrating to-day this third design; but we hope to give an illustration of it next week.





A, Boyle's patent "air-pump" ventilator (up-cast); B, extraction-shaft led to end of cabin; C, foul-air exit, opening into extraction-shaft; D, Boyle's patent down-cast ventilator; E, down-cast shaft; F, Boyle's patent fresh-air warmer.

#### VENTILATION OF THE FRAM.

THE new expedition to the North Pole under the leadership of Otto Sverdrup, captain of the *Fram* during Dr. Nansen's expedition, left Christiania in that now historic craft on its second adventurous voyage to the "White North," on Friday, June 24. Considerable alterations have been effected in the *Fram*, which is now much more comfortable and seaworthy than when it first set out for the Pole, five years ago to the day. The upper deck has been converted into the main, and is entirely roofed in by a new flush deck. The saloon, which is some 18ft. square, is situated forward. Special provision has been made for the ventilation of this part of the vessel, which is effected by the Boyle system of ventilation, originally designed for the *Fram*, as per accompanying diagram, by Messrs. Robert Boyle and Son, ventilating engineers, of London and Glasgow, to whom Dr. Nansen at that time wrote: "I am convinced that your ventilating system will prove to be of the utmost value in those regions where the ship for years will be our dwelling, and where, of course, good ventilation is *conditio sine qua non* for our health and sanity." On the *Fram*, as altered, the ventilators are fixed on the flush deck, so that the wind can reach them freely and unobstructedly from every quarter, insuring their efficient action with the wind blowing from any direction.

#### DESIGN AND ARTISTIC TRADES.

THE exhibition of work done by students of the Central School of Arts and Crafts at their school in Regent-street, although small, shows a right idea of the industrial application of design to crafts. All our readers may not be aware of the work done by this school, established by the Technical Education Board of the London County Council, under the able directorship of Mr. George Frampton, A.R.A., and Mr. W. R. Lethaby. Classes are established for the students of architectural design, drawing from the round intended for architects, stone-working for architects, lead-work, the mechanics of building, modelling, stained glass, silversmiths' and goldsmiths' work, enamelling, &c., each of which is conducted by efficient instructors and lecturers. The results of the work done by these classes may be seen at 316, Regent-street. Passing through the rooms of the studio we see a few examples of artistic craftsmanship, one or two examples of stone-working, a stone jamb and mullion, and a base moulding. We should like to have seen more examples of stone-working of this kind. The

beaten-up leadwork applied to ornamental purposes, like gutters, pipe-heads, crestings, vallances, tablets, ridges, &c., are instructive, as they indicate a true motive in dealing with the material. Some of the specimens show a right appreciation of ornament, as in the nice stamped or beaten-up work in which the thistle has been introduced, also a tablet with date. The examples of metal-work, done by the class of silversmiths, and chasing and engraving, shown in the case, are meritorious; the ewer, teapot, cups, vases, and basins in brass and copper are simple in outline, and the ornamentation appropriate. Near it are a few enamelled objects, showing Champlevé, Cloisonné, and painted enamels, the colours and design both good.

The furniture designs are few. We notice designs for a hall table with inlay top, simply treated by Geo. Fletcher, an architect's assistant; a design for cabinet, a cupboard, handle of drawer, a kitchen dresser, a high back armchair with cut rails and turned legs, mahogany sideboard, a chimney-piece with copper plates instead of tile-work. Those signed W. Wigginton and Percy Walker show an application of right principle in design. The design for a country house, by G. Fletcher, in red brick with tile roofs, is unpretentious, and illustrates how designs for buildings can be made to express the facts of country life. The plan is rather straggling. The town house, by H. H. Witt, is rather commonplace, the lower stories are the best, and the plans indicate study.

The stained-glass work specimens are simple and practical, and effective designs of leadwork as applied to plain glazing and figure work, and the class presided over by Mr. Whall has done some good work. Elementary forms are well applied in the designs shown for plain lead glazing, as in the work done by A. J. Drury, of simple plant forms, Messrs. H. Rayment, Evestaff, and others. The cartoon in chalk, representing the Psalmist's words, "Storms and wind fulfilling His word," is vigorous and expressive.

Embroidery is represented in several very beautiful needlework specimens, the designs and colours in which are well chosen. Mrs. Sparling (Miss May Morris) is a visitor to this class. Several clever examples of woodcuts in colour, showing a Japanese style of picture-making, are exhibited. This is the work of a class for design in engraving and printing of colour prints from wood blocks, admirably adapted for picture books and nursery tales. The shaded drawings from the round shows many architectural subjects, and we must not forget to mention a few admirable studies of the figure in crayon, modelling of the figure by R. Garbe, C. White,

and others; some good designs for wall-papers, and a stencilled curtain by M. M. Bruton, and cases of bookbinding in which several specimens are shown of this craft. Drawing highly-finished ornament of the conventional kinds are not encouraged, the aim of the school being to develop the handicrafts, and to encourage the student to understand materials, motives, and ideas adapted for the several trades.

#### STRENGTH OF BUILDING STONES.

THE chief elements of strength in building stones are briefly described in a paper by Prof. Alexis A. Julien, of Columbia College, as follows:—

(1) Interlockment of grains, of which three stages occur: irregular aggregation, in helter-skelter disorder and with poor consolidation; parallel sorting of grains; and dove-tailing, or interpenetration. The last is most thoroughly effected in the crystalline stones, and on it far more than on the specific gravities of the constituent minerals depends the weight, taken in mass.

(2) Coherence between the grains, effected in two ways. First, cementation, mainly of the fragmental stones by means of various natural cements, the presence of silicious cement being the reason for the special excellence of certain sandstones. Second, surface or capillary adhesion between the minute plates and grains, especially in the crystalline rocks. An important distinction must be made between the two classes of voids in a stone, the pores and the cavities, this involving the subject of the different destructive effects of cavities and pores when filled by flakes or films of ice. This question also includes the solubility of stones and their cements in fresh and salt water, upon which there is need of further investigation.

(3) Tension among the mineral grains, and the active stresses which survive in stones and affect their strength, of which three classes occur. First, tension produced by crystallisation; second, tensions produced by subterranean strain; third, tensions produced by present physical conditions; all of which may cause a stone to behave very differently from previous specimens examined and tested.

(4) Rigidity, or absence of mobility among the grains of a stone. Evidences of internal motion, flexibility, and plasticity in stones may be attributed to three sources. First, cleavage planes of cleavable minerals, particularly mica; second, gliding planes, illustrated by the miniature faults abounding through all varieties of stone; third, the presence of a lubricant, such as oil, bitumen, and especially of water. The influence of water in nearly all stones is most important, and there is need of special methods of determining the strength of wet or moist stones, especially as regards diminution of rigidity from this cause.

It was reported to the Maidstone Town Council last week that the total cost of the typhoid epidemic to the ratepayers had been £17,522.

New premises for tanners and carriers are being built in Chapel-street and Butcher-lane, Bury, Lancs. The new works, which are being built from plans by Mr. David Hardman, of Silver-street, Bury, will be three stories in height, covering an area of 92ft. by 34ft., with a floorage of about 18,000ft. The contractor is Mr. J. Tinline.

The Queen has granted pensions from the Civil List of £25 per annum each to the two daughters of the late Mr. George Wallis, in consideration of his long services to art education. Mr. George Wallis was one of the earliest pioneers of the modern movement for the extension of art education in this country. He was head master of the Manchester School of Design from 1843 to 1846, and held the post of senior keeper at the South Kensington Museum for nearly 30 years. His youngest son, Mr. Whitworth Wallis, is director of the Birmingham Art Gallery.

A stained-glass memorial window has just been erected in Stenton Parish Church, N.B. The window is one of two lights, and is filled with an illustration of the three Christian graces—Faith, Hope, and Charity—and tracery. Faith is represented by a female figure reading the Bible, and holding the staff with a crucifixion top; and Hope by a young female figure, with the anchor, looking upwards; while Charity is also represented as a female figure, with a child in her arms, and a youthful figure at her feet. The window was executed at the studio of Messrs. A. Ballantine and Gardiner, Edinburgh.



## Building Intelligence.

**DEPTFORD.**—The Prince of Wales laid the foundation stone of the Deptford Fund House on Saturday. The building is the outcome of efforts made four years ago by Viscount and Viscountess Templetown, who then drew public attention to the social wants of Deptford. Premises specially adapted to meet the requirements of the various branches of work have been designed by Mr. C. M. Mileham, architect. The first portion of this group of buildings is now in progress, and to this, when completed, will be transferred the work of the fund, together with a school of domestic economy under the Technical Education Board. The new building will contain accommodation for cooking, laundry, sewing, and dressmaking classes, club and recreation rooms, dormitory, and baths. It is intended to extend the building, as soon as funds are forthcoming, by the erection of a large hall for entertainments, and a gymnasium under it, and to build a settlement house for the ladies engaged in the work. Provision is also to be made in a separate portion of the building for club, recreation, and reading-rooms for men and boys.

**INVERNESS.**—The Highland Railway Company's Station Hotel at Inverness has been considerably extended, and its internal arrangements have been remodelled and perfected. The hotel, in its renovated and modernised state, was reopened the other day. The designs for the renovation of the structure were prepared by Messrs. Ross and Macbeth, architects, Inverness. The great waste of floor space in lobbies which was entailed by the two main entrances being at extremities of the building has been obviated by the entrance porch from the town side being transferred to the corner of the Station-square, just outside the station portico, the platform entrance being only a few yards from it, inside the portico. These entrances open into a well-appointed hall, from which springs a grand staircase, which communicates with all parts of the house to its uppermost floor. Every one of the hundred bedrooms, all of which have been redecorated and refurnished, has been placed in direct communication with the general office in the hall by means of telephones and electric bells. The public rooms on the ground floor have also been remodelled and refurnished.

**IRTHINGTON.**—On Tuesday week the Bishop of Barrow dedicated the new church tower, clock, and bells, which have been added to the church at the cost of Mr. James Carruthers, of London, a native of the parish. The Bishop also consecrated an addition to the churchyard. The tower is in the Late Gothic style, and is provided with a clock, showing the time by three dials, and possessing chimes. It is 60ft. in height, and 17ft. square, and resembles in its substantial character and embossed coping the ancient fortified towers, examples of which are still to be found in the diocese. It was designed by Mr. T. Taylor Scott, of Carlisle, who was the architect for the restoration of the church a couple of years ago. The tower has been erected of red sandstone, from the parish quarry at Three Horse Shoes, the stone used at the church in olden times. Buttresses are constructed on each side of all the angles, and windows with moulded heads and lead lights are formed at each stage; the large openings at the upper part of the tower and on each side of it being filled in with louveres for the belfry. The stone spiral staircase has a splayed angle and stepped stone roof. The new peal of five bells were cast by the firm of John Warner and Sons, Cripplegate, London. The weight of the hour bell is 12cwt., and that of the quarter bells is 16½cwt. The clock, which strikes the Great St. Mary of Cambridge chimes, has been constructed by Messrs. Wm. Potts and Son, of Leeds and Newcastle. The work has been carried out by Mr. Robt. Mark, builder, of Laversdale; the oak-work and general joiners' work by Mr. William Edger, of Brampton. Mr. J. F. H. Harriman, of Carlisle, has been clerk of works.

**WESTON-SUPER-MARE.**—The foundation-stone of the permanent church for All Saints' district was recently laid with full Masonic honours. The cost of the new church when completed will be £6,000, of which £1,800 has at present been raised. It will be built in the 14th-century style, and is to consist of a nave, sanctuary, north and south aisles, side chapel, vestry, sacristy, organ chamber, and north and south porches. The tower will stand completely separate from

the church, and will form a lych-gate. The church, which will accommodate some 675 persons, will be built of local stone, the external dressings being of Box Ground stone, and those of the interior of Corsham Down stone. The roofs will be of wood, of barrel-vault form, and will receive decorative painting. The steps are to be of rubbed Portland stone and the paving of the chancel also; the floor area will be of concrete; whilst the windows, which will be occupied by flowing tracery, will be fitted with slightly-tinted glass. Mr. G. F. Bodley, A.R.A., of Gray's Inn-square, W.C., was the architect.

### CHIPS.

Mr. Onslow Ford, R.A., has been commissioned to execute the portrait medallion of the late Duchess of Teck, which it is proposed to attach to the drinking fountain erected as a memorial of her late Royal Highness at Richmond, Surrey, by residents in that town.

The new Marlborough and Grafton Railway was opened on Saturday in the presence of the Marquis and Marchioness of Ailesbury. Messrs. John Aird and Sons were the contractors.

New board schools are being erected at Longport, Burslem, and special consideration has been given to the ventilation, which will be carried out on the Boyle system.

In the case of Richard Charles Wright, Wellington-road and Finchley-road, St. John's Wood, N.W., carrying on business with Frederick Neish Hunter as builders and house agents, the discharge from bankruptcy has been suspended for two years, ending May 24, 1900. The public examination was concluded on May 21.

A new church, dedicated to St. Peter, was opened on Thursday in last week at Rhosrobin, a mining village a mile and a half from Wrexham, and in the parish of Rhosddu, a suburb of Wrexham. The church has been built of brick at a cost of nearly £1,500. It is erected on a site given by Sir Watkin Williams Wynn, Bart., and will accommodate 230. The builders were Messrs. Rogers and Sons, Brymbo, and the architect is Mr. J. H. Swainson, Wrexham.

The Passmore Edwards public library at Bodmin was completed last week by the erection in the entrance hall of a brass tablet measuring 2ft. 6in. by 2ft., and set in a teak frame. The brass bears an inscription stating that the library was presented to the borough of Bodmin by Mr. John Passmore Edwards, as a memorial to the late Right Hon. Sir William Molesworth, Bart., of Pencarrow, Cornwall, Secretary of State for the Colonies in 1855. It further mentions that the architect was Mr. Silvanus Trevail, F.R.I.B.A., of Truro and Westminster, and the builder was Mr. S. Trehane, of Liskeard.

Mr. Herbert H. Law, inspector to the Local Government Board, held an inquiry at Urmston on Friday into an application of the urban district council to borrow £1,000 for works of street improvement, inclusive of the flagging of the public footpaths. The council was represented by Mr. C. C. Hooley, C.E., surveyor, who described the proposed works in detail.

Mr. Isaac Gordon, money-lender, in the Queen's Bench Division, on Friday sued Mr. Bray, a Paddington builder, to recover £480 on a promissory note. Defendant's counsel could not deny that his client signed the instrument, but pleaded that under it plaintiff was charging 1,000 per cent. interest. Mr. Justice Channell said the present state of the law was such that if people chose to enter into foolish contracts they must stand by them. He gave judgment for the plaintiff.

Mr. W. O. E. Meade-King, M.I.C.E., Local Government Board inspector, held an inquiry at the Guildhall, Conway, on Friday, relative to an application made by the corporation for sanction to borrow £2,270 for purposes of street improvements. The roads proposed to be improved were from Llandudno Junction to Tywyn and the Gylfin-road, which were to be made 800 yards in length and 30ft. wide, with a 6ft. parapet. The deputy surveyor (Mr. Oliver Jones) submitted and explained the plans.

The rector of Longsight conducted on Friday night in St. Paul's Church, Peel, Little Hulton, a service in dedication of the spire, which has just been completed. The spire has been erected out of a bequest left by the late Mr. Samuel Weston, of Manchester.

At St. John Baptist Church, Spalding, on Monday, the Bishop of Lincoln dedicated memorials to the Rev. A. W. G. Moore, M.A., the first vicar of the church, 1875-97. The memorials take the form of a brass eagle lectern and a mural brass, both Early English in character. The work has been fashioned by Messrs. Hart, Son, Peard, and Co., art metal workers, of London and Birmingham.

## Engineering Notes.

**MUNDESELEY BRANCH RAILWAY.**—The opening last Friday of a new line of railway between North Walsham and Mundesley-on-Sea marks the beginning of a series of railway extensions which will be carried out by a joint committee of the Great Eastern, the Great Northern, and the Midland Railway Companies. The line from North Walsham forms a junction with the Great Eastern Company's Norwich and Cromer line and the Midland and Great Northern joint committee's Lynn and Yarmouth line, and extends a distance of 5½ miles to Mundesley-on-Sea, a rising little watering-place to which access has hitherto been gained only by omnibus or char-a-banc from North Walsham. The line will be a single one, with only one intermediate station, to be known as Paston and Knapton. It has been constructed from plans by Mr. W. Marriott, as engineer to the joint companies, the contractors for the railway stations having been Messrs. Cornish and Gaymer, of North Walsham. The second section, yet to be constructed, will be a new line between Mundesley and Cromer, a distance of eight miles along the coast, and passing *en route* Trimmingham, Sidestrand, and Overstrand, each of which villages will be supplied with a railway station. The third section will proceed in the opposite direction from Mundesley to Happisburgh, or Hazeboro, serving also the villages of Bacton and Walcott. A further important section of the same scheme is a new direct line, ten miles in length, between Lowestoft and Yarmouth, which will also serve the intermediate villages of Gorleston, Hopton, and Corton.

The Select Committee of the House of Lords on the London and South-Western Railway Bill decided on Monday that the preamble of the Bill, so far as the proposed further extensive enlargement of Waterloo Station was concerned, was not proved.

A branch free library in Ramadan-road, Balham, was opened on Friday. The materials used in the construction of the buildings are red bricks, Portland stone, and green slate, while all arches are done in a specially made red tile. The architect is Mr. Sidney R. J. Smith, F.R.I.B.A., and the contractor is Mr. Walter Wallis, of Balham.

At Crathie Church, near Balmoral, on Monday, the Jubilee Commemoration window given by the Tenantry of the Royal estate was unveiled and dedicated. A window has also been given by the Queen as a memorial to the late Duke of Clarence, and, opposite it, one to the memory of Prince Henry of Battenberg.

The Duke of Devonshire, as Mayor of Eastbourne, announced to the town council on Monday his intention of presenting to the town, as a site for a free library and technical institute, a piece of land valued at between £5,000 and £6,000, situate at the corner of Grove-road and Water-lane, within a minute's walk of the railway station and the chief business thoroughfare of the town. The announcement was received with applause.

The new organ which has been built in the cathedral at St. Asaph by Messrs. Hill and Son was opened on Friday by Mr. H. P. Allen, Mus. Bac., organist of Ely Cathedral.

Mr. W. O. E. Meade-King, A.M.I.C.E., of the Local Government Board, held an inquiry at Colwyn Bay on Friday with reference to the application of the Colwyn Bay and Colwyn Urban District Council for permission to borrow £5,000 for the purchase of a town's yard, £500 for the purchase of the old promenade and sea-wall, and £600 for sewerage work (extension of old outfall).

According to the July Circular of the Emigrants' Information Office, plenty of work has been offering in the building trade and in most other trades in New Zealand; but with some few exceptions the local supply of labour seems to be sufficient. The building trade has been very active of late at Cape Town, and there is said to be some demand for carpenters and masons at Grahamstown. Speaking generally, however, there is at the present time no demand for anyone in the colonies except in some parts for thoroughly skilled mechanics; inexperienced hands will find great difficulty in getting work.

The hybrid committee of the House of Commons, presided over by Sir U. Kay-Shuttleworth, which has had under its consideration for some 15 days the merits of the Fishguard and Rosslare Railways and Harbours Bill, affording a new route from Pembroke to the south-east coast of Ireland, concluded its labours on Friday, when the preamble of the Bill was declared to be proved. A direct line, 17 miles in length, is to be made between Fermoy and Dankettle, shortening the route to Cork.



## PROFESSIONAL AND TRADE SOCIETIES.

**LANCASHIRE AND CHESHIRE BUILDING TRADES EMPLOYERS' FEDERATION.**—The first annual meeting of this federation was held at the Exchange Station Hotel, Liverpool, on Wednesday week. The president (Mr. Robert Neill, jun., Manchester) was in the chair. The report stated that the federation now consists of 26 local associations, having an aggregate of 1,320 firms. Negotiations are pending with St. Helens, Wigan, and other boroughs, and it is confidently expected that these towns will shortly join. At the first meeting of the new executive board, Mr. R. Neill, jun., Manchester, was elected president, Messrs. C. W. Green (Liverpool) and D. J. Stores (Stalybridge) vice-presidents, and Mr. W. Marshall (Manchester) treasurer. In the event of a protracted struggle with the union masons, the executive are assured of the support of the Yorkshire Federation and of many of the Quarryowners' Associations. The president said the Federation had not been formed with any idea of lowering wages. They were always prepared to pay good wages to efficient workmen; but the employers strongly resented any interference in connection with their business. It was decided to resist all future attempts of the operatives to enforce the rule limiting the number of apprentices. It was also decided to approach the architects, and point out the increased cost of work owing to the Workmen's Compensation Act. An opinion was expressed that the responsible foremen should not be members of trade unions, but should have a separate association.

**MIDLAND FEDERATION OF MASTER BUILDERS OF GREAT BRITAIN.**—A meeting of the Executive Council of the Midland Centre of the Federation was held on Wednesday in last week at the offices of the Nottingham Master Builders' Association. Twenty-two members were present, representing the counties of Derby, Nottingham, Lincoln, Salop, Stafford, Worcester, Warwick, Leicester, Rutland, Northampton, Huntingdon, Flint, Denbigh, Carnarvon, Anglesea, Merioneth, and Montgomery. The President (County Alderman John Bowen, of Birmingham) occupied the chair. Reports from the Lancashire and Cheshire branch of the National Federation relating to the strike of stonemasons, the lock-out in that district, and the present strike in Nottingham were received, and with other matters of general and urgent importance to the building trade fully discussed.

**NORTHERN ARCHITECTURAL ASSOCIATION.**—On Saturday the members of this society had an excursion to Durham. At three o'clock the members, to the number of 30, assembled at Durham Railway Station and from thence proceeded to the new County Buildings in Old Elvet, where they were met by Mr. H. Barnes, of the firm of Messrs. Barnes and Coates, Sunderland, the architects for the new buildings, who conducted them over the premises, which are to be formally opened on the 26th of the present month by Mr. S. Storey, the chairman of the Durham County Council. From the County Buildings the company proceeded to the newly-restored Chapter House, where Mr. C. Hodgson Fowler, M.A., F.S.A., the cathedral architect, acted as guide. St. Oswald's and St. Margaret's Churches were also visited, and subsequently the company were entertained to tea by Mr. and Mrs. Hodgson Fowler.

**SOUTH WALES ARCHITECTS AT BATH.**—The first outing of the Cardiff, South Wales, and Monmouthshire Architects' Society was held on Wednesday, when the members journeyed to Bath, where they were met by Mr. David, one of the firm of the Bath Stone Firms, Limited, and conducted over the principal quarries of the company. Then they were entertained at luncheon, and subsequently driven in brakes through the quarry properties. Major Davies, the architect of the Bath Corporation, afterwards took the party over the Roman baths, and explained the whole of the excavations. The Abbey was next visited. At luncheon Mr. David presided, and gave the toast of "The Cardiff, South Wales, and Monmouthshire Architects' Society," to which Mr. C. B. Fowler, the president, and Mr. Caple, the hon. secretary, responded.

Viscountess Portman laid the foundation-stone on Wednesday afternoon of a nurses' home connected with the Queen Charlotte's Lying-in Hospital, Marylebone-road. The cost of the new building is estimated at £12,000.

## TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the BUILDING NEWS, 332, Strand, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

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## ADVERTISEMENT CHARGES.

The charge for Competition and Contract Advertisements, Public Companies, and all official advertisements is 1s. per line of Eight words, the first line counting as two, the minimum charge being 5s. for four lines.

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Front-page Advertisements 2s. per line, and Paragraph Advertisements 1s. per line. No Front-page or Paragraph Advertisement inserted for less than 5s.

Advertisements for the current week must reach the office not later than 3 p.m. on Thursday. Front-page Advertisements and alterations in serial advertisements must reach the office by Tuesday morning to secure insertion.

## SITUATIONS.

The charge for advertisements for "Situations Vacant" or "Situations Wanted" is ONE SHILLING FOR TWENTY-FOUR WORDS, and Sixpence for every eight words after. All Situation Advertisements must be prepaid.

## NOTICE.

Bound copies of Vol. LXXXIII. are now ready, and should be ordered early (price Twelve Shillings each), as only a limited number are done up. A few bound volumes of Vols. XXXIX., XL., XLII., XLVI., XLIX., LI., LIII., LVIII., LIX., LXI., LXII., LXIII., LXIV., LXV., LXVI., LXVII., LXVIII., LXIX., LXX., LXXI., LXXII. may still be had, price Twelve Shillings; all the other bound volumes are out of print. Most of the back numbers of former volumes are, however, to be had singly. Subscribers requiring any back numbers to complete volume just ended should order at once, as many of them soon run out of print.

RECEIVED.—W. H. G. and Co.—W. F. M.—T. F. G.—W. Mordaunt.—H. C. M. and Co.—C. Delahaye.—W. Cooper.

## "BUILDING NEWS" DESIGNING CLUB.

DRAWINGS RECEIVED.—"Umbopa," "Swan," "Centaur," "Hotspur," "Datum," "Economy," "Don't Know," "Jeddah."

## Intercommunication.

### QUESTIONS.

[1890].—**London Building Regulations.**—(1) What height of walls are allowed for single-story buildings, one brick thick, under the London Building Regulations? (2) What floor-load do building surveyors require to be provided for in the following buildings? (a) Warehouses, (b) public buildings, (c) factories, (d) shops, (e) offices, (f) dwelling-houses?—CONTRACTOR.

### REPLIES.

[1897].—**Soundproof Walls.**—Yes; a cavity wall, or, rather, two walls connected only at back and front, if closely packed with, say, a couple of inches of slag-wool, will be found impervious to the passage of sound—vide the case of the Queen's Hall, Langham-place, where the architect, Mr. Knightley, specified the use of F. Jones and Co.'s slag-wool for use in the manner indicated.—M. H.

[1897].—**Soundproof Walls.**—A cavity wall of, say, two 16in. thick, a 9in. and a 4in. wall with 2in. cavity between, will be a good barrier to sound, or a cavity packed with slag-wool would be better. Joists, of course, convey sound, and their ends should be cut off and surrounded by an open space, or filled with slag-wool.—A. Z.

[1898].—**Damp-Wall Solutions.**—Szerelmey's solution is an effective remedy for damp walls. White's "Hygeian Rock Composition" applied inside the wall, or to a cavity an inch wide between granite wall and an outer wall of stone or brick, will answer.—G. H. G.

[1897].—**Architects' Charges.**—See clause 5 of the Revised Schedule in the issue of "B.N." for last week, where you will see that you are entitled to 2½ per cent. for plans prepared and ½ per cent. for receiving tenders, making 3 per cent. on the estimated cost; but for additional services, for making tracings for local authorities,

an additional sum may be charged, based on the time occupied. These charges are exclusive of the charge for taking out quantities, which vary from 1½ to 2 per cent.—G. H. G.

## CHIPS.

In the House of Lords on Friday night the Metropolis Management Acts Amendment (By-laws) Bill was read a third time and passed.

The foundation-stone of St. John the Baptist, a new church on Risca-road, Newport, Mon., was laid on Thursday in last week.

At a meeting of friends and admirers of the late Sir Edward Burne-Jones, held at Dorchester House on the 4th inst., it was resolved to raise a fund to be applied to the purchase of a characteristic work by him, to be presented to the nation as a memorial. An influential and representative executive committee has been appointed to carry out the scheme, for which it is estimated some £3,000 to £5,000 will be required.

Two electric supply schemes were considered on Friday by a Select Committee of the House of Lords—one promoted by the Metropolitan and the other by the Central Company. It is proposed to erect large generating stations at Willesden and on the north bank of the Regent's Canal.

The new workhouse infirmary, Ipswich, is being warmed and ventilated throughout by means of Shorland's patent double-fronted Manchester stoves, with descending smoke flues and patent Manchester grates, the same being supplied by Messrs. E. H. Shorland and Brother, of Manchester.

The Bishop of Winchester consecrated on Friday a new burial ground and chapel at Compton, near Guildford. The chapel, which is very elaborately finished, was the gift of Mr. G. F. Watts, R.A. It has been erected from the designs of Mrs. Watts and Mr. G. T. Redmayne.

The past week was accounted a notable one in the annals of the Auction Mart, the aggregate realisation being an absolute record for many years past. The amount registered was £347,640. With the exception of one sale of gas stock, which produced a little over £16,000, the business done was almost entirely in real estate. Residential properties, building estates, agricultural land, ground rents, and other classes of investments all found a good market.

The foundation-stone of the new Central Technical Schools and Museum Extension in Byron-street and William Brown-street, Liverpool, was laid on Friday by Sir W. B. Forwood. The architect is Mr. E. W. Mountford, F.R.I.B.A., of London, whose plans were adopted by the committee in competition. The contractors are Messrs. Henshaw and Son, Chatham-street, and the clerk of the works is Mr. James Scales. The contract price was £89,224, and the portion devoted to the work of the technical school will be ready for occupation at the opening of the winter session in September, 1900. A system of ventilation and heating will be carried out by Mr. W. Key, of Glasgow.

Colonel Foster, M.P., on Friday opened Warwick's Revolving Tower at the West End, Morecambe. The tower is 155ft. high, hexagonal in shape, built of steel girders, angle-bars, and cross roads, and having six main steel uprights. Surrounding the outer framework is a platform carrying a circular car to accommodate 200 persons, and which revolves slowly round the structure. The foundations are of concrete. The tower is similar to the one erected at Yarmouth last year.

The Mayor of Leamington laid, on Friday, the corner-stone of the new nave and bell tower of the parish church. When the work, for which Sir Arthur W. Blomfield, A.R.A., is the architect, is completed, the nave will be about twice its present length. The new tower, in which it is intended to place the peal of six bells, which have been without a home since the wooden belfry was removed in 1889, will rise at the south-west angle of the church to a total height of 143ft. to the top of the pinnacles. It is proposed to build a light lantern, of the Peterborough pattern, over the crossing of the nave and transepts, where 60 years ago it was intended to place a tower and spire. The whole work of restoring and completing the church will cost £15,000, and towards this £7,400 has already been received.

On Tuesday week the Mayor and Corporation of Ripon received on behalf of the city the Victoria Clock Tower, which has been erected at the junction of the Palace and North roads. The structure is 10ft. square, and rises to a height of 43ft., terminating in a Crown Imperial in copper. There are four dials inclosed within circular moulding, within squares, the spandrels being carved. On the stage below that of the clock a statue of the Queen occupies a canopied niche on the side fronting the city. Her Majesty is represented in a sitting position, the statue, as well as the rest of the carving, having been executed by Mr. Milburn, of York. The Royal arms, the arms of the diocese of York, and those of Ripon occupy the other sides.



## LEGAL INTELLIGENCE.

**THE STRAND IMPROVEMENT SCHEME.**—Mr. James Green, the arbitrator appointed by the Local Government Board, has continued his inquiry as to the value of the property in the betterment area in the Strand improvement scheme. The first case was 24, Holywell-street. Mr. Tewson, surveyor, who represented the owners (Hadley's trustees) estimated the value as £90 per annum, which at 25 years' purchase would be £2,250. The site had a frontage of 17ft. and an area of 463ft. He took this at 4s. per foot, and estimated that the rebuilding would cost from £450 to £500. Mr. Andrew Young, the Council's surveyor, estimated the annual value at £90, and at 20 years' purchase, the value at £1,800. The site value he estimated at £1,279. The next case was that of 13, Holywell-street, the property of Mr. Andrew Simmons. The property was let under lease for 14 years from Michaelmas, 1889, at a rent of £165. The property had a frontage of 22ft. and an area of 908ft. Mr. Pilditch, surveyor, estimated the property to be worth £260 per annum, which, at 25 years' purchase, he considered worth £6,500. The site value he fixed at 908ft. at 4s. per foot, at 25 years' purchase—£4,500, and the building he considered was worth £2,000. Sir J. Whitaker Ellis corroborated the evidence of Mr. Pilditch. Mr. Andrew Young, on behalf of the County Council, valued the property at £200 per annum. It was assessed at £181 gross with £151 net value. At 22½ years' purchase he estimated it as worth £4,500. The site, at 2s. 6d. per foot, at 24 years' purchase, he valued at £2,724, and the building he considered was worth £1,400. The present value he considered was £4,550. Mr. G. H. Wilkinson gave corroborative evidence. The next case was that of 11, Strand Hotel-buildings, the property of the parishes of St. Giles, Cripplegate, and St. Luke's. Mr. Vigers, surveyor, said the property was held under a lease for 80 years from 1863, at a rental of £85 per annum. He estimated the value of the premises at £380 per annum, and, at 20 years' purchase, at £7,600. The site value he estimated at £2,833, and the present value of the property under lease at £3,926. Mr. Young, for the County Council, estimated the ground value at £115 per annum, which at 24 years' purchase he estimated at £2,775. The proceedings were adjourned to July 19.

**THE LONDON COUNTY COUNCIL AND BUILDINGS ON RAILWAY COMPANIES' PREMISES.**—At Marylebone Police-court Mr. Lane, Q.C., on the 17th ultimo, decided a case of considerable importance to coal merchants and others. Messrs. J. H. Tite and Son, coal merchants, Brixton, were summoned at the instance of the London County Council for setting up a wooden structure at Maygrove-road, Hampstead, without the license of the Council. Mr. Chilvers, from the solicitors' department, supported the summons; and Mr. Nonwheeler, solicitor, defended. Mr. Chilvers stated the summons was taken out under section 84 of the London Building Act, 1894, and that the structure complained of was used as a stable, being constructed of wooden uprights and crosspieces and wooden roof, all covered externally with corrugated iron, which supplied accommodation for about five horses, for which the Council had declined to grant a license. Evidence having been called proving these facts, it was admitted, on cross-examination, that the structure stood on land belonging to the Midland Railway, who carried coals for the defendants. Mr. Nonwheeler contended that the structure came within the exemption contained in section 86 of the Act, as being used in connection with the traffic of the railway company, the defendants using the stable for their horses which took the coal from the railway trucks to the wharf in the company's yard. Mr. Lane in giving his decision said he was convinced that the structure did not come within the exemption contained in section 86. Had there been any available land off the company's premises it would have answered the defendants' purposes just as well; that being so it could not be said to be used in connection with the traffic of the railway company. The traffic of a company meant that which was conveyed by the company, and in the present case the conveyance ceased upon the coal being run into the siding, after that it became the property of the person who had bought it. He, therefore, fined the defendants 10s., and ordered them to pay £1 10s. for costs.

**ABBAY MANSIONS AND THE BUILDING ACT.**—At Westminster Police-court on Tuesday, two summonses under the Dangerous Structure Clauses of the London Building Act of 1894 were preferred by the London County Council against the owner of Abbey Mansions, Orchard-street, Westminster. There were also summonses under the Constructional Section of the same Act, at the instance of Mr. Drury, the district surveyor, against Mr. W. R. Rickard, builder, of City-road, the offences alleged being (1) erection to a greater height than 80ft. without the consent of the Council; (2) that the roof story (not more than 60ft. above the street) was not constructed throughout of fire-resisting materials. The County Council asked for orders in respect of these irregularities. Mr. Seager Berry

appeared for the County Council, Mr. H. Avory for the defendants, and Mr. Marshall Hall, Q.C., for interested parties. After the case had been opened by Mr. Berry, and the history of the building given, Mr. Avory contended that it was exempt under Section 202 of the Act, dealing with Government buildings. These proceedings appeared to have been taken, he said, in consequence of a suggestion by the coroner that because her Majesty, or any department of the Government, were not actually in occupation of the building while it was being put up, the section did not apply. How a building was to be occupied while it was being put up he could not understand. It was the most distorted conception of an Act that he had ever heard. Mr. Berry pointed out that the exemption was being claimed, not by the Government, but by private persons. Mr. Marsham said he thought the premises under the agreement produced were vested in the Government, and, therefore, exempt from the Act. He dismissed the last summons, and formally adjourned the other three to see whether a case would be taken. In that event he should grant £10 10s. costs.

**THE LONDON CONTRACT COMPANY (LIMITED).**—A sitting for public examination was held last week under the winding-up order made against this company, which was formed in January, 1896, to carry into effect an agreement to purchase for £2,000 in shares, from Charles Paveley, the business of a contractor carried on at 12, Basinghall-street, under the title of the London Contract Company. Mr. G. S. Barnes attended as Senior Official Receiver. Mr. Charles Jenkins Bayliss stated that he and Mr. Thomas Grover were the joint promoters of the company. Both of them were undischarged bankrupts at the date of the formation of the company. The business sold to the company by Paveley had been previously carried on by himself and Mr. Grover. The reason for forming the company was that they were advised it would be best to carry on the concern as a limited company. Witness put £2,000, which he had made, into the business, and a Mr. Charles Glendening Phillips (who he had since heard was then an undischarged bankrupt) subsequently put £1,000 into the company. There were no directors, but witness and Mr. Grover were appointed managers, and Mr. Phillips became *ex officio* manager. The 2,000 vendors' shares were issued to the solicitors of the company, and beyond these only the seven signatories' shares were issued. The reason why the shares went into the names of the solicitors was because he, Grover, and Phillips were bankrupts. As managers, witness and Grover were to receive £10 per week. The only business done by the company was the purchase and sale of two public-houses, and the promotion of the Dover Tivoli (Limited). The promotion of the Dover Tivoli (Limited) resulted in a loss to the company. In January of this year the only assets of the company consisted of 8,750 shares in the Dover Tivoli (Limited) and a small bank balance. The shares were sold to Mr. Phillips for £2,125, which was used, so far as it would, in paying creditors of the company. Witness was then examined at some length with reference to payments made to certain creditors of the company, the Senior Official Receiver stating that it was alleged that such payments were of a preferential nature. Witness said that he paid creditors as they pressed him for money. The sitting was adjourned.

## CHIPS.

Plans of new buildings, representing a value of £19,000, were sanctioned last week by the plans committee of the Aberdeen Town Council. The plans included a new church at Mid-Stocket.

The Southampton Corporation having applied to the Local Government Board for sanction to borrow £2,500 for technical instruction purposes, a Local Government Board inquiry was held by Col. Durnford, R.E., at the Audit House in that town yesterday (Thursday).

The committee of the proposed Gladstone memorial at Penmaenmawr have resolved that a life-size bronze statue of Mr. Gladstone be erected in one of the most prominent sites in the town at an estimated cost of £1,000.

Two new buildings belonging to the Liverpool School Board were formally opened on Thursday in last week. These are a pile of offices erected in St. Thomas-street, and a large pupil-teachers' college in Clarence-street, with class-room accommodation for 569 students; and the new offices of the school board, erected at a cost of about £25,000, opposite the municipal buildings, where the board's business has hitherto been conducted.

The Corporation of Sheffield propose to construct a new bridge over the River Don at Ball-street, Sheffield. The bridge will be of arched steel girders on stone piers, and the plans and quantities have been prepared by Mr. Charles F. Wike, M.Inst.C.E., City Engineer. The tender of Messrs. Braithwaite and Co., of Leeds, amounting to £9,087 15s. 4d., has been accepted.

## Trade News.

## WAGES MOVEMENTS.

**BRISTOL.**—A dispute in the Bristol building trade resulted on Friday in all the masons and bricklayers deciding to come out on strike. While the carpenters, painters, plasterers, and plumbers of the federated industries had agreed with the employers to refer the two points in dispute—the time for receiving ½d. per hour advance of wages, and increased pay for walking time—to arbitration under the Conciliation Act through the Board of Trade, the masons seceded from the federation, and the bricklayers never joined it. The secretary of the Bristol Master Builders' Association has received a letter from the Bristol and District Lodge of the Friendly Society of Operative Masons, stating that the latter body have severed their connection with the federated trades. We are pleased to hear as we are going to press that the Board of Trade has appointed Mr. A. A. Hudson, Q.C., of the Inner Temple, to arbitrate in the dispute.

**BURY, LANC.**—There is no change to report locally in connection with the dispute in the stonemasons' branch of the building trade. The employers connected with the federation hold to their original proposals, and one firm outside the federation also declines to accede to the men's requirements. The men, on the other hand, having had their proposals conceded in full by several of the local firms, and having got one-half of their members employed, are hopeful of a favourable result.

**GLASCOTE.**—About 350 men and boys employed at the terracotta and brick works of Messrs. Gibbs and Canning, Limited, Glascote, Tamworth, are on strike. The men belong to the National Union of Gasworkers and General Labourers. The increase demanded averages 7½ per cent., and the firm made small advances in certain departments before work ceased, but the men are holding out chiefly to secure an increase in the wages of labourers.

**GLASGOW.**—A new working agreement between the Master Masons' Association of Glasgow and neighbourhood and the Glasgow and Suburban Lodges of the United Operative Masons' Association of Scotland came into operation on Friday, and will bind both parties till June 30, 1899. Under the agreement the standard rate of wages is raised from 9d. to 9½d. per hour. It also fixed that the time worked per week shall not exceed fifty-one hours, or nine hours per day on the first five days and six hours on Saturday. For the winter months a special time card is drawn up, and shows a working week of as low as forty-two hours. The employers undertake to provide hot plates or other convenience, with necessary fuel, whereby tea and coffee can be "prepared in a proper manner before the hours of stoppage for meals, as also the services of a proper person to prepare the same." Other trade matters are dealt with, and, finally, the agreement provides that a committee shall be appointed of seven employers and seven operatives, to whom all differences that may lead to a dispute between the two associations shall be submitted, with a view to amicable settlement by mutual consent.

**NEWPORT, MON.**—The carpenters' strike at Newport was settled on Friday night, when the men accepted the proposal to return to work under the old rules, but not to continue working after five o'clock. This arrangement will remain in force until May next. If they so desire, however, the men may give notice in September to terminate the agreement in May.

The Swiss National Museum at Zurich, opened last week, has been built from designs by M. Gull, the town architect of Zurich.

Damage to the extent of £2,800 was caused on Thursday in last week by an outbreak of fire occurring on the premises of Mr. James Robb, joiner and house carpenter, 11, Springfield-street, Leith-walk, Leith.

The auditorium of the Lyceum at Ipswich—a theatre erected nine years ago from Mr. Walter Emden's designs—is now being structurally altered, and will be redecorated. The work is being carried out by Messrs. Grimwood and Son, of Ipswich and Sudbury.

On Wednesday week the Roman Catholic Church of St. Peter, Bloxwich, was reopened after extensive alterations and improvements. The church was erected in 1865 by the Rev. Peter Austin Davies, who for 22 years served the mission. As a permanent memorial to him, the congregation subscribed to the erection of a new high altar, the front of which is polished alabaster, and the reredos is Caen stone. A new stained-glass window surmounts the reredos. The side chapels have been decorated, as well as the body of the church and roof of the nave and choir. The organ has been renovated throughout and its position changed. The total cost has been £700.



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## ILLUSTRATIONS.

SECOND PREMIATED DESIGN FOR THE NEW TOWN HALL, TAUNTON.—DESIGNS FOR A COTTAGE HOME FOR WAIFS AND STRAYS.—FIREPLACE IN BOLSOVER CASTLE.—LEYLAND ARCADE, SOUTHPORT.

## Our Illustrations.

TAUNTON TOWN HALL: SECOND PREMIATED DESIGN.

THE selected design for this building, and for which the first premium was awarded, was illustrated in the BUILDING NEWS on June 10. To-day we publish some drawings of Mr. J. M. Brydon's design, to which the second place was accorded, and, as might be anticipated, the scheme presents several features of interest, which will be readily noted upon an examination of the illustrations, which include a section through the big hall as well as the two principal plans, printed with the perspective view. Red brick and stone are the materials intended. We shall publish drawings of the third premiated design, of which Mr. H. T. Hare is the author, next week, and our readers will then be able to see the comparative advantages of all three of the prize designs in this interesting competition.

"BUILDING NEWS" DESIGNING CLUB: A COTTAGE HOME FOR WAIFS AND STRAYS.

(For description and awards see page 39.)

CORNER FIREPLACES, BOLSOVER CASTLE, DERBYSHIRE.

ON June 3rd we gave the second sheet of Mr. A. B. Illston's silver medal drawings of these well-known Renaissance fireplaces. To-day we complete the series by giving details of two corner chimneypieces. Both these, like the others, are enriched with marble panels and mouldings, sections of which are given. The author on the previous occasion described Bolsover Castle at some length, so that to-day there is nothing further to add.

LEYLAND ARCADE, SOUTHPORT.

THE front section of the above, consisting of 13 lock-up shops, has recently been completed. The rear portion is expected to be in readiness for occupation within a few months. The arcade will comprise 45 lock-up shops and caretaker's house on the ground floor, together with numerous offices, ladies' club, sale-room, and other conveniences on the first floor, and assembly-hall on the second floor. As may be seen by the plan, the frontage to Lord-street (the principal business street) is limited: hence an entrance of but 10½ ft. wide leads to an arcade 27 ft. in width, marked by a central area covered by an octagonal dome 63 ft. in diameter. The whole will be covered in to afford a sheltered promenade. Electric light is to be employed throughout. The whole of the premises are to be heated throughout by a circulation of hot-water so arranged that each tenant may regulate the temperature of his own premises. The whole is being carried out from the designs and under the supervision of Mr. G. E. Bolshaw, architect, 189, Lord-street, Southport, by the following contractors:—Front section, Messrs. Vaughan Brothers, Southport; back section, Messrs. Wishart and Irving, Southport.

## COMPETITIONS.

LEWISHAM.—The Central Library competition at Lewisham has been settled in favour of Messrs. Best and Callon, of Westminster. This building is to cost about £4,000.

LISCARD CENTRAL HOSPITAL.—Further correspondence has taken place with reference to this competition. Replying to the protests by Messrs. Harnett-Harrison and Harvey and Messrs. T. Mellard Reade and Son, published in our last issue (p. 32), the vice-chairman and hon. secretaries of the hospital committee write stating that they decided to adopt the plans submitted by Messrs. Maxwell and Tuke on the advice of an architectural expert. They then deal in detail with the three specific points in the complaint—the area per bed, the width of site, and provision for extending the administrative block. "When plan No. 3 was examined, it was at once apparent," say the writers, "that the large wards were too small. The schedule of requirements was consulted, when it was found that the specification of area might be read in two ways. The committee undoubtedly intended that the 144 ft. superficial and 1,500 ft. cubic per bed should apply to all wards, large and small; but it was so printed off by the typist that it might be read to apply only to the smaller wards. Plan No. 3 gave the required space in the smaller wards (the architects having read the section in that sense), but not in the larger. To give sufficient space in the larger wards meant widening the pavilion and raising the ceilings, which could be done without any prejudice to the general design. The committee considered whether this discrepancy should act as a disqualification, but with the schedule before them they could not so regard it. In other respects the plan was superior to the others. The next point is the site. When the schedules were sent to the competitors, there was given to each a plan of the site, showing one dimension in length and one in breadth. This was copied from a plan prepared by Messrs. T. Mellard Reade and Son some years ago, and the figures were theirs. The architects were recommended to survey and measure the site for themselves, but Messrs. Maxwell and Tuke contented themselves with the figures supplied. It happens that the site is not rectangular, and that Messrs. T. Mellard Reade and Son's figures were the mean dimensions. The variation does not affect the plan, nor its suitability to the site. The last point is provision for extension of the administrative block at a later date if required. The successful plan did provide for this, and Messrs. Mellard Reade and Son's criticism is quite wrong." The writer adds: "The most scrupulous care was taken to deal fairly and justly with all the competing architects."

The Cambrian Archaeological Society will meet at Ludlow on August 8 and four following days, under the presidency of Lord Windsor. The places to be visited include Stanton Lacey, Culmington, Diddlebury, Heath Chapel, Nurdy Bank, Abdon Burf, Stoke St. Milborough, Middleton, Stokesay, Leominster, Mortimer's Cross, Shobdon, Aylmestry, Wigmore, Pipe Aston, Leintwardine, Brampton Brian, &c.

The Government of Victoria, Australia, have agreed to construct several important works, at a cost of just over two millions sterling. The works include railways to open up the more remote parts of the colony, a colossal coal-storage depot, and the irrigation of a large tract of country. The sum representing the total cost is to be raised by Government bills, issued annually.

The Coventry School Board are about to build new schools in the suburb of Radford. The architects (Messrs. G. and I. Steane, of Coventry) have made provision for 180 boys and girls, and 120 infants, whilst the buildings can be easily extended to accommodate 300 boys and girls, and 200 infants, and the playground is set out for the requirements of 500 children. The work will now be proceeded with.

There are now in course of erection large banking premises for the North-Eastern Banking Company at Sunderland. The premises have a frontage of 36 ft. and a depth of 52 ft. The building is three stories high, and attics with cellars beneath. The ground floor comprises banking-room, manager's offices, and two general offices, the rooms above being appropriated by a spacious residence for the banking manager, Mr. R. Oliver. The building is faced with an ashlar stone front. The contractor is Mr. Nathan Watson, of Bishop Auckland. The work has been planned and carried out by Messrs. W. and T. R. Milburn, architects, Sunderland.

## PARLIAMENTARY NOTES.

PARLIAMENT-STREET IMPROVEMENT.—Sir H. Fowler asked the First Commissioner of Works on Friday when the remaining houses between Parliament-street and King-street would be pulled down, and whether he would place in the Tea-room a ground plan showing the line of the widening of Whitehall from Charles-street to Great George-street, and the position of the new offices to be erected on the vacant land. Mr. Akers-Douglas: I have not yet been able to acquire the whole of the property between Parliament-street and King-street. I hope to do so within the next three months. Directly this property has been obtained the buildings will be taken down, and the street widened. A plan showing approximately the proposed frontage line of the new buildings next Parliament-street and Great George-street shall be prepared and exhibited, as the right hon. gentleman desires.

## CHIPS.

At Peterborough a new church is about to be built in an outlying part of St. Mark's district, from plans by Mr. W. Boyer. The estimated outlay on the work is £3,000, and the chancel and transepts will cost another £1,500.

The county asylum for Cheshire at Upton is being enlarged at a cost of £100,000. The new wing will accommodate 400 patients, raising the total capacity of the institution to 1,100 beds.

A cottage hospital is about to be built on the Tynewydd estate, midway between Colwyn Bay and Old Colwyn. The architects are Messrs. Booth, Chadwick, and Porter, and the cost will be about £1,500.

The Corn Exchange at Coventry is about to be converted into a theatre, from plans by Mr. W. G. R. Sprague, of London. The existing front will remain intact, but a new vestibule will be provided. The holding capacity of the theatre will be for 2,500 persons, and the stage will have a width of 70 ft. and a depth of 40 ft. The internal arrangements will include stalls, pit stalls, and pit on the ground floor, upon the first tier dress circles, 10 private boxes, and balcony, and above this the amphitheatre and gallery, the whole of the galleries being carried without a single column. The scheme of decoration will be in the French Renaissance style. To the rear will be a large block of dressing-rooms and lavatories, and around the hall saloons and retiring rooms are to be arranged.

The Department of Science and Art has received information, through the Foreign office, that the first International Congress of Public Art, organised by L'Enseignement Nationale Belge, will be held at Brussels from the 24th to the 28th of September next.

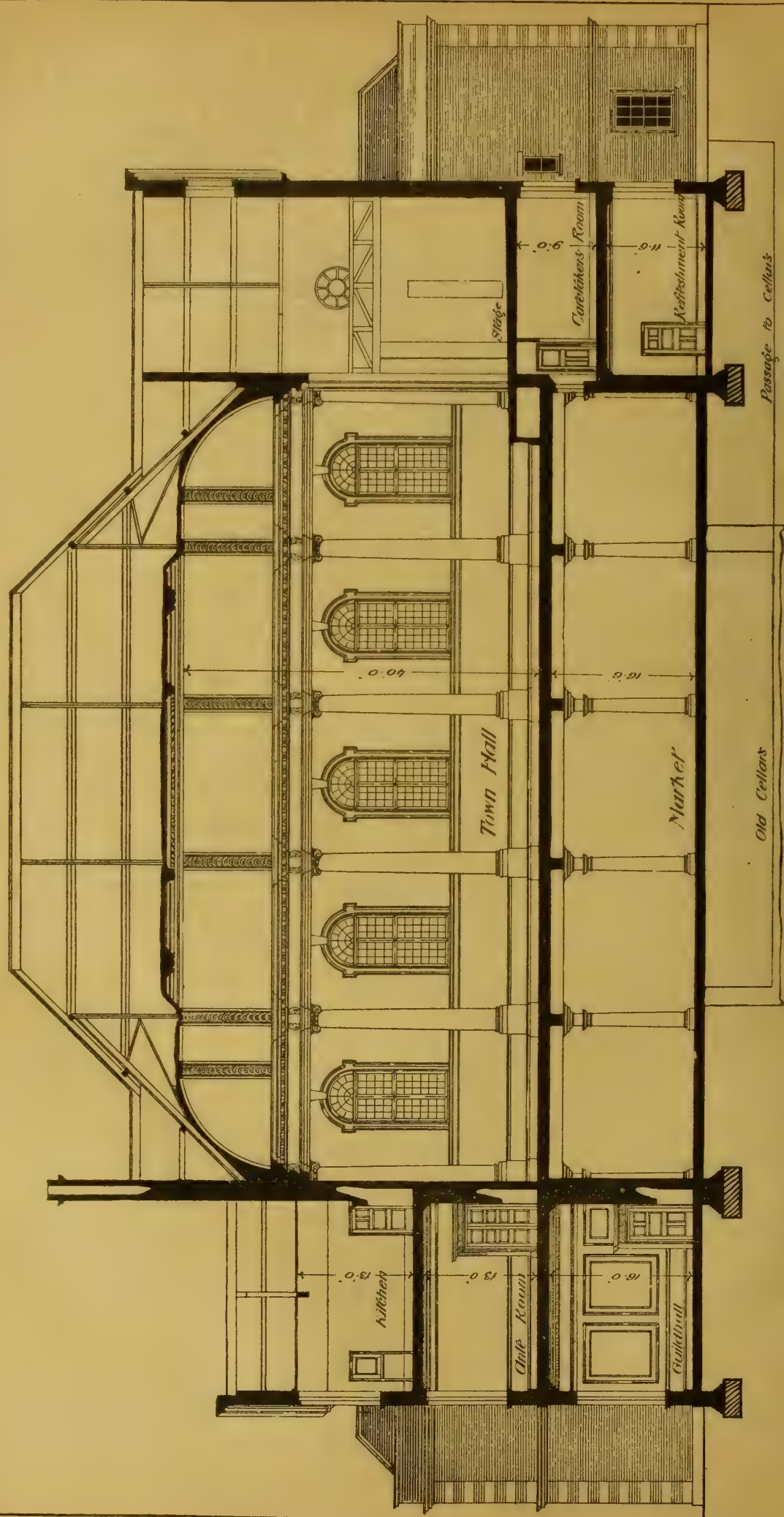
In joint commemoration of their 21st birthday and the Diamond Jubilee of Her Majesty, the Misses Ashton, of Little Onn Hall, Staffordshire, offered Newton Lodge estate, including the hall and woodland, to Hyde Corporation for the purposes of a park. The town council have, after some delay, accepted the gift. The Misses Ashton have finally promised to contribute £1,000 towards constructing a bridge across the river to the park grounds, and to make a road from the bridge up to Mr. Mose-dale's house, at a cost of £7,000, the work to commence at once.

Messrs. Christie sold on Friday an interesting collection of portraits in pencil of eminent personages, by George Dance, R.A., executed at the close of the last century, the property of the late Rev. George Dance, grandson of the painter. The 163 lots brought a total of £318 16s. Several of the portraits of surgeons were purchased for the Royal College of Surgeons.

A new depot covering six acres is being constructed for the Midland Railway Company immediately behind St. Pancras Station, on the west of Pancras-road. The new depot is two floors in height, and will be opened next September. It will cost the Midland Company close upon a million sterling. The property alone cost over three-quarters of a million, nearly £100,000 has been spent on the building works, and a similar amount paid for the steel work in the huge structure. Messrs. J. D. Nowell and Sons, of Westminster, are the contractors.

On Wednesday week, a service was held in St. Mary's Church, Woodbridge, Suffolk, in connection with the dedication of a stained-glass window which has been placed in the north wall of the north aisle of the church in commemoration of the Queen's 60 years' reign by the women of Woodbridge, at a cost of £150. The window was the design and work of Mr. A. L. Moore, 89, Southampton-row, W.C. The prominent figures are those of the three patron saints of the United Kingdom. The centre light represents St. George for England, the right St. Andrew, the patron saint of Scotland, the left St. Patrick. In the small lights in the apex are cherubim and angels.





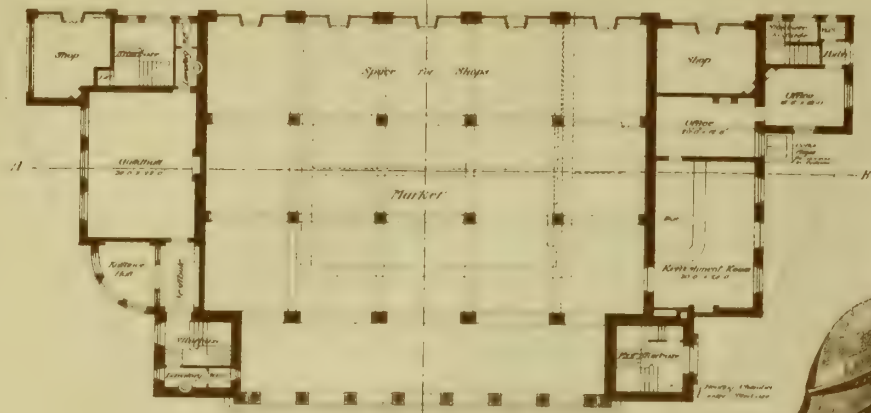
Section on line A-B







TAUNTON  
SECOND PREMIATED DES



Plan of Ground Floor









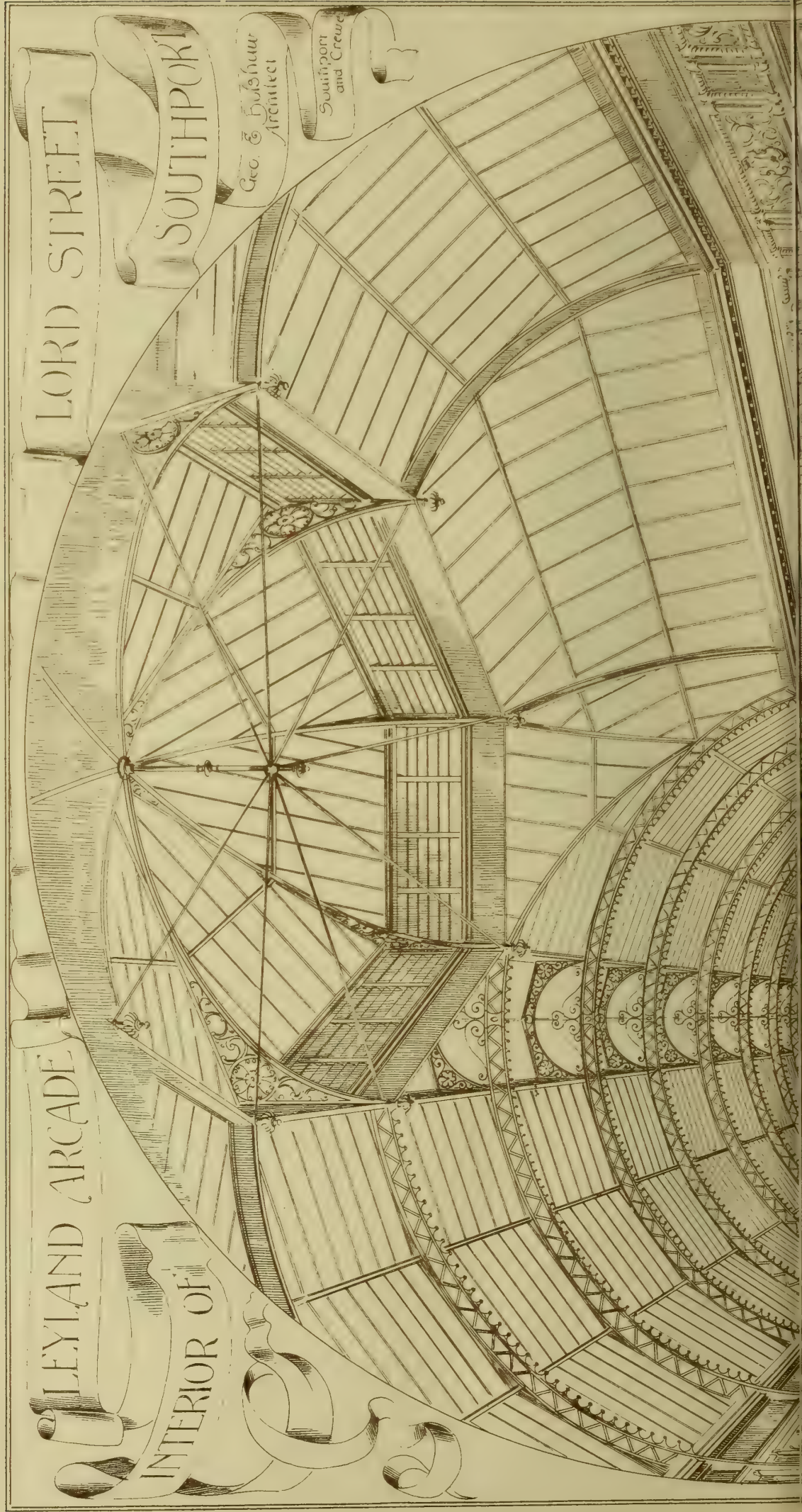








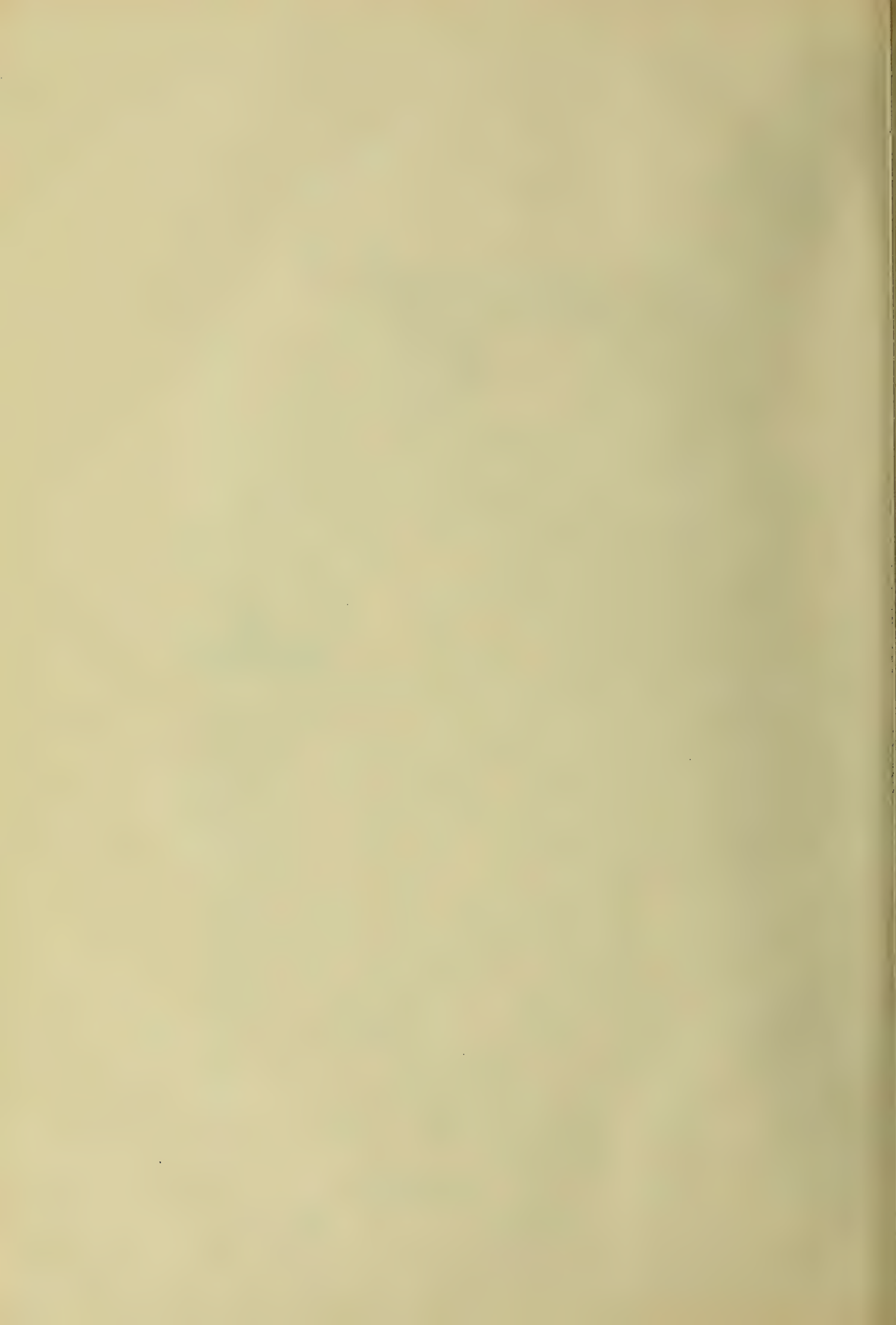
THE BUILDING BEWAS JULY 8. 1795













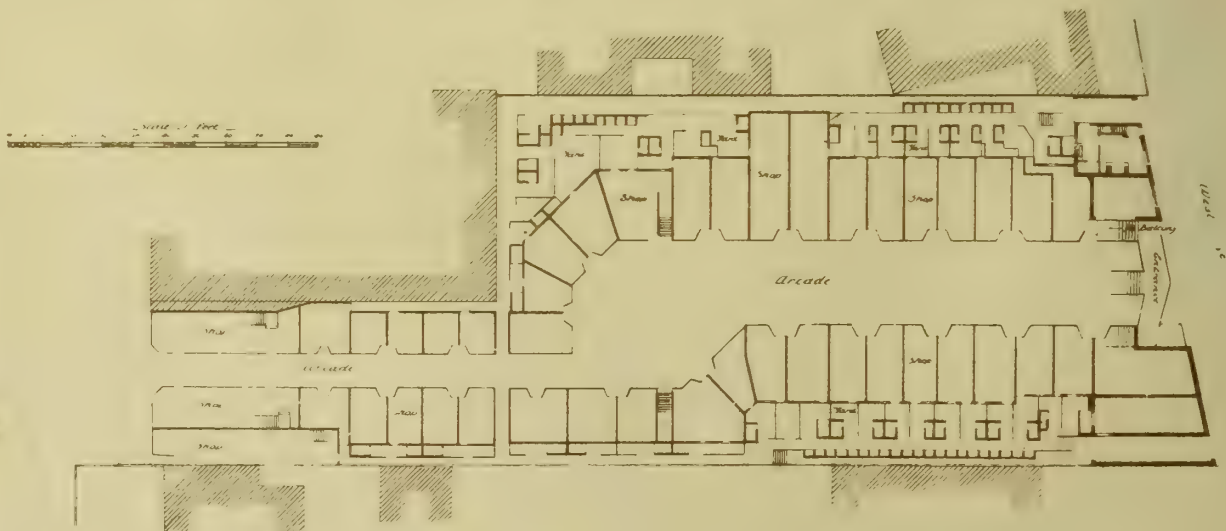




# LEYLAND ARCADE

## SOUTHPORT

See & Bolshaw  
Architects





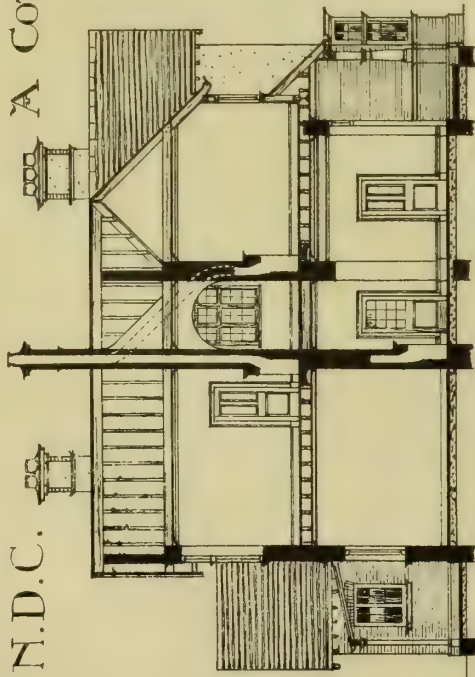




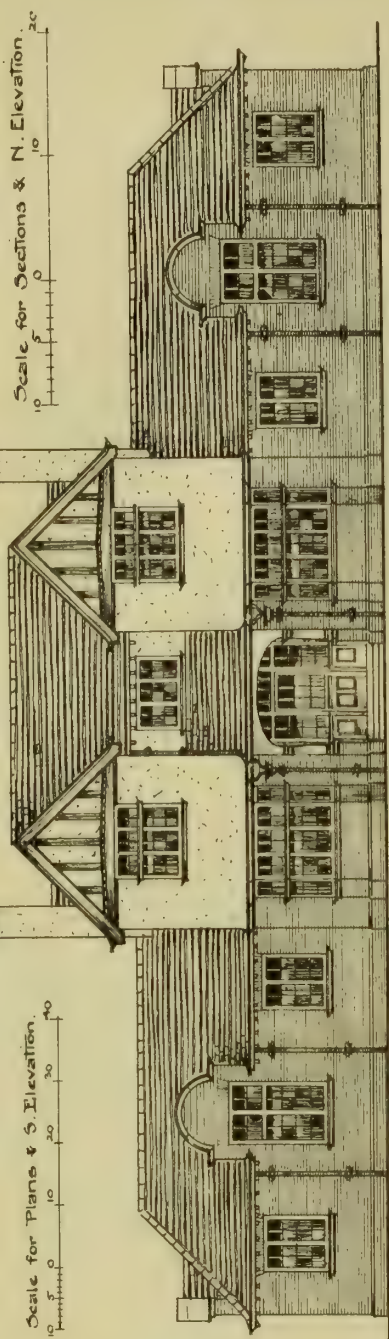
B.N.D.C. A COTTAGE HOME FOR TWENTY-FOUR POOR BOYS, BY "CENTAUR."

Scale for Plans & S. Elevation.  
0 10 20 30 40

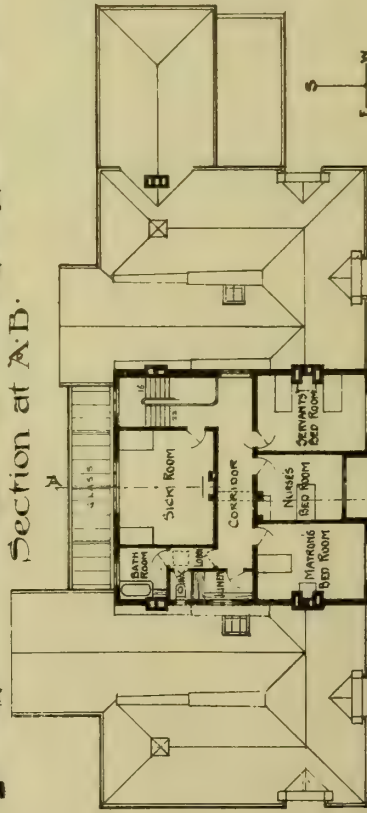
Scale for Sections & N. Elevation.  
0 10 20 30



Section at A-B.



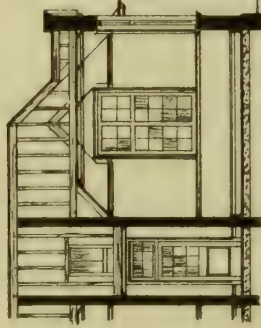
North Elevation.



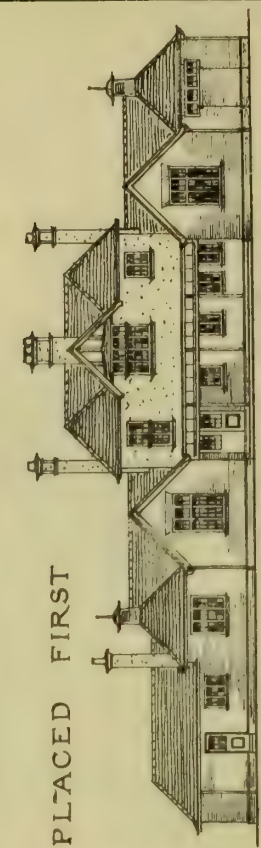
1st Floor Plan.



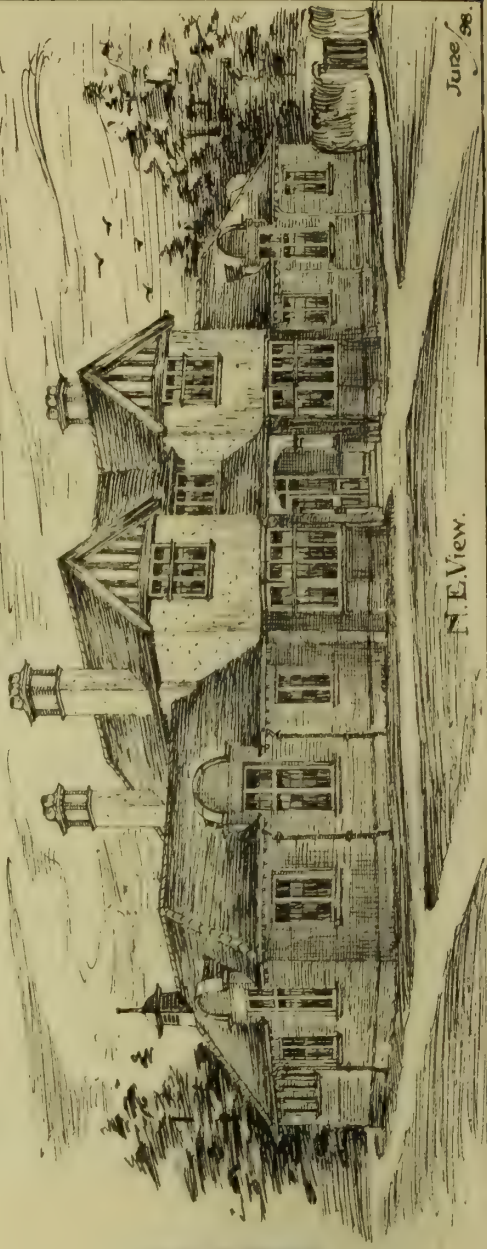
Ground Plan



Section at C-D.

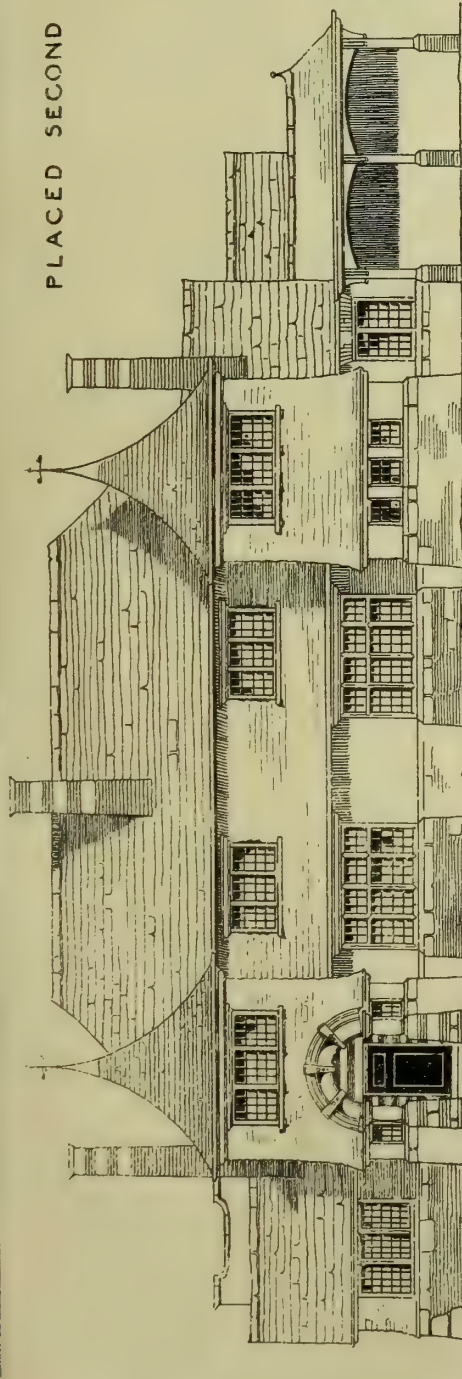


South Elevation.



N.E. View.





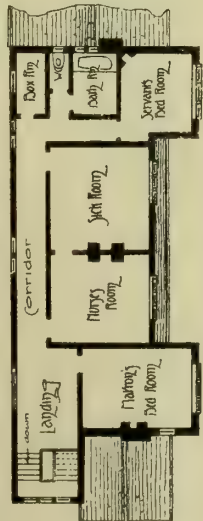
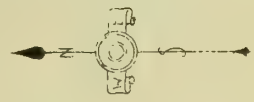
PLACED SECOND

SOUTH ELEVATION

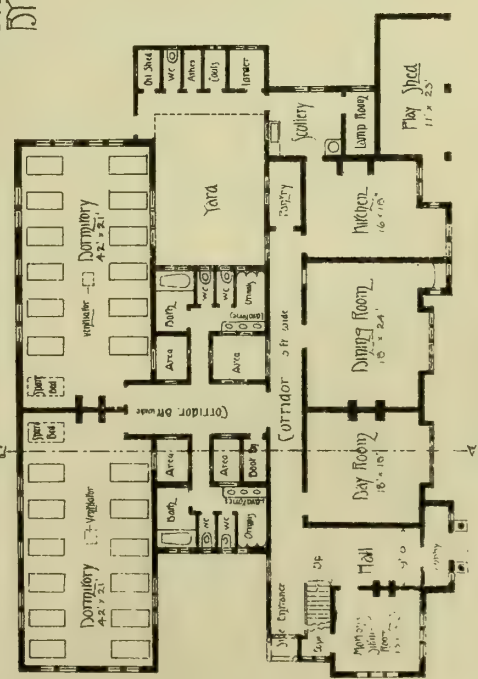
B.N.D.C.

A COTTAGE HOME  
FOR WAIFS AND  
STRAYS  
BY MCGILLIGAN

Scale Elevations and  
Section 1/8" = 1'-0"

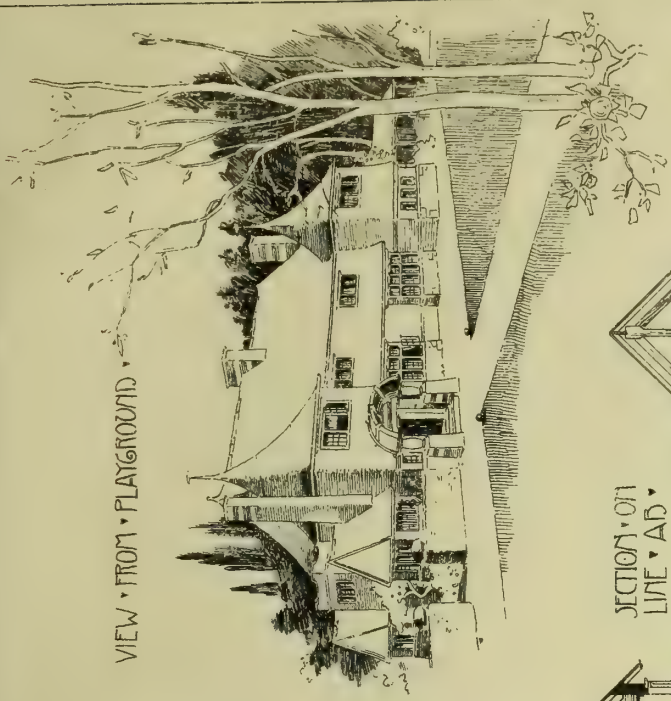


FIRST FLOOR PLAN

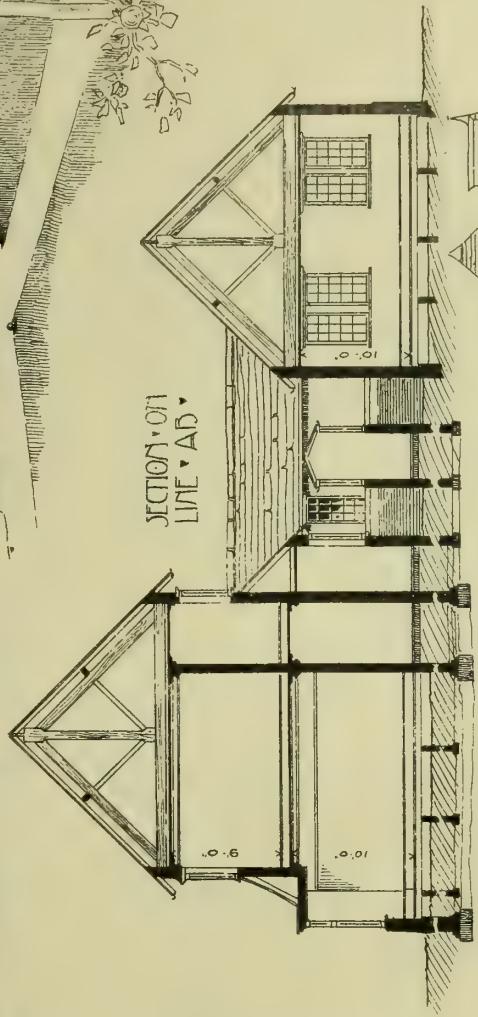


GROUND FLOOR PLAN

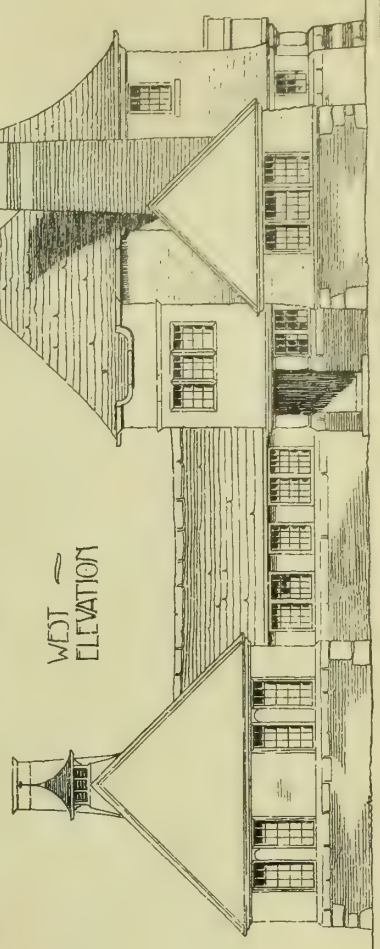
VIEW FROM PLAYGROUND



SECTION ON  
LINE A-B



WEST  
ELEVATION



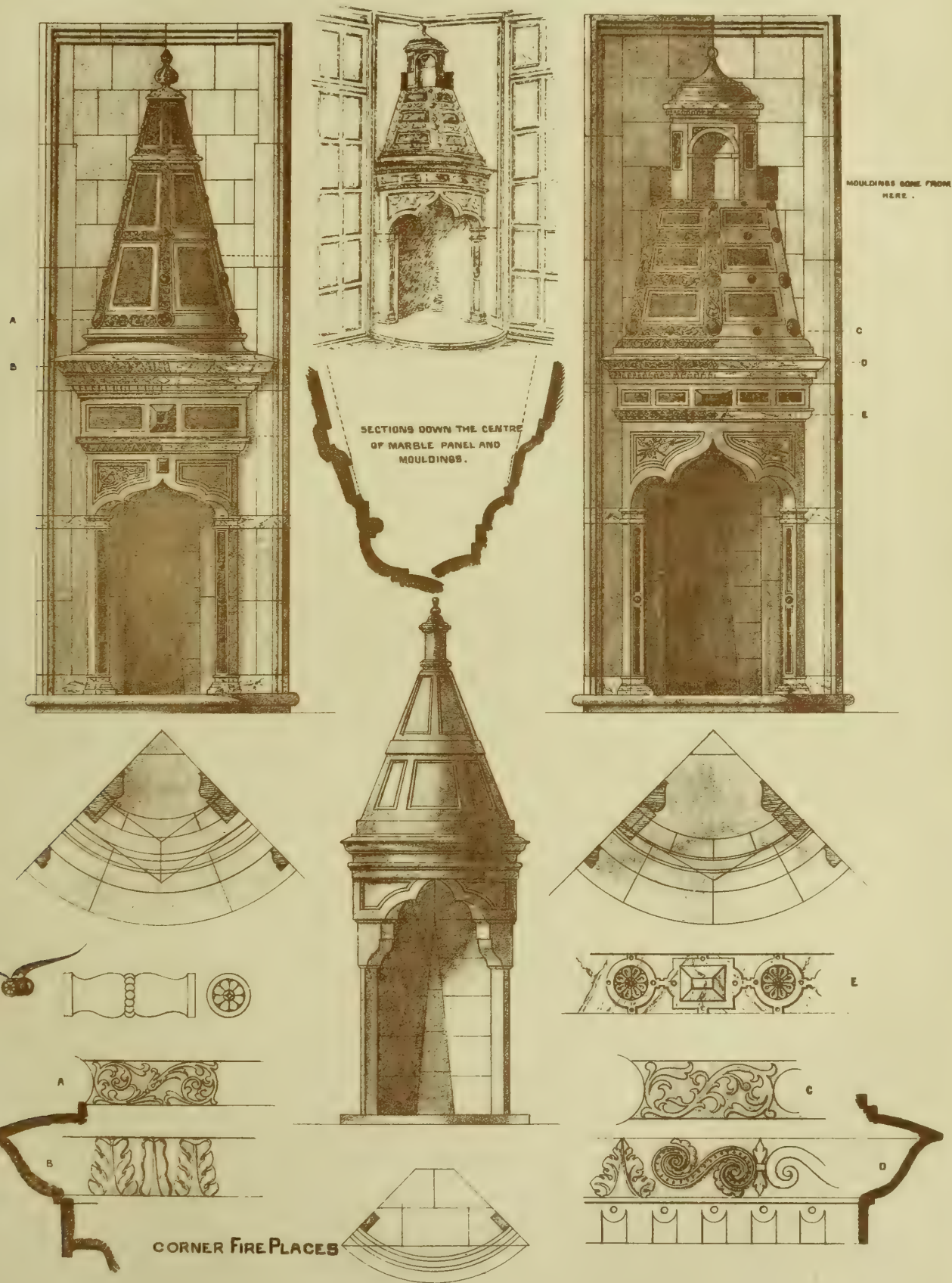






FIREPLACES IN BOLSOVER CASTLE.

FROM ACTUAL MEASUREMENT.



NATIONAL SILVER MEDAL DRAWINGS

BY A. B. ILLSTON







## Our Office Table.

THE London County Council discussed, on Tuesday, the recommendation of the Improvements Committee that application should be made to Parliament next session for power to construct the new street from Holborn to the Strand, together with subsidiary streets, and that provision be made for re-housing the people previously to their being displaced. The scheme was opposed by several members on the ground of its enormous cost; but it was pointed out that every year's delay would add a hundred thousand pounds to the ultimate expense. An amendment to defer dealing with the question until the Royal Commission on Local Taxation has reported was rejected by 93 votes to 20, and the committee's report was adopted. The proposal to seek Parliamentary powers to widen High-street, Kensington, at a cost of £81,000, and the eastern end of Wandsworth-road, between Vauxhall and Nine Elms-lane, at a further cost of £55,000 were agreed to.

THE portrait of Mr. Gladstone, by Sir John Millais, which has been presented to the nation by Sir Charles Tennant, has been placed in Room XXI. in the English wing of the National Gallery. The portrait by Ambrogio de Predis, said to be of Francesco Archinto, now being exhibited in the collection of works of the Milanese School at the Burlington Fine Arts Club, has been purchased for the same collection. It will be placed, after the close of the exhibition, in Room IX. in the National Gallery. The late General John Julius Johnstone has left, by bequest to the National Gallery, a portrait of a lady and child and a sketch portrait of Lady Hamilton, both by George Romney, and two portrait heads of Mr. James P. Johnstone and of Mr. Alexander P. Johnstone, both by Sir William Beechey. Colonel the Hon. F. W. Stopford has presented a portrait by Romney of Lady Craven, afterwards the Margravine of Anspach, from the same collection. They will be placed in Rooms XVIII. and XX. in the English wing.

THE forty-first annual report of the Trustees of the National Portrait Gallery, 1898, just published as a Parliamentary paper, states that the trustees at a meeting held on May 19 last passed a number of resolutions, the effect of which was to declare that any work of art accepted or acquired in any way by the nation for the national art collections, if it be *primâ facie* a portrait of great historical importance, should be deposited in the National Portrait Gallery, unless it should form part of a collection destined to be kept together in circumstances of a special nature. With regard to Sunday opening, from April 4 to September 26 the total number of visitors admitted on Sunday afternoons was 13,683, an average of 526 each Sunday. Sunday opening was resumed at the Gallery on April 3 last, and will continue up to October 30 inclusive. The attendance at the Gallery generally is regarded as satisfactory, though, of course, the abnormal interest created by the opening of the new building was not maintained. The total number of visitors admitted in 1897 was 162,056, which compares with 214,100 admitted from April 4 to December 31, 1896.

THE Select Committee on the Museums of the Science and Art Department met again on Tuesday, and made further progress with the consideration of their report. Certain paragraphs were postponed; but the portion of the chairman's draft dealing with the origin and development of the several museums which remained to be discussed was finally disposed of, and when the committee reassemble they will proceed at once to formulate their conclusions. Although the question of recommendations has yet to be dealt with, Sir Francis Powell's draft report has already undergone considerable alteration, the committee having adopted an amendment relating to the Bethnal-green Museum, declaring that, inasmuch as no arrangement has been made to provide technical instruction in connection with this institution, the object of its inception remains unrealised. The official records show that the Bethnal-green Museum was established to provide for the working population of the East End adequate means of instruction, and that promises were repeatedly given that a school of science and art with a library attached should be started. The complaint from the locality is that no attempt has been made to redeem these promises.

ACCORDING to the London correspondent of the *Birmingham Post*, a hitch has occurred in the arrangements connected with the plans for the new buildings at the South Kensington Museum, and this will, in all probability involve the abandonment for the present season of the laying of the foundation-stone by the Queen, which had been virtually settled to take place early this month. Negotiations are proceeding, with a view of endeavouring to reconcile the rival claims of science and art without going beyond the limit of the amount (£800,000) promised by the Chancellor of the Exchequer for the new buildings. Meanwhile, Mr. Aston Webb has been instructed to introduce various modifications in his accepted design for the front of the museum, so as to materially reduce the cost of erection; but it is open to doubt whether this will contribute to the solution of the difficulty which has arisen.

THE new R.A., Mr. Edwin Austin Abbey, elected on Friday night, was born on April 1, 1852, at Philadelphia, U.S.A. In 1871 he began drawing for the publications of Messrs. Harper Brothers, and in 1876 became a member of the American Water-Colour Society. It is exactly twenty years since he came to England. He has illustrated the following works:—"Selections from the Hesperides and Noble Numbers by Robert Herrick," 1882; "She Stoops to Conquer," 1887; "Old Songs," 1889; "Sketching Rambles in Holland," 1885 (in conjunction with Mr. G. H. Boughton, R.A.); "The Quiet Life," 1890 (in conjunction with Mr. Alfred Parsons). He was elected a member of the Royal Institute of Painters in Water Colours in 1883, and received a second-class medal at the Munich International Exhibition in 1883, and a first-class medal at the Paris Exposition Universelle, 1889. Among the Associates who received support at the election, were Sir Arthur W. Blomfield and Mr. G. F. Bodley.

THE Edinburgh Town Council, at a special meeting on Monday, discussed for four hours the question of the Usher Hall site. The Lord Provost reviewed the situation, and proposed the adoption of the West Meadows site. Bailie Kinloch Anderson moved the music hall site; Treasurer M'Crae, the canal basin; Bailey M'Kenzie, a site in Spittal-street; Mr. J. C. Dunlop, one in Melville-street; Mr. Gulland, that it should be in the George-street neighbourhood; while Mr. A. S. Brown proposed recommitment of the subject for further information, and Mr. Waterston that the ratepayers should be consulted. The discussion was adjourned.

### MEETINGS FOR THE ENSUING WEEK.

SATURDAY (TO-MORROW).—St. Paul's Ecclesiastical Society. Visit to the Church of Holy Trinity, Rochester, under the guidance of G. H. Fellows Pryne, P.A.A. Train from Waterloo to Putney at 3.5 p.m., or from any District Station (Mansion House 2.33 p.m., changing at Earl's Court) to East Putney.

SATURDAY (JULY 16).—Architectural Association. Visit to Swakeley's, near Uxbridge, by permission of Mr. H. J. Barrett. Train from Paddington Station, at 2.10 p.m., for 2.25 p.m. train.

St. Paul's Ecclesiastical Society. Visit to Horsham, in company with the Lewisham Antiquarian Society.

### THE ARCHITECTURAL ASSOCIATION.

JULY 16th, VISIT to Swakeley's fine old mansion and park, near Uxbridge. Name and P.O. for 2s. to be sent to Mr. W. H. Raffles, 9, Argyle-street, W., by JULY 13th. Meet at subway entrance, main line departure platform, Paddington Station, at 2.10 p.m., for 2.25 p.m. train.

JULY 30th.—There will be no visit on this date.  
E. HOWLEY SIM } Hon. Secs.  
G. B. CARVILL }

## The Society of Architects.

Founded 1884. Incorporated 1893.

NOTICE is hereby given that THE SOCIETY OF ARCHITECTS, Founded 1884, Incorporated 1893, will hold an EXAMINATION in Architecture and Construction on the Fifth, Sixth, and Seventh days of OCTOBER next. The following being the subjects of Examination: Section I.—ARCHITECTURE. (a) Architectural History; (b) Planning and Design. Section II.—BUILDING CONSTRUCTION AND MATERIALS. (a) Construction; (b) Materials. Section III.—PRACTICE. (a) Specifications; (b) Contracts; (c) Sanitary Science.

All Candidates are requested to give notice to the Secretary, St. James's Hall, Piccadilly, W., as early as possible, and not later than August 9th.

Full particulars will be supplied with regard to time, place, fees, &c., on application.

ELLIS MARSLAND, Hon. Sec.  
MONTAGU BALDWIN, M.A., Sec.

## LATEST PRICES.

IRON, &c.			
	Per ton.		Per ton.
Rolled-Iron Joists, Belgian.....	£6 0 0	to	£6 10 0
Rolled-Steel Joists, English.....	£6 10 0		7 0 0
Wrought-Iron Girder Plates.....	5 15 0		6 10 0
Bar Iron, good Stacks.....	7 0 0		8 0 0
Do., Lowmoor, Flat, Round, or Square.....	17 0 0		17 5 0
Boiler Plates, Iron.....	5 15 0		5 17 0
South Staffs.....	7 17 6		8 5 0
Best Suedshill.....	10 0 0		10 10 0
Angles 10s., Tees 20s. per ton extra.			
Builders' Hoop Iron, for bonding, &c., £6 15s.			
Builders' Hoop Iron, galvanised, £15 10s. 0d. per ton.			
Galvanised Corrugated Sheet Iron—			

No. 13 to 20. No.			
	Per ton.		Per ton.
6ft. to 8ft. long, inclusive gauge.....	£10 15 0	to	£11 0 0
Best ditto.....	11 5 0		11 10 0
Cast-Iron Columns.....	£6 0 0	to	£8 10 0
Cast-Iron Stanchions.....	6 0 0		8 10 0
Rolled-Iron Fencing Wire.....	7 0 0		8 0 0
Rolled-Steel Fencing Wire.....	7 6 0		7 10 0
Galvanised.....	10 10 0		11 10 0
Cast-Iron Sash Weights.....	4 0 0		4 2 6
Cut Clasp Nails, 3in. to 6in.....	8 15 0		9 15 0
Cut Floor Brads.....	8 10 0		9 10 0
Wire Nails (Points de Paris)—			

	Per ton.		Per ton.
0 to 7 8 9 10 11 12 13 14 15 B.W.G.			
8/6 9/0 9/6 10/3 11/0 12/0 13/0 14/9 16/9			per cwt.
Cast-Iron Socket Pipes—			
3in. diameter.....	£5 10 0		£5 15 0
4in. to 6in.....	5 5 0		5 10 0
7in. to 24in. (all sizes).....	4 15 0		5 0 0
[Coated with composition, 2s. 6d. per ton extra; turned and bored joints, 5s. per ton extra.]			

Pig Iron—			
	Per ton.		Per ton.
Cold Blast, Lilleshall.....	105s.	to	110s.
Hot Blast, ditto.....	57s. 6d.	to	62s. 6d.
Wrought-Iron Tubes—Discount off Standard Lists f.o.b.			
Gas-Tubes.....	75p.c.	Fittings	77p.c.
Water-Tubes.....	70		72s.
Steam-Tubes.....	62s.		65
Galvanised Gas-Tubes.....	60		62s.
Galvanised Water-Tubes.....	55		57s.
Galvanised Steam-Tubes.....	45		47s.

10cwt. casks. 5cwt. casks.			
	Per ton.		Per ton.
Sheet Zinc, for roofing and working up.....	£22 10 0	to	£23 0 0
Sheet Lead, 3lb. per sq. ft. super.....	15 7 6		16 7 6
Pig Lead, in lwt. pigs.....	14 10 0		15 10 0
Lead Shot, in 28lb. bags.....	17 10 0		18 10 0
Copper Sheets, sheathing and rods.....	60 10 0		61 10 0
Copper, British Cake and Ingot.....	51 15 0		52 15 0
Tin, Straits.....	71 15 0		72 15 0
Do., English Ingots.....	73 10 0		74 10 0
Spelter, Silesian.....	18 0 0		19 0 0

### TIMBER.

	per load £13	0 0	to	£14 5 0
Teak, Burmah.....	9 5 0			14 0 0
" Bangkok.....	2 18 0			4 18 0
Quebec pine, yellow.....	3 15 0			5 0 0
" Oak.....	3 0 0			4 13 6
" Birch.....	4 3 0			5 3 0
" Elm.....	3 18 0			5 3 0
" Ash.....	2 0 0			3 0 0
Danish and Memel Oak.....	2 13 0			4 3 0
Fir.....	4 18 0			5 18 0
Waincoat, Riga p. log.....	4 10 0			5 10 0
Lath, Danish, p.f.....	5 0 0			6 10 0
St. Petersburg.....	8 0 0			8 10 0
Greenheart.....	4 0 0			15 0 0
Box.....	0 1 5			0 1 10
Sequoia, U.S.A. .... per cube foot	0 1 5			0 0 6s.
Mahogany, Cuba, per super foot	0 0 5			0 0 6s.

lin. thick.....	0 0 4s.		0 0 6s.
" Honduras.....	0 0 4		0 0 5
" Mexican.....	0 0 4		0 0 4s.
Cedar, Cuba.....	0 0 3s.		0 0 4s.
" Honduras.....	0 0 3s.		0 0 4s.
Satinwood.....	0 0 5		0 1 0
Walnut, Italian.....	0 0 3		0 0 7

Deals, per St. Petersburg Standard, 120—12ft. by 1 1/2 in. by 1 1/2 in. —			
Quebec, Pine, 1st.....	£18 15 0	to	£21 15 0
" 2nd.....	13 5 0		15 15 0
" 3rd.....	5 15 0		9 5 0
Canada Spruce, 1st.....	10 15 0		12 5 0
" 2nd and 3rd.....	8 5 0		9 5 0
New Brunswick.....	7 5 0		8 5 0
Riga.....	7 5 0		7 15 0
St. Petersburg.....	9 5 0		13 5 0
Swedish.....	9 15 0		16 5 0
Finland.....	8 15 0		9 5 0
White Sea.....	9 15 0		16 5 0
Battens, all sorts.....	5 0 0		18 0 0

Flooring Boards, per square of lin.—			
1st prepared.....	£0 9 6		£0 17 9
2nd ditto.....	0 8 0		0 13 6
Other qualities.....	0 6 3		0 7 0
Staves, per standard M.—			
Quebec pipe.....	—		—
U.S. ditto.....	£35 0 0		£42 10 0
Memel, cr. pipe.....	220 0 0		230 0 0
Memel, brack.....	190 0 0		200 0 0

### OILS.

Linseed.....per ton.	£16 12 6	to	£17 2 6
Rapeseed, English pale.....	23 10 0		23 15 0
Do., brown.....	22 0 0		22 5 0
Cottonseed, refined.....	15 15 0		16 5 0
Olive, Spanish.....	32 10 0		33 0 0
Seal, pale.....	20 0 0		20 5 0
Cocoonut, Cochua.....	29 0 0		29 10 0
Do., Ceylon.....	24 5 0		24 10 0
Palm, Lagos.....	23 10 0		24 0 0
Oleum.....	18 15 0		19 15 0
Lubricating U.S.....per gal.	0 6 3		0 7 6
Petroleum, refined.....	0 0 4s.		0 0 4s.
Tar, Stockholm.....per barrel	1 0 0		1 5 0
Do., Archange.....	0 12 6		0 15 0
Turpentine, American.....per ton	23 15 0		24 0 0



## LIST OF COMPETITIONS OPEN.

Beverley—Extension of East Riding County Council Offices .....	£30 (merged), £20, £10 .....	J. Bickersteth, Clerk, County Hall, Beverley .....	July 16
West Hartlepool—Refuse Destructor, Burn-road .....	.....	J. W. Brown, Borough Engineer, Municipal Bldgs, W. Hartlepool ..	27
Wivenhoe—Water-Supply and Drainage Schemes .....	.....	C. W. Denton, Clerk, East Stockwell-street, Colchester .....	27
Glasgow—Exhibition Buildings (£60,000 limit) .....	£210 (merged), £156 10s., £105 .....	H. A. Hedley, Secretary, 141, Buchanan-street, Glasgow .....	Aug. 15
Pendlebury—Three Chapels, Offices, Lodge, Entrance Gates, and Boundary Wall, at proposed Cemetery .....	.....	.....	.....
Glasgow—City Improvements between King-street, City, and the N. W. Wynd .....	£50 (and 5 per cent. com.), £20, £20 .....	Samuel Brown, Town Clerk, Town Hall, Salford .....	16
Stockholm—City Railway Stations and Junctions .....	£100, £50, £25 .....	J. D. Marwick, Town Clerk, City Chambers, Glasgow .....	31
Liverpool—New Buildings for Royal Institution .....	£656, £438, £219 .....	Consulate General, 27, Great Winchester-street, E.C. ....	31
Godalming—Football Stand (150 seats—£150 limit) .....	50gns., 20gns. £3 3s. ....	Harold Waterhouse, Hon. Sec., 3, Cook-street, Liverpool .....	31
.....	.....	Secretary, Recreation Club, Godalming .....	.....

## LIST OF TENDERS OPEN.

## BUILDINGS.

Bury St. Edmunds—Chapel at Thingoe Workhouse .....	Board of Guardians .....	T. D. Atkinson, Architect, St. Mary's-passage, Carlbridge .....	July 9
Abertillery—Twenty-eight Cottages, Glandwr-road .....	.....	W. Thomas, Brynawel, Aberdare .....	9
Shillelagh—New Bathrooms at Workhouse .....	Board of Guardians .....	J. J. O. Ransay, M.E., Dunlavin .....	9
Belhelvie—Steading at Inn Farm .....	.....	J. Farquharson, 37, Westbury-road, Aberdeen .....	9
Liversedge—Club Premises, Norriethorpe .....	Gas Company .....	J. Barton & Son, Architects & Surveyors, Halifax-road, Dewsbury ..	9
Canterbury—Additions, Purifying House .....	.....	J. Burch, Secretary, 39, Castle-street, Canterbury .....	9
Woolston—Church House and Institute .....	John Matthews .....	Colson, Farrow, and Nisbett, 45, Jewry-street, Winchester .....	9
Crofton—U.M.F.C. Schools .....	.....	W. North, Mostell-road, Crofton, Wakefield .....	9
Penzance—Business Premises, Market Jew-street .....	.....	N. C. Whear, Holbein House, Penzance .....	9
Woolston—Church, House, and Institute .....	.....	Colson, Farrow, and Nisbett, Architects, Winchester .....	9
Lossiemouth—Villa at Stotfield .....	.....	A. and W. Reid and Wittet, Architects, Elgin .....	9
Rochester—Scully and Bathroom at New Almshouses, Maidstone-road .....	Trustees of Watts's Committee .....	J. W. Nash, Surveyor, High-street, Rochester .....	9
Enzie—House at Hill Park .....	.....	Alex. Grant, Cairnfield, Buckie, N.B. ....	9
Bolton—Eight Shops .....	T. P. Fawcett .....	Bradehaw and Gas, Architects, 19, Silverwell-street, Bolton .....	9
Castleford—Drying Kiln .....	Monmouth County Council .....	A. Hartley, Architect, Carlton Chambers, Castleford .....	9
Buckpool—Cottages .....	.....	Wm. Duncan, 54, Land-street, Huntly .....	9
Llanhilleth—Police Station .....	Co-operative Building Society .....	William Tanner, F.S.I., County Surveyor, Monmouth .....	11
Dromore—Enlargement of Cathedral .....	Board of Guardians .....	Henry Hobart, Architect, Dromore, Co. Down .....	11
Grangemouth—Three Double Cottages .....	Committee .....	J. P. Mackenzie, Solicitor, Grangemouth .....	11
Armagh—Dispensary .....	Guardians .....	W. Calvert, Clerk, Workhouse, Armagh .....	11
Ramsey—Villa, Bury-road .....	Pure Ice Co. ....	J. Ruddle, Architect, Boroughbury, Peterborough .....	11
Birkenhead—Extension to Hospital .....	.....	E. Kirby, Architect, 5, Cook-street, Liverpool .....	11
Llanelli—New House at Halfway .....	Stirling County Council .....	J. White, 4, Mona-terrace, Llynwendy .....	11
Kingston-on-Thames—Disinfecting Chamber at Workhouse .....	Hornsey Urban District Council .....	W. H. Hope, Architect, Union Office, Portsmouth-road, Kingston ..	11
Halifax—Additions to Factory, Horton-street .....	Joint Hospital Board .....	Buckley and Son, Architects, Tower Chambers, Halifax .....	11
Mold—Alterations to National Schools .....	Urban District Council .....	The Vicar, Mold .....	11
Blackbraes—Police Station .....	R. and P. Hartley .....	A. and W. Black, Architects, Falkirk .....	11
Muswell Hill, N.—Fire-Engine Station .....	R. Broughton .....	F. D. Askey, Clerk, Southwood-lane, Highgate, N. ....	11
Tiverton—New Isolation Hospital Buildings .....	Corporation .....	C. M. Hole, Clerk to the Board, Tiverton .....	11
Shepsted—Extension of Burial Ground .....	Guardians of Gateshead Union .....	W. T. Hampton, F.S.I., Surveyor, Swan-street, Loughborough .....	12
Ulverston—Stables at Old Brewery .....	Pease and Co. ....	J. W. Grundy and Sons, Architects, Ulverston .....	12
Lancaster—Residence at Caton .....	Lumby, Son, and Wood .....	N. G. Lewis, Architect, 1, New-road, Lancaster .....	12
Huddersfield—Isolation Block, Sanatorium, Mill Hill .....	Vestry .....	F. C. Lloyd, Town Clerk, Town Hall, Huddersfield .....	12
Shotley Bridge—Cottage Homes .....	A. F. Langley .....	W. Lister Newcombe, F.R.I.B.A., 89, Pilgrim-street, Newcastle ..	12
Ushan Moor—Schools for 400 Children .....	.....	Clark and Moscrop, Architects, Darlington .....	12
Halifax—Boiler-Houses, &c., North Dean .....	Metropolitan Asylums Board .....	R. Horsfall and Son, Architects, 22a, Commercial-street, Halifax ..	12
Aberdeen—Additions to City Hospital .....	.....	John Rust, City Architect, 224, Union-street, Aberdeen .....	13
Fulham, S.W.—Demolition of 1, 3, 5, and 7, Harwood-road .....	Mountain Ash Navigation Bldg Club .....	Surveyor, Town Hall, Walham Green, S.W. ....	13
Cardiff—Premises in High-street .....	Stokesley Rural District Council .....	E. J. Williams, M.S.A., 14, High-street, Cardiff .....	13
Dartford—Destructor House and Pair of Destructors, Gore Farm Hospital .....	School Board .....	.....	14
Annan—Pair of Semi-Detached Villas .....	Perthshire County Council .....	T. D. Mann, Clerk, Norfolk House, Norfolk-street, Strand, W.C. ...	14
Abercynon—Twenty-four Houses .....	Markets Committee .....	John S. Millar and Son, Annan .....	14
Slyne—New Church .....	Admiralty .....	G. A. Evans, F.R.I.B.A., 12, Temple-row, Wrexham .....	14
Blisdale—Re-erecting Rainsdale Bridge .....	L. Clark and Sons .....	Austin and Paley, Architects, Lancaster .....	14
Rochester—Schools (760 children), Gordon-road, Strood .....	.....	W. Richardson, Clerk, Stokesley .....	14
Gouthland—Villa .....	London County Council .....	Apeley Kennette, Clerk, Guildhall, Rochester .....	14
Crieff—Police Station .....	.....	E. H. Smiles, A.B.I.B.A., 5, Lowergate, Whitby .....	15
Billingsgate Market—Works to the Foreshore .....	Chester Agricultural Society .....	D. Smart, Architect, Perth .....	15
Little Torrington—Restoration of Church Tower .....	School Board .....	The City Surveyor's Office, Guildhall, E.C. ....	15
Bradwell, Essex—Coastguard Buildings .....	Trustees of the Savings Bank .....	Harbottle and Reed, Architects, 12, Castle-street, Exeter .....	15
Goole—Wesleyan Chapel, Boctherferry-road .....	Governors of Christ's Hospital .....	Director of Works Department, Northumberland-avenue, S.W. ....	15
Coalisland, Co. Tyrone—Manager's House .....	Talent and Co., Offices, Carter-gate, Newark .....	H. B. Thorp, Architect, Goole .....	15
Leeds—Rebuilding of the Three Horseshoes Hotel, in Park-lane and Princess-street .....	A. E. Nalder, Solicitor, Shepton Mallet .....	J. G. Lindsay, Architect, 6, Chichester-street, Belfast .....	15
Midway—School Chapel .....	Cullingworth—Baptist Sunday School .....	.....	16
Colne—Technical Schools and Public Library, Albert-road .....	Hendreforgan—Cottage .....	Thomas Winn, Architect, 92, Albion-street, Leeds .....	16
Salisbury—Nursing Staff House .....	Honley—Additions to Cottage, Offices, &c. ....	Rev. T. S. Clark, Newhall .....	16
Murrayfield—Ten Houses in Abinger Gardens .....	Bristol—Goods Shed, Lawrence-hill .....	Alfred Varley, Town Clerk, Town Hall, Colne .....	16
Bethnal Green, E.—Two Blocks of Dwellings on Boundary-street area .....	Portsmouth—Additions to St. Mary's-road Board Schools .....	S. Buchanan Smith, Secretary, Crown Chambers, Salisbury .....	16
Marchwiel—Infant School and Reading-Room .....	Cushendall—Presbyterian Church .....	Dunn and Findlay, Architects, 35, Frederick-street, Murrayfield ..	16
Chester—Shedding .....	Swindon—Post Office Sorting Room .....	.....	16
Norton-in-Hales—Repairing Tower of Church .....	Upper Edmonton—Receiving Wards at Workhouse, Silver-st. ....	C. J. Stewart, Clerk, Spring Gardens, S.W. ....	16
Moss Side—Extension of Two Schools .....	Malden—Crown Post Office .....	Edward Jones, M.S.A., 12, Temple-row, Wrexham .....	16
Aleodon—Board Schools .....	Hull—Engine Shed for 48 Engines .....	T. A. Beckett, Secretary, St. Werburgh's Chambers, Chester .....	16
Halifax—Villa, Green Royd Estate .....	Dewsbury—Twenty Shops in Arcade .....	Lynam, Beckett, and Lynam, Architects, Stoke-upon-Trent .....	16
Leigh—Bank Premises, Bridge-street .....	Cheshunt, N.—Dwelling-House at Turnford .....	W. E. Rowcliffe, Clerk, 30, Cross-street, Manchester .....	16
Shepton Mallet—Grammar School .....	Newhaven—Kitchen, Scullery, and Offices at Workhouse .....	J. R. Thompson, Clerk, 18, Scotch-street, Whitehaven .....	16
Halifax—Villa, West End .....	Clova—Approaches to New Bridge .....	Buckley and Son, Architects, Tower Chambers, Halifax .....	16
Abingdon—Block of Three Houses, Albert Park .....	Grange-over-Sands—Public Hall .....	J. H. Stephen, Architect, Leigh, Lancashire .....	16
Dolbenmaen—Mission Church .....	Barrow—Medical Wing to Hospital .....	A. E. Nalder, Solicitor, Shepton Mallet .....	16
Newark—Out-Offices and Cloakroom at Christ Church Schools .....	Belowda—Additions to Higher Tenoweth Farmhouse .....	H. Hutton, Architect, Town Hall Chambers, Sowerby Bridge .....	16
Shepton Mallet—School .....	Halifax—Workshops, North Dean .....	J. T. Morland, Clerk, 33, Bath-street, Abingdon .....	16
Barton Stacey—Three Cottages .....	London, E.C.—Head Office Buildings, Carmelite-st. & Victoria Embankment .....	P. S. Gregory, Architect, Bangor .....	16
Cullingworth—Baptist Sunday School .....	.....	Talent and Co., Offices, Carter-gate, Newark .....	16
Hendreforgan—Cottage .....	.....	A. E. Nalder, Solicitor, Shepton Mallet .....	16
Honley—Additions to Cottage, Offices, &c. ....	.....	Westbury and Son, Land Agents, Andover .....	16
Bristol—Goods Shed, Lawrence-hill .....	.....	Judson and Moore, Architects, Keighley .....	16
Portsmouth—Additions to St. Mary's-road Board Schools .....	.....	G. K. Mills, Secretary, Paddington Station, London .....	16
Cushendall—Presbyterian Church .....	.....	Alfred J. Slocombe, Clerk, Town Hall, Huddersfield .....	16
Swindon—Post Office Sorting Room .....	.....	G. K. Mills, Secretary, Paddington Station, London .....	16
Upper Edmonton—Receiving Wards at Workhouse, Silver-st. ....	.....	J. Bascombe, Clerk, Board Offices, Town Hall, Portsmouth .....	16
Malden—Crown Post Office .....	.....	W. J. Fennell, Architect, 11, Chichester-street, Belfast .....	16
Hull—Engine Shed for 48 Engines .....	.....	G. K. Mills, Secretary, Paddington Station, London .....	16
Dewsbury—Twenty Shops in Arcade .....	.....	A. H. Maddocks, Clerk, Covent Garden, W.C. ....	16
Cheshunt, N.—Dwelling-House at Turnford .....	.....	Hon. Reginald B. Brett, Sec., H.M. Office Works, Storey's Gate, S.W. ....	16
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Grange-over-Sands—Public Hall .....	.....	James Bunce, Turner's Hill, Che-hunt, N. ....	16
Barrow—Medical Wing to Hospital .....	.....	Clayton and Black, Architects, 152, North-street, Brighton .....	16
Belowda—Additions to Higher Tenoweth Farmhouse .....	.....	J. P. Anderson, District Clerk, Forfar .....	16
Halifax—Workshops, North Dean .....	.....	John Hatton, M.S.A., Kendal .....	16
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# THE BUILDING NEWS AND ENGINEERING JOURNAL.

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## MISAPPLIED LABOUR.

AN old adage runs "An honest tale speeds best being plainly told"; but the lesson seems hardly learned now by artists and craftsmen. A great deal of labour, skilled and otherwise, is thrown away and lost in our modern industries, and all comes from the lack of restraint which has ruined so many of our architectural styles. The later Roman period is one of the earlier examples of the want of restraint. The Greeks, in the subtle contour of their mouldings, sought to convey the real use of certain forms; they never lost the sense of due proportion and grace in the delicacy of their enrichments and surface relief, the outline was always preserved, while the ornament was used to accentuate it. The later Romans lost sight entirely of this restraint by employing a redundancy of carving. Ostentation replaced refinement. Again, in the later phases of Gothic, as in the Tudor, elaborately-cut surfaces, carving and devices obscured the earlier forms of the Gothic architects. Lastly, we have the Rococo styles as the debased form of Renaissance. Whether in architecture, decoration, or metalwork, we find the same rebellion against classical forms and traditions. It was a natural reaction from system and rule. Such vagaries as broken pediments, twisted columns, and shell-like scrolls exhibit the license of the style, the riot of forms and features. In all these combinations there was an unrestrained and indiscriminate mixture of the earlier forms. The Baroque styles in decoration and metalwork showed all these vagaries, and one of the leading characteristics of the style was the distorted and crowded use of details. Symmetry was lost sight of and straight lines abandoned—in fact, the laws of composition were completely sacrificed to extraneous ornament.

A similar spirit of exaggeration, of insubordination to methods and of regard for detail and elaboration, is observed in modern work. Our exhibitions of manual skill and craftsmanship display the same want of restraint, an impatience of the principles and rules of art. If a workman can find an easier way of doing any work than that prescribed, he will adopt it. He will not spend two days over a piece of stonework or a piece of joinery to find out a better method if he can do the work in a day. To him decoration or a display of handicraft is far easier and more profitable than design; but his ancestor in the craft was satisfied if he could perform his work simply, and tell its own tale, according to rules and methods he had learned as an apprentice. A display of technical detail, or an appearance of labour, he did not attempt to make; he was content if his work showed thoughtfulness and honesty. But this character is not found in modern work. There is a restlessness to produce something novel, to display mechanical labour, to elaborate parts of a design when it can be done cheaply and without thought. Our technical exhibitions in wood, metal, stone, plasterwork illustrate almost a fatal facility for this kind of misapplied labour. In cabinet-making, furniture, lathe-work, we are often disgusted by a redundancy of ornament and carving, and intricacy of mouldings, which prove the artist has not learned the most elementary principles of design. Take the design of a sideboard and overmantel. A multiplicity of notches and scrolls, fretwork turned out by the lathe, minutely-turned balusters obtrude

upon the eye; the whole looks fussy and freakish. The very nature of such an object as a baluster is forgotten in the efforts to articulate it into numberless parts by mouldings and rings. The base, cap, and contour of the middle part of the baluster, which can be made to express the idea of support, are lost in this excessive moulding of the outline; and so it is in decorative woodwork, as we see it in modern premises, restaurants. "Mechanical turning is cheap—let us apply it plentifully." This is the motive inspiring the furniture-maker and shop-fitter. If it is a panel or frame, we find the corners turned or pieces of lathe-turned mouldings introduced, to make it look as rococo as possible. In wrought or cast iron work, as we see it turned out for gates and grilles, grates and fireplaces, the desire to make them elaborate and ornamental is the main object. Some of the modern stove fronts and chimney mantels are exuberant; but one pattern suffices, and the manufacturer knows he sells the showiest the best. The plain and appropriate patterns are only selected by the few. What is more offensive than the modern cast-iron railing and crests one sees round suburban villas, full of scrolls and twists and finials? Their early destruction by breaking off is the just retribution.

There are modern typical buildings exhibiting the like redundancy. "Just too clever" is often the comment that we pass on some of our new shops. There is the over-wrought gable, with its series of ramps and twists, and volutes of terracotta; a front frittered by pilasters, horizontal bands, friezes and carving, or cast work. We know the effect of it all in a few months. That mass of ornament and detail will soon lose all its freshness and brightness under a coating of smoke. Recent instances of over-delicate detail may be seen in almost every main thoroughfare of London where the carver, the terracotta manufacturer, or decorative artist has had *carte-blanc*. New hotels, printing-offices, restaurants, office blocks have vied in producing the last new front of sculptured stone or decorative terracotta; but, alas! they one by one sink into oblivion under the veil of smoke and dust, which reduces them all to one tone of depressive greyness. One of the latest examples of overwrought carving applied to a front is that of the new and extensive range of buildings in the Haymarket, the Carlton Hotel, where the carving in the spandrels of the windows of the upper stories has been executed in an exceedingly elaborate manner. The carver appears to have been left to do his best. Without doubt, much of the design is very beautiful; but it is quite lost, and in a few months the carving will be indistinguishable.

We have yet to learn much of the principle of proportion in detail. Large sums of money are expended on façades like those of the new theatre and hotel at the corner of the Haymarket, many buildings in the Strand, and a few in Oxford-street; but the expenditure is lost, because the labour has been spent on surfaces too high or far removed to be admired in the bustle of a busy street; or detail has been put into domes and other elevated features which cannot be estimated, while the profiles or outlines of the features themselves have been spoiled or blurred by accessories which are worthless as ornament. What is more ironical than to design a graceful dome and then mar its profile by a number of small vases and finials and turrets which can never be seen with any satisfaction? And there are architects who commit this mistake every day.

The widow of the late Giovanni Fontana has just presented to the Walker Art Gallery, at Liverpool, a marble group by her husband, of which the subject is "Jephtha and his Daughter."

## MODEL SPECIFICATIONS.—XXI.

MARBLE AND FLINT WORK.—CARPENTER AND JOINER.

WE illustrate a few more details of stonework of a special kind. For groined vaulting the architect should insist on the vault being set out full size from his detail drawings, and that the wooden centring if necessary should be constructed with accuracy for the ribs and filling. The springing of the vault is important; the springer-stones should be built solid into the walls at the proper level, in one or more courses, projecting sufficiently to allow the ribs to separate themselves. The initial starting of the moulded ribs is worked as shown in section I., on the upper part of the springer block where they clear the wall, and upon the accuracy of the setting out of this part the success of the work depends. The seating for the three ribs—viz., the two wall-ribs and groin-rib must be determined by the proper method. After ascertaining the centres and curvature of the wall-ribs, the diagonal or groin-rib is next struck from one or more centres, its apex being the same height as the apices of wall-rib, though this is not always so in practice. As will be seen, the diagonal rib will be of a flatter curve, and is often composed of arcs struck from different centres (see section). Each stone of a rib represents a voussoir, its ends or bed-joints worked square with the curve; but the horizontal beds of the filling-in will not be at right angles to one rib, but to a line midway between the two supporting ribs.

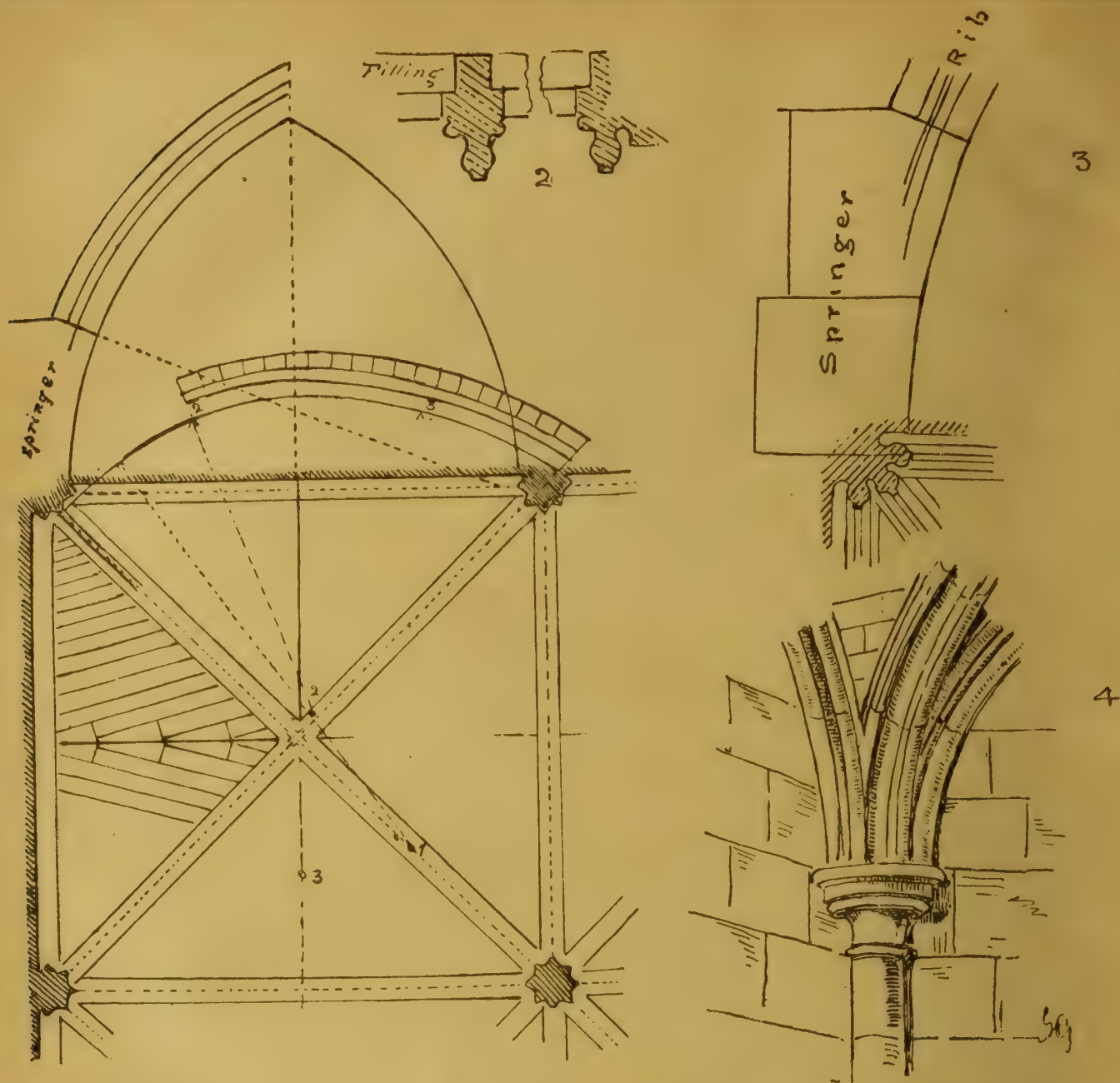
Diagrams 1, 2, 3 illustrate the construction of groined vaulting, and we refer to clause 63 for specification. Sketch 4 shows the angle-shaft and ribs at the springing. Sketch 5 is an ornamental gable with stone copings, the specification clauses for which we have given (see clause 49). To illustrate the jointing of stone arches, tracery, and vaulting, we give further examples (6, 7, 8, &c., see clause 54.) The last sketch is taken from Viollet le Duc, and shows what we may call a "stalk" of skewbacks, from which diverge several ribs, both transverse and diagonal. A bears the section of one rib; B, of two ribs; C shows a horizontal bed, and the upper skewback D bears the section of five ribs. It illustrates how many separate ribs may be carried from one pillar, and is given as a feat of the mason's art.

## MARBLE.

In specifying works in marble, state the kind of marble by the usual description or name; state if polished, the size of slabs, their thickness, stipulating that cracks or blemishes will not be allowed. Italian marbles have the preference for superior work; but many of the Irish marbles, as the Connemara and the red varieties are said to be equal to any foreign marbles. The Devonshire marbles are also largely used, and very beautiful in colour and veining. They chiefly come from Plymouth and Torquay. Such firms as Farmer and Brindley of London, A. W. Blackler and Sons of Torquay, the Irish Marble Company, J. and H. Patteson, Manchester, can be fully relied upon for excellent quality and workmanship. The Devonshire marbles vary in colour from delicate greys to dove tints, spangled with brown and rose tints, mixtures of black, reds of various shades, and yellows. Some beautiful varieties of reddish brown and rose are seen at Billacombe and Radford, and green varieties, clouded and veined, occur at other places in the neighbourhood. The foreign marbles often specified are sienna, rouge royal, Sicilian, dove, statuary, and black, but these varieties cannot always be obtained.

67. *Paving to Hall.*—Pave the hall with  $\frac{1}{2}$  in. (or 1 in.) Sicilian and black marble tiles in alternate squares, diagonally laid and jointed in 6 in. (or 9 in. or 12 in.) squares and half squares, with a black and red border  $\frac{1}{2}$  in. or 6 in. wide, as shown





in drawing. The tiles to be laid in stone dust and lime mortar on a bed of Portland cement concrete 6in. thick, floated to a perfectly even surface coat of cement and sand  $\frac{1}{2}$ in. thick. The surface to be sanded or gritted over and cleaned off at completion to the architect's satisfaction. Or—

Pave the hall, vestibule, and passages with 1in. marble tiles of two colours 9in. square (state varieties), as shown, upon a bed of Portland cement concrete floated with cement and sand, or state that the same are to be executed by J. and H. Patteson, of Manchester, or by the Irish Marble Company, Kilkenny, or by some well-known London firm like Messrs. Farmer and Brindley. Or—

The pavements of hall and vestibule, &c., to be laid with Sicilian marble tiles in 9in. squares  $\frac{1}{2}$ in. thick (or black and Sicilian, dove and ditto, rouge and dove, rouge and black), square laid with border of 9in. tiles, as shown, on Portland cement concrete, 6in. thick, with floated cement bed; cleaning off, and sanding or gritted to satisfaction of the architect. Or—

The marble paving to be laid by marble merchant, and state how it is to be laid: if jointed and laid in mortar or cement, with attendance provided by contractor.

(Marble paving is best done by a separate firm at a stipulated price, or so much per yard p.c.)

68. *Marble Wall Lining.*—The walls of hall (or vestibule) to be lined with  $\frac{1}{2}$ in. (or 1in.) sawn, jointed, and polished Devonshire or Italian marble (state kind) slabs, set in plaster of Paris (or cement), cramped to walls with copper (or gun-

metal) cramps. The dado to be of dark rouge or variegated marble, 1in. thick, with plinth and surbase moulding, and frieze, as shown. The plinth to be 12in. by 2in., moulded to section, and sunk and polished; the surbase moulding to be 4in. by 3in., moulded to detail and polished, and the frieze cornice to be 8in. by 6in., moulded, sunk, and polished, as per detail. For large public buildings the linings should be at least  $\frac{1}{2}$ in. to 4in. in thickness.

(For columns or pilasters, the clauses may follow those for stone. State diameter of column, and if the shafts are in one or how many blocks, whether the apophyses are worked on, how bedded, &c. For other marble features, staircases, entablatures, see clauses for Stonework.)

#### FLINT RUBBLE.

A backing of brickwork is necessary with the facing of flints. Quoins, window dressings, door-jambs, chimneys, &c., should be of stone or brick, with horizontal bands at intervals for bonding the work. The flints are laid in random courses. The clause for solid flint walls may run:—

69. *Solid Flint Walls.*—The walls to be built their entire thickness with random coursed flints 2ft. (or 18in.) thick in lime mortar, composed of 2 parts of sea-sand grit to one of hydraulic lime. The courses to be well flushed up, and the flints to be not less in length than 6in. The quoins, bands, and window dressings to be of red brickwork 14in. and 9in. alternately in the quoins.

The bands or lacing courses to be of three (or four courses) the full thickness of wall, and the arches to be of axed (or gauged) bricks 12in. deep. The joints to be raked out and pointed with cement mortar. Or—

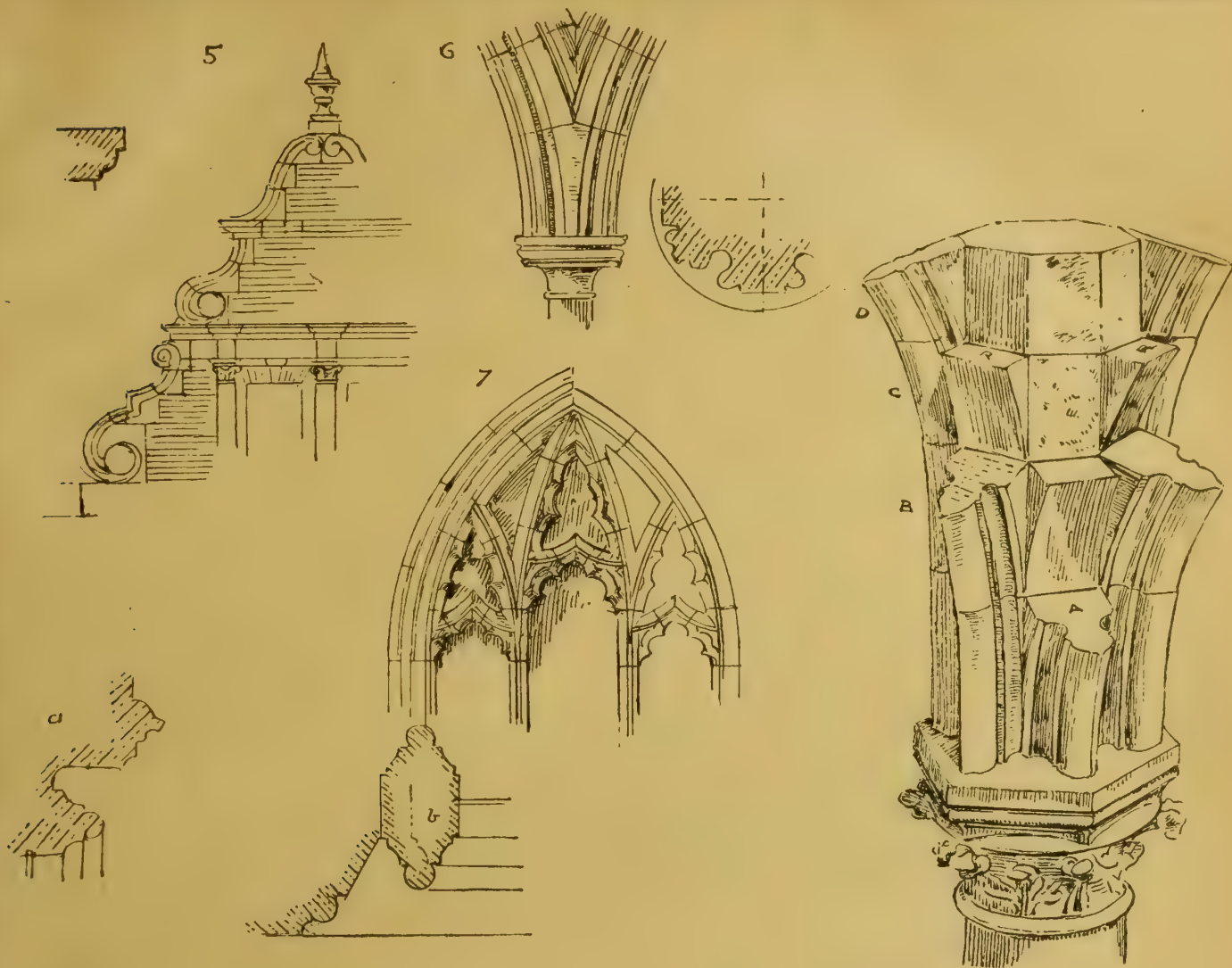
Face the brick walls externally with flints on random courses 6in. (or 9in.) thick in lime mortar, and bond the same with brick lacing courses at intervals of 5ft. or 7ft. The brick or stone jambs and quoins to be built throughout the entire thickness of walls, as shown in elevations, and the flint facing to be pointed in mortar or cement. (State average size of flints).

70. *Carving.*—(Under this head the sizes of stones or extra thickness to allow for carving ought to be stated.) The carving to be done in conformity with the details supplied by the architect, or according to approved models made to full size; and the contractor is to provide all necessary scaffolding, hoisting, screens, and shelters for those engaged on the work. (Sometimes it is necessary to state that the carvers employed are to be approved by the architect, the contractor being required to pay the carver — days after the architect has certified for payment. It is often best to provide a provisional sum for all carved work.)

#### CARPENTER AND JOINER.

The carpenter, joiner, and ironmonger are often taken together, and in ordinary specifications this is convenient; but we shall, as far as possible, separate these three branches for the sake of reference. We shall give clauses for an ordinary house or building, interpolating special clauses when necessary,





our object being to make the form adaptable to ordinary requirements. Several systems of classification are adopted. The following are the usual order of general clauses:—*General stipulations*, which include such matters as the distance apart of joists and rafters, extra thickness of trimmers; the centring, cradling, shores, &c.; lintels—how far they shall bear at each end of opening, their depth, allowing usually 1in. extra in depth for every foot of span above the usual minimum depth of, say, 3in.; wood bricks, concrete fixing blocks for fixing joinery, if creosoted, distance to be fixed; finished sizes of timber, the usual clause being, "The sizes given in the specification to be those when finished or fixed in the building without deduction." The lap of timber, number of bolts to each scarf or joint, dowels, &c., are also stipulated, and these provisions apply to the whole, and need not be repeated. As to principal heads, we may take those which come in the natural order, such as: 1, Bond timber; 2, Breastsummers; 3, Floors of different kinds, beginning with the simplest; 4, Framed partitions; 5, Roofs, describing the trusses, scantlings, ironwork in bolts and straps, &c.; 6, Turrets, &c. To this general order we keep.

As to the qualities of the timber, we refer the reader to "Notes on Building Construction," Mitchell's, and other textbooks for information on this important subject, also to Tredgold (Hurst's edition), Tarn's, and other treatises on constructive carpentry, and to our own columns. It must be noted that the term Baltic fir, Memel fir, &c., always implies red fir or red pine in balk. "Red" and "yellow" deal are really different names for the same wood (*Pinus sylvestris*) or Scotch fir. It has been noticed that

timber merchants and builders call the wood "red," joiners call it "yellow." Memel, Riga, and Dantzic, and the northern Swedish ports supply the chief qualities in balk. The best joinery deals are obtained from Petersburg, Finland, and Swedish ports (see Stevenson's valuable work, "Wood and its Constructive Uses," published by Batsford).

It is desirable, if possible, to specify imported sizes in deals and battens, and for many purposes these ready-sawn scantlings are more reliable than timber sawn from the log. Usual sizes are 7in. by 2½in., 9in. by 3in., 11in. by 3in., 2in. by 4in., 2in. by 4½in., and many more. The best Russian sawn wood is generally 2½in. and 3in. thick, and 7in., 9in. and 11in. wide.

1. *Quality*.—The whole of the timber to be sound and well seasoned, free from sap, shakes, and large or loose knots, and other defects, and sawn die-square.

*Fir*.—The fir to be of the best quality Dantzic, red Riga or Crown Memel fir. Or—

The timber to be of deals and battens, K.H.B. (or other brand), to be of the best selected Swedish red timber. Or—

The deals to be the best Petersburg Archangel red (or yellow Christiania or Onega).

*Oak*.—The oak to be of English growth, sound and well seasoned, and free from all defects.

*Teak*.—The teak to be the best Moulmein, well seasoned, and free from all defects.

2. *Scantlings and Framing*.—The timber to be cut into scantlings as soon after the signing of contract as possible, and the framing to be put in hand at once, but not glued up till orders are given for that purpose. Or—

The joiners' work to be framed as soon as possible after commencement of building. All timbers and deals to hold the full scantlings.

3. *Window and Door Frames*.—All door and window frames to be built in as the work proceeds.

No joists, rafters, or quarters to be fixed more than 13in. apart, nor less than 12in. away from all flues or hot pipes.

(Amongst preliminary clauses may be placed the erection of an office for clerk of works; necessary shoring to old buildings or party-walls; proper and substantial scaffolding, to be erected in accordance with any instructions given by the architect; overhead platforms, derrick cranes, &c. In some specifications it is specified in timbers wrought both sides, a bare ½in. less than the specified thickness will be allowed; or, if wrought only one side, only ¼in. less will be allowed.)

4. *Sundries*.—Provide and fix all required scaffoldings, centring, turning-pieces, cradlings, tilting fillets, blocks, firrings, bearers, and all necessary articles of carpentry necessary to the perfect and efficient completion of the various works particularised under the heads of carpenter, joiner, mason, bricklayer, slater, plasterer, and plumber.

5. *Bond, &c.*—Provide all necessary wood bricks and templates of sound old English oak with every required preparation for fixing grounds, battens, and joinery; also the various courses of bond timber and wall-plates described, shown, and figured in the drawings; also lintels of old English oak over all square-headed window, door, or other openings within the brick or stone arched soffits. The said lintels to have a vertical depth of 1½in. for every foot of opening between the templates, and not to be longer than sufficient to cover the templates.

6. *Story Posts*.—Provide and fix the story posts as shown in drawings, the same to be of sound Memel fir, and of the full figured scantlings, with cast-iron boxed and tenoned caps and bases, ½in. thick (see sketch).

7. *Breastsummers*.—The breastsummers over openings (or see drawings) for the support of brick walls to be of the full figured scantlings (or 11in. by 9in.), and formed of sound Memel fir timber, halved, reversed, trussed with wrought-iron king or queen bolts, abutment struts, and straining-pieces, and bolted together with proper nut screws,



as shown. The whole screwed up to a camber and mortised for the tenons of story posts (or iron columns), taking care to leave the mortise free for a lateral thrust, in the event of the camber returning to the horizontal. The breastsummer over bay to consist of four timbers, each 11in. by 3in., 3in. apart, with wood slips, and bolted through with 3in. wrought-iron bolts, heads, nuts, and washers. The ends of breastsummer to be cased on cast-iron shoes of 3in. metal 10in. long, and rest 9in. on tooled York templates, with cover stone 3in. thick over (see sketch).

8. *Door Frames.*—All solid door frames to be shod with cast-iron shoes of 3in. (or 4in.) 4in. deep, screwed to frames, and with iron tenons let into the stone thresholds.

9. *Ground Joists.*—The ground-floor joists to be of sound old English oak (or Memel fir), 5in. by 3in., 12in. (or 13in.) apart, on oak plates 4in. by 3in. Or—

*Principal Rooms.*—The rooms and passages and landings to be laid with Memel fir (or red pine, or yellow fir) joists. Those of the chief rooms (named) to be 9in. by 3in., and to be laid 12in. apart (or 14in. from centres). Or the joists to be properly framed into binders or trimmers, and to rest on plates 4in. by 3in. All the trimmer joists to be 1in. thicker than the common joists. The joists to have two rows of solid bridging the full depth of joists (or herring-bone strutting the full depth of joists every 6ft. apart).

10. *Single-Framed Floor.*—The floors of drawing-room, dining-room, &c., to be constructed with Memel fir binders 9in. by 4in., not more than 6ft. apart, on oak templates 4in. by 4in., having a 9in. hold on walls, with bridging joists of red pine 6in. by 2in., 12in. apart, and ceiling joists under 2½in. by 1½in., and 12in. centre to centre. Or—

The floors of reception-rooms to be constructed with two 12in. by 6in. rolled iron joists resting on tooled 3in. York templates 2ft. 6in. by 9in. The iron joists to have 3in. by 2in. fillets, bolted on each side with 3in. bolts, nuts, heads, and washers, secured. The bridging joists to be 9in. by 2in., stiffened with 2in. solid bridgings the whole depth of joists every 6ft. apart, and solid filling-in blocks 2in. thick between the iron joists and wooden joists. (For large floors, the sectional areas of steel rolled joists and timber scantlings should be regulated according to the load. The lower part of iron joists may be cased, or ceiling joists provided, by making every fourth or fifth wood joist a trifle deeper than the lower flange.)

(Sometimes for principal floors, every fourth or fifth joist is made 11 by 3 [2in. deeper] or more according to span, with ceiling joists 4 by 2in. notched to same. Occasionally, tension rods 3in. with nuts, heads, and washers are carried through all the joists every 10ft. apart.)

#### COMPULSORY VENTILATION IN BOMBAY.

UNDER the Epidemic Diseases Act, the Municipal Commissioner for the City of Bombay is now empowered (says the *Times of India*) to interfere in the constructive details of any house the use of which as a dwelling has been, or may be, prohibited under Clause 1 of a Government Notification, dated February 10 and March 5, 1897. He may require the owner thereof within not less than 48 hours to put in hand and diligently complete such structural alterations as may be prescribed. If within the stipulated time the order is not complied with, the Commissioner may have the work done and paid for out of the municipal fund, and shall recover the outlay in the same manner as is followed under the provisions of the City of Bombay Municipal Act, 1888. For many years Bombay has been suffering from a steady disregard of ventilation in the design of buildings, and in proportion as the open spaces have been built up and stories added to existing buildings, the mischief has been aggravated. Many of the most notable buildings in Bombay, whose plans were passed and signed by officials of the municipality, are standing examples of the utter neglect of this most important consideration. The utmost accommodation that the space will afford seems to be the standing rule, and such is the ignorance of the public generally on the subject that tenants rarely protest or demand alterations, however bad the ventilation may be. The enormous number of faulty building plans that have been passed by the municipality, and which are now represented by as many defective buildings, would lead one to believe that no proper rules had been formulated to guide our censors. Ventilation will be

found to be just as unpopular as segregation among the people at large. They will find that it interferes with their privacy, restricts their habitable space, and reduces to a serious degree the revenue from tenements. As for the benefits that ventilation brings to their bodily health, they will deny it flatly. If the evils of deficient ventilation could be fully investigated they would probably account for a large proportion of the sickness in our midst; but reform in this direction is fraught with so many difficulties in its application (if it is to be applied with useful effect) that some very clear definitions will have to be established, without which the work of the Executive will soon be full of contradictions. Ventilation in Bombay could not be carried out thoroughly upon rules that are common to all India. Here the limited range of temperature excludes any question of warming, so ventilation may be described as a means of providing a sufficient supply of air from out of doors into and through the house, so that the impurities of the air, due to human agency, may be kept down to a recognised safe limit. How this is to be effected may vary in a hundred different ways, what the standard of impurity should be will vary with the habits of the people. The rate of circulation of air through houses depends principally on the velocity of the wind, and secondly on the difference of shade temperature inside and outside the house. It often happens here that there is no wind in the streets, and that the difference of temperature of the air within and outside of a house is so small as only to produce an appreciable movement when the openings are vertical. Many houses in Bombay can only be ventilated by cutting a vertical well, like a mine shaft, through the middle of them. This shaft would admit light, and would act like a chimney while the windows or doors giving upon it remained open. Many shops, offices, and dwellings in Bombay resemble tunnels, with one or perhaps two windows at each end. How stagnant the air may become in such places is only known to the people who are obliged to occupy them. Frequently this tunnel is broken up by partitions into chambers, and, although the partitions do not reach the ceiling, the circulation of air is much impeded. In many houses where the windows are closed at night the air becomes so foul that the wonder is that anyone comes out alive. It is hopeless to expect to carry out any complete and absolutely consistent work of ventilation in Bombay as it exists at present. Nothing but an enormous fire, or several of them, would permit it. But it is possible to make working rules to determine the limit of distance from any daylight to daylight through any building as a first consideration; to insist on the ventilation of stairways, by preference at the top and bottom; to prohibit the inclosure of balconies and verandahs which go on daily, and may even be observed at the Municipal Office. It would be unjust to limit official attention to the ventilation of dwellings while public health is influenced by the emanations from imperfectly ventilated sewers. Our sewers in their present state may furnish, to any house proprietor of litigious disposition, the occasion for retaliating upon the Commission by means of an injunction to abate the nuisance, should that official worry him too much about ventilation. There can be no doubt that stringent rules are needed to prevent Bombay from being gradually built up solid, for at present owners and tenants conspire to increase what they miscall "accommodation" at any cost.

#### SOME INSTANCES OF PILES AND PILE-DRIVING, NEW AND OLD.—II.\*

(Continued from p. 8.)

NEXT is Brevet Lieutenant-Colonel J. L. Mason's memoir on work at Fort Montgomery, Lake Champlain, dated 1850:—

"Fort Montgomery is founded on a timber platform resting on 4,383 piles driven into the ground. These piles were driven in 1844-46, and the grillage laid on them in those years and in 1848. These piles, when the work is completed, will bear an average load of 7 cubic yards of masonry and 1½ cubic yards of earth; or, estimating the masonry at 4,200lb. and the earth at 2,700lb. per cubic yard, the weight with which each pile will be loaded will amount to 34,125lb. in addition to its own weight and that of the grillage. These piles were all driven by two steam-engines, one

\* A Paper by HORACE J. HOWE, member Boston Society of Civil Engineers, and read before that society.

of 6H.P. and the other of 8H.P., the former requiring generally an engineer and three labourers to serve it, and the latter an engineer and four labourers. The original cost of engines was 4,388-71dol.; the consumption of oil and rope, together with the repairs applied to them, has amounted to 1,982-21dol.; total, 6,370-92dol. I suppose they could now be sold for 1,000dol. [not more than what they would cost to-day new], a sum not over one-third their value as pile-drivers if they were further needed at this work for that purpose. Deduct the 1,000dol. and it leaves the amount actually bestowed on the pile-driving, 5,370-92dol. The following is the itemised cost:—

	Dols.	Per Pile.
Machinery for 4,383 piles .....	5,370 92	1 22
Cost of piles .....	6,121 42	1 40
Driving .....	1,724 41	40
Measuring, hauling, securing for winter, and sharpening .....	792 24	18
Iron bands to protect the head while driving .....	439 29	10
Cutting down and levelling the piles with axe and adze to receive grillage .....	495 21	11
Machinery other than steam pile-drivers .....	181 10	04
Contingent services and contingencies for this part of the work .....	1,890 05	43
	17,017 67	3 98

The general arrangement of the piles aimed at was to place their centres under the four angles of a square yard, the double pile-driver having been so constructed as to drive two rows two yards apart, from centre to centre, and on repassing the same track to insert an intermediate one, together with one outside the two already driven; but the distance from pile to pile in each row, resulting generally from dividing a given length into a certain number of spaces, would vary an inch or two from 3ft. The grillage was laid in two courses. The lower, a timber 15in. wide and 12in. thick, was generally laid perpendicular to the scarp, thus connecting together rows of piles parallel to the scarp. It was notched down 4in. on to the piles and pinned. The upper course, at right angles to the lower, was of 12in. by 12in. timber across the piles, and of 12in. by 8in. between them, the 12in. by 12in. being notched 4in. down on the lower course, brought its top to the same level as the 12in. by 8in., thus giving a level floor with the masonry. The material for the grillage, consisting of 45,610 running feet of timber of the sizes 12in. by 8in., 12in. by 12in., 12in. by 15in., and of 12,147 hard-wood pins, cost 2,277-45dol.; measuring, hauling and securing this timber for the winter, 235-80dol.; preparing, laying, and pinning, 2,318-02dol.; machinery, 70dol.; contingent services and contingencies belonging to this part of the work, 612-66dol. Total cost of grillage, 5,513-93dol. The difference of level between the highest and lowest water in this part of Lake Champlain is nearly 8ft.; according to our memorandum, 7ft. 10in. To prevent the decay of the wood it was necessary to place the top of the grillage at least as low as the lowest level of the surface of the water; the piles had to be accurately levelled 1ft. 4in. below the top of the grillage. It thus became necessary, let the stage of water be what it would, to inclose the area with a coffer-dam and dyke, and to pump out the water.

The cost of coffer dam and dyke, together 1,700ft. long, and inclosing an area of 2 3-4 acres, was .....	Dols.
Pumping .....	1,395 93
Excavating for platform for the piles and grillage .....	1,504 21
Contingent services and contingencies belonging to these last three items .....	1,587 87
Total cost .....	5,049 91

"We have then—

For excavating, pumping, and coffer-dam .....	5,049 91
Grillage .....	5,513 93
Piles .....	17,017 67
	27,580 51

Then follows the theoretical deduction of the formula already mentioned—

$$L = \frac{F W^2 h}{S (W + P)}$$

"The hammer with which these piles were driven weighed 1,630lb. The weight of the spruce piles was found to be 393-5lb. to the cubic foot, but the piece weighed was rather more dry than the average of the piles—they may be assumed to have averaged at least 40lb. per cubic foot." An example follows giving an application of the formula, and making  $L = 118,175lb.$ , claimed to be an average value for piles driven:—"Each pile supports 28,675lb. They have been loaded with 23,800lb. since the fall of 1846 (three years), and the total now is



28,575lb. Bastion A, the bastion nearest the channel, was finished in the fall of 1846, with the exception of the parapet wall surmounting the scarp. In that bastion the piles were longer and heavier, and they also went farther under the last blows. The formula applied to those in the neighbourhood of the salient would give about 85,000 as the load they could sustain. They have sustained for three years 23,700lb each; the parapet wall will add about 4,000lb. to each pile. Thus, Fort Montgomery gives three years' experience in favour of a coefficient of stability of 3½, when applied to the calculation, under the supposition of a constant force." In discussing the theory further, he closes as follows:—"There might be circumstances perhaps to make the intensity of the retarding force greater at some intermediate moment than at the commencement or close of the motion—as, for instance, a very thin, hard stratum just below the point of the pile; before the pile should reach it the penetration would be easy; it would be difficult while passing through it, and again become easy. But there were no such circumstances in the cases in question. The borings in Bastion A, down to the depth of 45ft., gave a mixture of a very fine clay and sand, so fine that, when dried and rubbed between the fingers, it made an almost impalpable powder. Many cases occurred in which after a pile had been driven some days another blow was struck, and the result was invariably a less motion than was to have been expected if this blow had immediately succeeded the others. One of these cases occurred in which a pile, that on the 18th of September was driven from 4½ in. to 5½ in. on the last four blows, on being struck again on the 20th of September was driven but 2 in. In stating the average weight with which the piles are loaded, no deduction has been made for the influence of the water (in the spring months) in reducing the weight of the masonry. In certain seasons, and for a short time, this might reduce the loads from 4 to 5 per cent."

The following Table shows the circumstances under which some of the piles were driven (77 given in the memoir):—

No. of Pile.	Kind of Wood.	Diameter of Pile in Inches.		Length Before and After Cut Off		Fall of Hammer at the Last Blow.	Several Penetrations of Pile, with a few of the Last Blows in Corresponding Order.
		Butt.	Point.	Before.	After.		
1	Spruce	12½	9½	32 11	32 0	31 10	5½-4½-3½-3½-3½
2	"	17½	13	33 0	31 2	33 11	4½-3½-3½-2½-2½
3	"	14	11½	32 0	31 4	35 1	10-6½-5½-4½-4½-3½
4	"	14	9½	33 0	31 8	34 5	5-4½-4-3½
5	"	13½	10½	32 0	32 0	36 0	5½-4½-4½-4½-3½
6	"	14½	10½	32 0	32 0	35 10	5-4½-4½-4½-3½
7	"	14½	10	32 0	31 10	35 7	4½-4½-4½-4½-3½
8	"	14½	10	33 0	32 1	34 10	5½-4½-4½-4-3½
9	"	14½	10½	32 0	31 5	35 3	5½-5-5-4½-4½
10	"	14	11	33 0	32 9	35 8	4-3½-3½-2½-2½
11	"	12	9½	33 0	33 0	35 9	5-4½-3½-3½-3½-3½-3-3
12	Hemlock	14	11	29 0	29 2	35 1	11-10½-9½-9½-7½-6½
13	Spruce	13½	9	31 0	30 2	35 1	10-8½-6½-5-4½-3½
14	"	14½	12	31 0	30 2	34 11	6-4½-3½-3½-3
15	"	12½	9½	31 4	31 0	35 8	9½-6½-5-4½-3½-3½
16	"	13½	9½	30 9	30 6	35 9	6-5-4½-4-4½
17	Tamarack	15½	11½	29 11	29 2	35 1	8-7-6-4½-4½
18	Spruce	15½	11½	32 1	28 7	32 6	5-4-3½-3½-3½-3-2½
19	"	16	14½	31 9	28 1	32 1	5-3½-3½-3-3-3-3½
20	"	12½	9½	31 6	31 1	35 3	17-11-7½-6½-5-5½
21	"	13	9½	31 0	30 6	35 3	29-27-16-9½-6½-5
22	"	14½	10½	32 0	29 2	33 3	9½-7-5½-3½-3½-2½
23	Hemlock	15½	10½	31 10	29 10	34 1	6½-5½-4½-3½-3½
24	Spruce	16	11	31 4	29 11	34 5	5½-4½-3½-3½-3½
25	"	13	10	32 5	30 5	33 10	7½-6½-5½-4½-3½
26	"	14½	10½	32 0	29 9	31 8	5-4½-4-3½
27	"	14	10	33 0	31 4	34 5	5½-4½-4½-4-3½
28	"	13½	9½	33 0	31 4	34 4	5½-4½-4½-4-3½
29	"	15	9½	33 0	32 6	35 5	1½-3½-3-3-3-3

From these extracts we see that Colonel Mason did not obtain his formula from ultimate loading. He obtained it from theory and then "tried it on," figuring out a factor-of-safety of 3·6. It is stated that there has been some settlement since 1850 (Van Nostrand, 1882). Best recent information is that settlement stopped during 1886.

Chief Engineer Jos. G. Totten, United States Army, seems to have inspired his men to do original work; and we come to another example of this in the work of Brevet-Major John Sanders. The following is his well-known paper:—

MAJOR JOHN SANDERS—FORT DELAWARE.

For the *Journal of the Franklin Institute*: "Rule for Calculating the Weight that can be safely trusted upon a Pile which is driven for the Foundation of a Heavy Structure," by John Sanders, Brevet-Major United States Engineers:—"A simple empirical rule, derived from an extensive series of experiments in pile-driving,

made in establishing the foundation for Fort Delaware, will doubtless prove acceptable to such constructors and builders as may have to resort to the use of piles, without having an opportunity of making similar researches. I believe that full confidence may be placed in the correctness of this rule, but I am not at present prepared to offer a statement of the facts and theory upon which it is founded. Suppose a pile to be so driven, until it meets such a uniform resistance as is indicated by slight and nearly equal penetrations, for several successive blows of the ram, and that this is done with a heavy ram (its weight at least exceeding that of the pile) made to fall from such a height that the force of its blow will not be spent in merely overcoming the inertia of the pile, but at the same time not from so great a height as to generate a force which would expend itself in crushing the fibres of the head of the pile. In such a case it will be found that the pile will safely bear, without danger of further subsidence, 'as many times the weight of the ram as the distance which the pile is sunk the last blow is contained in the distance which the ram falls in making that blow, divided by eight.' For example, let us take a practical case in which the ram weighs one ton and falls 6ft., and in which the pile is sunk ½ in. in the last blow; then, as ½ in. is contained 144 times in 72in., the height the ram falls, if we divide 144 by 8, the quotient obtained, 18, gives the number of tons which may be built with perfect safety in the form of a wall upon such a pile.—Fort Delaware, September 27, 1851."

GENERAL RICHARD DELAFIELD—FORT DELAWARE.

As to the experiments themselves, I will refer to "Foundations on Compressible Soils," 1868, by Richard Delafield, Brevet Major-General. General Delafield is the "Captain Delafield" of the memoir, and was therefore connected with the work at Fort Delaware in 1833, and later. He says:—"Major Sanders's experiments at Fort Delaware were made with a view of deducing a rule for foundation on compressible soils, without any firm substratum lying within reach of piles, for calculating what weight

in 1834 found mud continuously to a depth of 46ft. below low-water mark, then 20ft. of sand, then 30ft. of coarse sand containing shells. It then entered and penetrated for 47ft. a bed of marl which contained boulders. At the penetration of 24ft. each of the blows of the ram drove them about 1in., or exactly ¼th of the fall of the ram. The conclusions that may be

Loads on the Four Piles.	Time. Months.	Total Time. Months.	Settlements.	
			Distance in ¼ in.	Total Distance in ¼ in.
60,700.....	6	6	6	6
75,700.....	—	—	0	6
94,000.....	1	7	2	8
94,000.....	1	10	0	8
107,500.....	1	11	1	9
121,800.....	8	19	7	16
121,800.....	33	52	0	16
134,000.....				
147,000.....	7	59	0	16
160,000.....				
174,000.....				
189,500.....	17	76	10	26
189,000.....	48	124	6	32

derived from it are obvious; that the subsidence had ceased may be safely assumed. It follows that a building on piles, driven in soils exactly of the nature of that in which these experimental piles were placed, will be safe if we do not load them with a greater weight than  $\frac{W}{3S}$ . The co-

efficient was, however, fixed by Major Sanders for safety at 1·8. Conversely, having given the weight of the superstructure, we can by the same rule ascertain the minimum number of piles that will sustain it if driven to a fixed depth or the depth to which an approximately fixed number of piles must be driven to effect the same purpose. There were two experiments of the kind we have described made at Fort Delaware. The second one continued three years and a half, had similar results, and was equally regarded in the determination of the coefficient used in the rule. From other experiments made during the same period, Major Sanders ascertained the relation between the living force of the ram and the distance the pile is sunk for different falls by a series of experiments on 64 piles which received 1,900 blows from a ram of 800lb. It was found that when the fall was less than 3ft. the useful effect was extremely small; that it gained in a rapidly increasing ratio as the fall was augmented, 1ft. at a time, to 5ft.; and that at this point the ratio of useful effect to the force expended is at its maximum, and that the piles are driven to distances proportional to the blow; or, in other words, that there is nothing gained by increasing the fall beyond 5ft. For example, two blows of 5ft. will sink a pile as much as one blow of 10ft.; three blows as much as one of 15ft.; four blows of 5ft. as much as one of 20ft. It was also found that if the 5ft. blows followed each other in rapid succession, the useful effect was rather greater than if the interval employed in common hand-power machines for hoisting the ram was allowed to elapse. From 1833 to 1838, 11,000 piles of 45ft. in length, 12in. square at head, and not less than 10in. diameter at small end, were driven for the foundations of Fort Delaware, under the superintendence of Captain Delafield, of the Corps of Engineers, with a hammer of 1,800lb., by blows in quick succession with steam-power, the maximum fall of the hammer being 45ft. Since 1850, 4,500 additional piles were driven, under Major Sanders's superintendence, from which experience he has drawn the preceding deductions.

Sixty-six hundred of these piles are under the scarps and casements of the present work. In 1848 the excavations for the foundations of the work existing at this time (1868) were commenced, and completed in 1849, and the piling by Major Sanders heretofore referred to was finished in 1851. By 1853, 2,000 tons of masonry had been laid on these piled foundations, and in 1859 the walls, arches, and other masonry were finished. Three bench-marks were established in 1854, reference to which was made in 1859, when it was found that the masonry had not settled in any part. From 1859 to October, 1866, the settlement in reference to the above bench-marks was 4in. at the maximum point and 2·65in. at the minimum, and a mean settlement for all the observed points of 3·19in. No crack was perceptible in any part of the work in 1866 or in 1868." Recent observations (1897) show that the fort stands with a single small unimportant crack



in one casement arch. It is well to note here Sanders considers the ultimate load as  $\frac{W}{3S}$ . So when he recommends  $\frac{W}{8S}$  he assumes a factor of 2½ only. Also that his experiments show that the sustaining power varies directly as  $h$  when the drop is 5ft. or over.

#### PENSACOLA NAVY YARD, FLORIDA.

Various authorities give results of tests at Pensacola Navy Yard Dock, built in 1851-52. The soil is clean white quartz sand to a depth of about 40ft., resting upon a bed of soft clay. The sand is so open that a cubic foot saturated contained six quarts of water. A space, 140ft. by 180ft., was inclosed by driving yellow-pine piles 12in. square to a depth of 20ft. in contact with each other, forming a coffer-dam. Within this space the sand was excavated to a depth of 14ft. below tide. Piles, 4ft. centres, were driven until a 2,200lb. ram, fall 30ft., could not move them more than ½in. A series of experiments was made under the direction of a special board of officers. The upward tests are what interest us. The trial pile was about 29ft. long, 16ft. in sand; diameter, 13½in.; weight, 1,632lb. Tested two months after it was driven.

Pounds.	TABLE OF TESTS.
78,000	no movement
80,000	resisted ½ minute and then rose very slowly
82,000	1½ minute
83,000	½ minute
60,000	18 hours. No movement.
64,000	1 Rose 3in. in one hour; 6in. in all.
74,000	
50,000	for two days. No movement.

A single pile used as a fulcrum sustained 39 tons. Tests showed that piles which one day penetrated ½in., ¾in., 1in., and 1½in. by three successive blows the next day, the blows being given in one minute. "If the pile is allowed to remain undisturbed a short time, the power to move it afterwards must be greatly increased." This is worth noting, and also the method of continuous testing.

#### A. C. HURTZIG—HULL DOCKS.

Further experiments on pulling piles are given by A. F. Hurtzig, Associate Member Institution of Civil Engineers, in 1881, Albert Dock, Hull. The material was compact bluish clay. Above it was from 3ft. to 5ft. of peat, above which again were silt and sand. The piles were 5ft. apart and formed a dam. It was made in 1874 and piles were drawn in January and February, 1880. That is, they were five years in the ground. The piles may be considered as having been chiefly in the stiff blue clay. Before the piles were drawn the clay puddle between the two rows was removed to as low a point as possible, which was about 13ft. below the level of the quay, or rather under high-water mark of ordinary neap tides. The clay puddle that could not be removed would increase to a small extent the frictional resistance to drawing. A "cat-head" was used to draw the piles, with frame, chain, and winch. To the lower pulley-block a heavy sling-chain was attached, and this was slung around the pile to be drawn and secured by wedges. The power exerted by one, two, or more men was ascertained by allowing them to lift certain known dead weights with the winch and tackle. Six men could haul up 41.0 tons; five men could haul up 35.5 tons, &c. It would have been easy with a dynamometer to have had the exact pull taken, but no such instrument was available. There were 420 piles drawn, upon which 300 observations were taken. The length varied between 20ft. and 49ft.; average length, 40ft.; average scantling, 12½in. square = 156sq.in. the sizes varying between 12in. by 10in. and 15ft. by 14ft. The depths to which the piles were driven in the ground ranged between 6ft. and 30ft.; average, 18½ft.; average superficial area of pile below the ground line, 76ft. The piles were not tongued and grooved, but driven close together, so that only two sides could be taken as frictional area, or 38sq.ft. For 300 piles the gross resistance per pile was 33.87 tons. From this must be deducted two items—the weight of the pile and the power required to overcome suction. The net frictional resistance, 31.82 tons, and this was on an area of 38 superficial feet, gives 1,875lb. as the friction per square foot in contact with the soil. The piles were of ordinary rough Memel balk timber. With sawn timber there would probably be a slight reduction

in the friction. The piles in the dam were driven by 1 ton ram falling 5ft. to 6ft. Penetration, ½in. to 1in. per blow.

#### H. LENTZ—CUXHAVEN HARBOUR.

We also have a description of the method of pulling piles by simple tidal action, Cuxhaven Harbour, by H. Lentz.\* The piles were in fine drift sand, which held them remarkably fast. A trial pile 3.23ft. in circumference, driven to a depth of 15.7ft., was extracted by a pull of 7tons 16cwt. after 23 days in the ground. Numerous piles, on the average 17in. in diameter, required pulls of from 23.5 tons to 28tons 15cwt. after having been imbedded from 10 to 20 years at a similar depth. Having used a rowing barge with windlass, and found it somewhat awkward, the author constructed a large timber box 22ft. by 19ft. by 6½ft. with slit or bay 34in. wide, reaching from the middle of one of the longer sides to beyond the centre of the box. When totally immersed, the pull was 59 tons. By means of an oak beam laid over the centre-of-gravity of the box and attached by chains to the piles, these latter could be floated out as before. In some cases 50 and 55 tons had to be exerted before the pile could be moved; but in no instance was the full power of the box, 59 tons, brought into requisition.

(To be continued.)

#### NOTES FROM EDINBURGH.

THERE have been as yet no indication of an ebbing tide in the building trades, and the six months past have not probably had any parallel in the amount of work in hand, both in the category of public buildings and speculative enterprise. The extension of the city's boundaries has, doubtless, given some impetus to the latter, which still continues to add tenements and villas in all the outlying quarters of the city. There has not been any advance in wages, which, at least in the mason and carpenter trades, appear to have reached the maximum limit; but the resolution come to by the masons last year (to try the experiment of an eight-hours' day) has been abandoned on reflection—to be heard of, probably, no more.

The public buildings in hand have made good progress, having had no strikes or unsettled weather to prevent it. The N.B.R. hotel is making its appearance above street level, and the southern portion (the only part in course of erection) is nearly completed on the ground floor. The most conspicuous detail is the large projecting segmental windows, with massive pillars, &c. The completion of the station itself is also well advanced—far enough to accommodate itself to the increase of the autumn holiday traffic without any great inconvenience to the travelling public. The two accesses from the Waverley Bridge are open; the masonry of the waiting-rooms and station offices is nearly finished, and the only portion of the work which appears to be behind its time is the roof and glazing. The whole of the platform space is divided into an eastern and western division, extending from the Waverley Bridge on the west to the farthest of the island platforms on the east. The ironwork is designed so as to get the utmost amount of light, the only obstruction being insignificant—in the gutters of the roof. A greater difficulty to contend with will be the task of keeping the glass as pleasantly transparent as at present. The pavements are being laid with the cork-and-asphalte blocks, laid in asphalte upon concrete, as in the Caledonian Station.

The reconstruction of the Waterloo Hotel buildings makes a large addition to the works undertaken by the N.B.R. The offices of the company are to be located here, instead of in the underground floors of the hotel, and this alteration of the plans will involve an expenditure of about £30,000. The alterations in the old hotel are mostly internal, and make no great change, if any, in the architecture of the streets.

The flourishing state of the insurance companies is giving evidence of itself in the reconstructions of their places of business. The Scottish Provident has added a third to its elevation to the street; this addition, probably contemplated from the first, being in the same style as the rest—i.e., the Classic of fifty years ago, then popularly known as the "Club" style. The Prudential Assurance has now been all but

completed, and is at present by far the most sumptuously decorated interior in the city. The old elaborated plaster decoration is exchanged for faience embellishment, all designed and executed by Burmantofts, of Leeds, with exception of the staircase to the public offices, which is in the same style, but with Doulton ware. The Scottish Equitable, at the opposite corner of St. Andrew's-square, is well advanced to the third floor, and has a good frontage to both street and square. It is in the many-mullioned Elizabethan style, built in much lighter-coloured stone than the Prudential, from Doddington in Northumberland. There is nothing in the architectural detail of the exterior so interesting and original as the design of its neighbour opposite. The corner is a simple corner, and the door enters from the square. The Standard Insurance, at the north-west corner, is also making progress; but it is not far enough advanced to say anything as to its details. It will, however, be as imposing in its frontage as the others, the first section only being now in course of erection. It is being built in a beautiful creamy white stone from Woodburn, also in Northumberland. Yet another institution of the class is being reconstructed in George-street; but it has a meagre frontage to the thoroughfare.

The north-west wing or portico of the Royal Institution has been taken down to the foundations and rebuilt within the last six months. Signs of dangerous settlement were beginning to appear, and the work of restoring its stability has been taken in time. The reconstruction of the old buildings on the north-west shoulder of the Castle Rock, for hospital and other accommodation, is nearly completed, and certainly improves the picturesque appearance of the Castle, which lacked some loftier edifice at this point, to be in keeping with the structures on all other sides. The additions consist of a larger and smaller tenement, built parallel with Prince's-street, and connected by a lower structure, not yet completed. The elevations to the west comprise the two gables, which are rather bald and bare. The front to Prince's-street is much better, although in every part the design is plain and unpretentious, with nothing of the ornamental detail of the Baronial style. In this it copies faithfully the old Scotch house style as it appears in the old Parliament House on the south; the windows are all small in the two lower floors, but in the uppermost they take the form of very tall dormers; this, and the site together, give this quarter of the Castle a more important, lively aspect.

The cable tramways should have been in operation by this time, but formed no exception to the rule which seems to govern the execution of all gigantic undertakings. The work has been carried out under great difficulties, and what with cable tramways and electric mains, the streets have for long been in a state of great confusion. The electric light has hitherto been a great success, and the demand for it has rendered necessary the erection of another station, which will be erected in the Broughton district. Public baths are also to be erected for the north side of the city. The alterations and additions to the municipal buildings are making an appearance on the west side, but as yet give no indication of the characteristic features of the whole, which will effect a complete transformation of the elevation as seen from Prince's-street.

The employment of asphalte as a roofing material is more popular than it has been. The Limmer asphalte is generally used in this district; but has not infrequently failed to give satisfaction. The name is given to a variety of German deposits, and it is said that the ingenuity of the chemist can produce the material in blocks undistinguishable from that obtained in the natural way. The Seyssel asphalte is more expensive for transit, and more extensively used in the west, and has been adopted for the new hospital in course of erection at Colinton.

A site for the Usher Hall has not yet been found. Two years have elapsed since Mr. Usher made his splendid gift, with only the condition that it should be built at an early date; and the offer has hitherto proved an apple of discord. A year was spent in selecting a site in Castle-terrace—only to be set aside—and in discussion of a great many others suggested by an interested public. The matter went to sleep for another year on the understanding that the hall could be erected at the Canal, in conjunction with a great improvement scheme for that quarter of the city. The subject turned up suddenly again

\* Deutsche Bauzeitung, 1879, quoted by Institution of Civil Engineers, 1880.



lately, when definite information was published as to the refusal of the N.B. Railway to part with any of their property. The latest site selected and approved by the committee of council was in the west corner of the Meadows Park—and this, too, by a large majority of the council, has been set aside. Not one of the numerous sites suggested has met with anything like a general consensus of approval, and the public and their representatives are still as far from that as ever. The *Scotsman*, which has good means of collecting information, has approved three sites successively. The city has so many gigantic and minor undertakings on hand, that the monetary aspects of the case presents the greatest difficulty. There seems also to be, even in the discussions of the committee and others, a lack of information as to the hall itself and its accessories, and the purposes it has to serve, and though a large building for the encouragement of musical taste or occasional political meetings is much to be desired, neither is so very necessary as to call for the expenditure of another £100,000 in the selection of a site. Many are of opinion that Mr. Usher's splendid donation could both purchase a site and nearly suffice to erect a hall large enough for the practical uses contemplated.

### TESTS OF BRICK PIERS.

SEVERAL tests of brick piers have been conducted at McGill University, according to the *Canadian Architect and Builder*, and Prof. Cecil B. Smith writes to the *Brickbuilder* about them. He points out that, while with the lime mortar the strength of the mortar determines the load the pier can carry, this is not so when good Portland cement mortar is used. The tests show that the quality of brick determines the pier strength, as the first and second brands of cement were rather superior to the third and fourth. The superior strength of the pressed bricks became evident in spite of this. Another point stated is that the pier strength per square inch is considerably less than that of a single brick on its flat side, but considerably more than cubes of mortar—i.e., beds of mortar are much stronger than cubes, and single bricks than built walls. We can only give two or three of the results here. Taking a pier 8-in. by 8-in., 11ft. 6in. high, with joints  $\frac{1}{2}$ in. thick, the mortar of 1 of Canadian Portland and three of sand, and the ordinary well-burnt flat brick. The crushing strength per square inch showed at first crack 822lb., and the maximum load 1,234lb. A pier 8-2in. by 8-3in., 10ft. 5in. high, with  $\frac{1}{2}$ in. joints of one English Portland cement and three sand, and La Prairie pressed bricks, the results were 1,130lb. at the first crack and 1,524lb. maximum load. The age of pier was in both cases three weeks, and the initial and final failure took place in the brick. It is stated in a footnote to the table from which we have taken these results that the crushing strength of a brick similar to those in pier 1, laid on flat and bedded in plaster of Paris, was 1,400lb. per square inch for first crack and 2,400lb. per square inch maximum load. This, if correct, shows a considerable increase in crushing strength, due to the plaster of Paris.

### STRENGTH OF WHITE PINE, BRICKS, AND STONE.

PROFESSOR W. A. PIKE has published the results of tests recently made in the testing laboratory of the University of Minnesota. Sticks of thoroughly seasoned white pine were tested for tensile strength. They were dressed to a uniform scantling 12in. in length, with shoulders on ends to take the pull. In scantling they varied from  $\frac{1}{2}$ in. square to  $1\frac{1}{2}$ in. by  $2\frac{1}{2}$ in.; average specific gravity 0.66. The average ultimate tensile strength was 7,373lb. per square inch. It was observed that the longitudinal shearing strength of the ends of the sticks, in resisting the pull, was less than has been generally given. The ends had a shearing area of 45sq.in.; but it was necessary to spike and clamp the ends in order to prevent splitting. Thirty-five tests were made of white pinewood for resistance to compression, in which the pieces varied from 1in. cubes to pieces 3in. square and 54in. in length. Of those which broke by direct compression, the crushing resistance averaged 6,283lb. per square inch; 1in. cubes bore 7,800lb. Pieces 3in. square and 54in. long bore 5,221lb.

per square inch; 24in. long, 5,038lb.; and 12in. long, 5,505lb. per square inch. Of those which failed by a combination of crushing and bending, from 54in. to 24in. long, and from 4in. by 2in. to 1in. in return, the average actual stress or load was about 3,000lb. The author argues from the results that the value of the usual constant in the ordinary formula for the resistance of struts is much too great. Half-bricks, placed between pieces of pasteboard, were tested for crushing resistance. St. Louis bricks failed flatwise under 6,417lb. per square inch; edgewise, under 4,080lb. Hastings red brick, hard, medium, and soft, failed respectively under 2,017lb., 2,012lb., and 1,748lb. per square inch.

### A STONEMASON NAMED WILLIAM EDWARD.

ABOUT 150 years ago there lived, not far from Pontypridd, a stonemason named William Edward. He entered into a contract with the county authorities to build a bridge over the often very turbulent Taff. He was to maintain the bridge at his own expense for seven years. He built a bridge of three arches, which in two years the Taff, in one of its mad floods, swept clean away. Edward immediately set to work upon another bridge, and, profiting by experience, determined this time to leave no obstacle in the way of the frenzied waters of the Taff. He built his second bridge in one great arch; but no sooner was the key-stone wedged in and the centres struck than down came the whole structure for the second time!

But William was a dogged, sturdy, honest Briton. He set to work again, and, again profiting by experience, he determined to lighten the haunches of his bridge, and built it again in one great arch, and there it stands to this day, wider in its span than even the great bridge of the Rialto in Venice and as fine a sermon in stone as ever man wrought.

This bridge is the delight of every Welshman, and, standing as it does as a record of indomitable perseverance in surmounting difficulties, and of honesty of word, should be an encouragement to our Welsh friends in this their hour of trial. Edward knew not defeat, and that was why he conquered and overcame his difficulties.

But there is yet another trait of this really fine man's character which is as beautiful as it is utterly opposed to the eager, money-making passion of the world. After his well-earned success on the "Bont Fawr" (great bridge), as his work was called, he became locally famous as a bridge architect, and, among other works, was commissioned to design a bridge for the corporation of Bristol, anent which there is related, in the "Letters from Wales" (by William Reed, the shoemaker-poet of Thornbury), the following anecdote, and which the poet collated when he visited the bridge in 1798, just a hundred years ago.

Edward had returned from Bristol, and a neighbouring lawyer said to him:

"Well, William, you have been to Bristol, I understand, to draw the plan of the new bridge. I hope you have pleased your employers."

"I believe I have," said Edward.

"Well, and what did they give you for all your trouble?"

"With many expressions of politeness," said the artist, "they requested my acceptance of a purse of gold; but my conscience would not suffer me to take more than three guineas—one for defraying my expenses to Bristol, another for maintaining myself there, and a third to bring me back again."

"O William!" exclaimed the lawyer, "had you but my conscience you would have swept all the cash into your pocket, without making the least scruple about the matter."

The preserver of this story calls Edward's utter absence of the least taint of greed "honest simplicity." We may say that it was the action of the noblest work of God—that of an honest man. These, then, are the kind of men that are wanted—men who know not defeat, men who keep to their word to their own hurt, and who are not seekers after filthy lucre. Let us have, and be as these men, and leaders, when wanted, will be to hand.—ROBERT WILLIAMS, F.R.I.B.A., in the *Labour Leader*.

The premises known as No. 4, Coleman-street, E.C., have just been rebuilt by Messrs. B. Colls and Sons, of Moorgate-street.

### OBITUARY.

MR. MICHAEL JOSEPH ELLISON, who for many years was agent for the Sheffield estates of the Duke of Norfolk, died from pneumonia on Tuesday at his residence, Beech Hill, Sheffield, at the age of 81 years. In 1884, on the completion of 50 years of service, he received a valuable service of plate from the Duke, who in a letter to him spoke of his gratitude for his unwearied labours in a sphere of duty calling for qualifications of so very many kinds. Mr. Ellison was elected to the first school board of Sheffield, upon which he served up till 1882, and he was chairman of the Sheffield and South Yorkshire Navigation Company. For 25 years he held a commission in the Yeomanry Cavalry, from which he retired in 1865. He was a Conservative, and one of the leading Catholics in South Yorkshire. A keen sportsman, he was most widely known by his association with Yorkshire county cricket.

MR. THOMAS GABRIEL, J.P., of Elmstead, Streatham, and head of the firm of Thomas Gabriel and Sons, timber merchants, Commercial-road, Lambeth, died suddenly of syncope on Friday while staying at Bournemouth. Mr. Gabriel was in his 63rd year. The funeral took place at Brookwood on Wednesday afternoon, the memorial service having been held at St. Alban's Church, Streatham Park, the same morning.

### CHIPS.

A Roman Catholic chapel is being erected in High-street, East Rickmansworth. Mr. Thomas Holland is the builder.

The Fire Brigade Committee of the London County Council have practically decided to transfer the chief City fire-station from its present site in Watling-street to a site in Jewin-crescent, Australian-avenue, in the Cripple-gate fire area.

At a vestry meeting held at St. Mary-le-Quay, Ipswich, last week, it was decided to apply at the Norwich Consistory Court for a faculty for the restoration of the parish church, which is in a deplorably dilapidated condition, especially as to the roofs.

A House of Lords Committee, sitting on Friday as to the Great Central Railway Bill, declared the preamble proved. Among other things, the Bill seeks powers to construct a line about six miles in length, commencing at a junction near Northolt with the High Wycombe-to-Acton branch of the Great Western Railway, authorised in 1897, and joining the Metropolitan Railway at Neasden Station by way of a siding already belonging to the Great Central Railway. The Bill has already passed through the House of Commons.

At the Norwich Consistory Court last week a faculty was granted for the restoration of the walls, roof, windows, and floor, and for reseating with open benches the parish church of Metfield, Suffolk. The estimated outlay is about £600, all of which has been raised.

Mr. F. H. Lewis, engineer at the corporation electric lighting works, Wolverhampton, has tendered his resignation, owing to failing health. As he designed the works, a committee of the Wolverhampton town council recommend he be retained as consulting engineer for 12 months at his salary of £300 a year.

The members of the Ramsgate Corporation proceeded to Whitehall the other day to inaugurate the new pumping-station erected there in connection with the municipal waterworks, to the design and under the supervision of the borough engineer, Mr. W. A. McIntosh Valon, C.E., and his son, Mr. Arthur Valon. The pumping-station is in three divisions, the main building containing the machinery being 63ft. by 59ft. by 25ft. high. This is lined throughout with glazed bricks and has an iron roof, supported in the centre with cast-iron columns. The flooring is composed of a tessellated pavement, the borough arms being worked in colours at the central entrance. Messrs. Paramor and Son, of Margate, were the contractors.

Steps are being taken to connect Looe with the main line of the Great Western Railway. At present the Liskeard and Looe Railway, seven miles in length, has its terminus in the deep valley at Moorswater, over a mile from the town of Looe, while the nearest point to the Great Western system is Coombe, also a mile distant, up a steep hill. To connect the two lines was an undertaking which presented many difficulties, since the Great Western line runs at a height of 215ft. above the level of Looe Railway. The tender of Mr. J. C. Lang, of Liskeard, has been accepted for constructing the junction line, which is necessarily a circuitous one, and will be two miles in length. Mr. J. Thomas, M.I.C.E., is the engineer, and Mr. W. J. P. Coombe the contractor's engineer. The first sod of the connecting link was formally cut on Tuesday week.



## BOOKS RECEIVED.

*Iron and Steel Bridges and Viaducts*, by FRANCIS CAMPIN, C.E., &c. (London: Crosby Lockwood and Son).—This little treatise will be found of value by engineers, draughtsmen, and students who require a reliable guide to the theory and practice of iron and steel bridge construction. It is uniform in size and get-up with the author's works on "Constructional Iron and Steel Work" and "Materials and Construction" noticed by us a year or two ago. Mr. Campin describes the physical properties of iron and steel and the mathematical principles of construction, and therefrom he deduces formulae for the design of bridges. The relations of stress to resistance are clearly shown in the first two chapters; and in the fourth chapter he attempts to apply the formulae to practical work. The mathematics are not beyond the reach of simple and quadratic equations, and the examples are worked out. The author pursues a practical course by taking the student through the routine of a bridge engineer's office. The chapters on joints and connections, the preparation of drawings on triangular lattice girder, trussed, cantilever, and other forms of bridges, and on iron and steel piers, bearings, abutments of masonry, &c., will be found of service in the design of these structures. The author deals fully with the question of bridge flooring and the provision to be made on bearings for expansion and contraction, and also the important subject of deflection. Several examples of iron and steel bridges are furnished. Numerous plates and diagrams illustrate the text.—*Architecture among the Poets*, by H. HEATHCOTE STATHAM, author of "Architecture for General Readers," &c., with illustrations by the author (London: B. T. Batsford), is an artistically got-up little book. The essay is a reprint of a series of articles under the above title, which appeared in a contemporary. It was a happy thought to bring together poetic allusions to architecture from various sources, and in this little volume we have an interesting repertoire of references from Chaucer to Tennyson and Browning. Many poets are not partial to architectural creations, and, as the author points out, Dryden was one of these. They were often more admirers of Nature than of Art, and when they refer to architecture or buildings, it is often in a patronising or supercilious sort of manner. Pope is also critical; but his verse is less objectionable, and there is some knowledge of the subject. Byron's references have a truer ring about them as in his allusions to ancient Rome, and so has Scott's "Marmion" in its reference to Edinburgh. These and Browning and Tennyson had an eye for architectural effect. The later poets have unquestionably a truer perception of architecture and style, and they could employ architectural imagery to idealise their conceptions. A list of poets quoted would have been of some value. The book is well printed and appropriately illustrated.—*Elementary Architecture*, by MARTIN A. BUCKMASTER, Art Master at Tonbridge School (Oxford: Clarendon Press) is an attempt to compress within the narrow limits of 144 octavo pages a description of the Classic Orders, English Gothic and Renaissance, and Modern Architecture, and is intended for schools and art students, and for this purpose may have some use, although little research and less originality are evidenced in its compilation. The thirty-eight full-page illustrations, including several sheets of details and plans of Westminster Abbey and Lincoln Cathedral, will serve to render the descriptions more clear, and the list of technical terms will be found very handy by the general reader.—*Sewer Construction*, by WILLIAM H. MAXWELL, assistant-engineer to the urban district council of Leyton (London: Hodgetts, 13, Clifford Inn) is a reproduction in paper-covered pamphlet form of articles contributed to the *Public Health Register*, and contains some trustworthy memoranda on the fixing of levels, the determining of gradients, and the formulae most in use in ascertaining the velocity of flow and discharge.—Another pamphlet describing the *Rise and Progress of the Waltham Abbey Building Society*, a body which is just celebrating its jubilee.—*My Home and Household Compendium*, by J. W. JARVIS and J. W. WOOD (London: Simpkin, Marshall, and Co.), is a paper-covered volume written by two practical cabinetmakers and furnishers of Southsea, and gives plans for making a complete inventory, room by room, of the contents of a house, with descriptions, date of acquisition, and its approximate value then and now. Such a record, if kept

up to date and preserved at the place of business, the bankers, or elsewhere off the premises to which it relates, will be invaluable in case of a claim being necessary on a fire or burglary insurance company.—*A Guide to Uriconium*, by Mr. GEORGE E. FOX, F.S.A. (Shrewsbury: Adnitt and Naunton, The Square).—A useful pamphlet describing the Roman City of Uriconium, near Wroxeter, Salop, has just been published by the Shropshire Archaeological Society. It is illustrated by a general and detailed plan, the latter showing in colour the Basilica unearthed in 1861, which lies between and parallel to two Roman streets, and the series of baths which adjoin it on the south side. The remains are singularly complete, and are situated about a quarter of a mile north of the modern village of Wroxeter, which is included within the circuit of the city walls, and a short distance east of the Severn.

## COMPETITIONS.

LEAMINGTON.—The town council adopted, on Monday, a series of recommendations recently drawn up by the Technical Instruction and Free Library Committees with reference to the proposed new free library and technical institute for the borough. It is proposed that £12,000 shall be spent on the new building, exclusive of land and furnishing; the work of design to be thrown open to competition—the first premium to be awarded the accepted design, the author to have the privilege of carrying out the work; the second premium to be 50 guineas.

PETERBOROUGH.—Ten architects have been asked to send in competitive designs for the proposed addition to the Guildhall.

PLYMOUTH.—The correspondence which has taken place between the town-clerk of Plymouth and Mr. B. Priestley Shires, A.R.I.B.A., and seventeen other architects or firms practising in the Three Towns, respecting the conditions imposed by the Special Works Committee for observance in the competition for designs for the erection of shops and dwelling-houses fronting Tavistock-road reveals, says the *Western Daily Mercury*, a somewhat curious course of procedure on the part of the committee, and one which is sure to draw upon their heads, if persisted in, the strong reprobation of the members and organs of the architectural profession. "In the original terms of the competition a premium of £150 only was offered to architects practising in Plymouth for supplying all the information requisite for the erection of the complete block of buildings, the aggregate cost of which cannot fall far short of £50,000. The acceptance of this condition would mean that those belonging to the profession would sacrifice every prospect of deriving any further receipts for the preparation of detailed plans—a course of things which is regarded by them as the main purpose to be secured. They offer no objection to the requirement to supply a block plan indicating the outline of any buildings that may be erected on the sites, so as to comply with the borough by-laws, or drawings of the elevation; but it is pointed out by the signatories that it is futile for them to design detailed plans of each floor, as in all probability they would turn out to be useless from the fact that purchasers would desire a modification of the internal arrangements to suit the exigencies of the business intended to be carried on. There can be no doubt as to the advisability of placing the selection of the successful design with an independent assessor, as the performance of this duty by the committee is calculated to create considerable dissatisfaction and criticism." The town council have since decided to make the competition a general one, instead of restricting it to architects occupying offices within the borough, and have raised the premium from £150 to £250, but decline to appoint an independent assessor.

PONTYWAUN.—The managers of the County School have invited competitive plans for the erection of the above school buildings at Pontyminster, Mon., in a field in the parish of Risca. The sum to be expended on the erection of the school buildings is £2,000, and the munificent premium of £5 is offered to the author of the plans most approved. Lest the rush of competing architects from all parts of the English-speaking world should be overwhelming, the promoters stipulate that "The plans in respect of which the premium is awarded are to become the property of the managers, and the author of such plans will not necessarily be employed by the managers

to carry out the works; but if he is employed, the premium is to form part of the commission"—so that the bait of a five-pound note for inducing skilled professional men to prepare plans for a £2,000 school will not necessarily be sacrificed. Further, the managers do not pledge themselves to accept or carry out any of the plans. Designs are to be sent in not later than Wednesday, Aug. 17.

WOLVERHAMPTON NEW WORKHOUSE.—At the meeting of the Board of Guardians, on Friday, it was agreed that Professor Aitchison, R.A., president of the Royal Institute of British Architects, be requested to nominate an architect of experience as to workhouses as an assessor in the selection of plans for the new workhouse, and that the gentleman so nominated to be paid a fee not exceeding 100 guineas.

## CHIPS.

The memorial being erected in St. John's Church, Kingston Vale, to the late Duchess of Teck, will be dedicated by the Bishop of Rochester on July 30.

Mr. E. Onslow Ford, R.A., has been commissioned to execute a bust in marble of Sir David Gamble, C.B., to be placed, by subscription, in the technical institute in St. Helena, Lanes, as an acknowledgement of the gift of the building to the townspeople.

The urban district council of Gainsborough have resolved to increase the salary of the surveyor, Mr. H. Riley, formerly of Halifax, by £25 the first year, and by a second sum of £56 after 12 months.

The town council of Colne, Lanes, have resolved to apply to the Local Government Board for sanction to borrow £2,000 for the purpose of acquiring property in Every-street.

The organ in the Baptist Church, Harrogate, was reopened last week, having been reconstructed by Mr. J. Binns, of Bramley, from a scheme prepared by Mr. R. Mack, of Catterick.

Central Park, the second public recreation ground which has been acquired by the East Ham District Council, was formally opened on Tuesday week. The park comprises twenty-five acres, which have been purchased from Colonel Burges for £12,500.

Mr. H. P. Boulnois, Local Government Board inspector, held an inquiry at the Council Chamber, Otley, on Friday, into an application to borrow £600 for works of sewerage in respect of houses to be erected in front of East View-terrace, Otley.

A large clock with two dials, chiming the quarters and striking the hours, has just been erected in the church at Cheveley, near Newmarket, by Messrs. John Smith and Sons, Midland Clock Works, Derby.

A Diamond Jubilee clock, with chimes, has been placed in the tower of East Farleigh Church, Kent. The work has been carried out by Messrs. John Smith and Sons, of Derby.

The managers of the Sunnyside Royal Lunatic Asylum, Montrose, have received a report as to the expenditure on the new house for private patients. The original estimate was £14,000, but with extras, including the introduction of the electric light and improved system of ventilation, the amount now spent is £26,000. In addition to this the House Committee was authorised to spend £2,000 in furnishing the house, and the meeting also authorised the purchase of a piece of adjoining land to form grounds and shrubberies for the institution, the cost being estimated at £7,000.

At the Boys' Middle School, Ipswich, on Friday, a new assembly hall was formally opened. The hall is 58ft. by 34ft., being 37ft. high at the apex, and 23ft. from the spring of the roof, which is of glass. It can be divided off by movable partitions into class-rooms, and above two existing rooms two others have been built to overlook the room in the form of a gallery. A platform faces the gallery, on which is a rostrum. The room is estimated to seat 500 persons. The building has been carried out by Mr. W. Grayston, from plans prepared by Mr. J. Shewell Corder, both of Ipswich.

The parish church of Stratford-on-Avon was reopened yesterday (Thursday) after restoration at a cost of about £3,000, from plans by Mr. G. F. Bodley, A.R.A. The organ has been greatly improved; a warming apparatus has been introduced; the floor has been entirely relaid, partly with stone, partly with oak blocks, and half the oak benches needed have been provided.

The aggregate realisation last week at the Auction Mart, though not equal to that registered in the preceding week, represents a high average even in the full tide of the season. The amount, as officially reported, is £291,045, which the result of Messrs. Edwin Fox and Bousfield's sale must be added, bringing the total to well over £300,000, a sum very rarely exceeded.



## Building Intelligence.

**BALMORAL CASTLE.**—The arrangements for lighting Balmoral Castle by electricity are now being carried into effect. Half a mile of iron pipes of large diameter has been laid for bringing the water from the upper portion of the Gelderburn to the site of the turbine-house, which is situated near the old sawmill, about a mile and a quarter from the castle. Provision is being made for two Gilkes vortex turbines, which, with a fall of nearly 80ft., will give 80H.P. combined. This power will be utilised in driving the dynamos for charging a large battery of accumulators at the castle, and also for lighting the lamps direct. The current will be transmitted by large cables laid underground all the way. The electric light will at first be limited to the Queen's private apartments, the ball-room, and a few of the principal rooms in the castle, and the installation will be in working order by the time her Majesty returns to the north next month. Eventually more than 600 lights will be installed in the castle alone; but if electric lighting is extended to the stables and outbuildings about 1,000 lights will be required. The work, with the exception of fixing the turbines, is being carried out under the direction of Mr. William Massey, of Twyford.

**BLOOMSBURY.**—The Prince and Princess of Wales visited the School of Medicine for Women on Monday in order to open the new science laboratories in connection with the school, which is within a few minutes' walk of the Royal Free Hospital in the Gray's Inn-road. During the last 25 years the work has been carried on in three private houses. The leases have now expired, and a long term of the site having been obtained from the Foundling Hospital, the council decided to demolish the premises. The new building, which will be erected in three separate sections, will consist of three blocks, which will be known as the Wakefield or Pfeiffer Wing, the Handel-street, and the Hunter-street Wings. The want of laboratories has long been felt, and in order to facilitate the operations of the school, the first-named block has been erected, and opened. Built at a cost of between £9,000 and £10,000, this wing provides adequate rooms for the teaching of chemistry, physiology, anatomy, and physics. The facing materials are red bricks, with Portland stone dressings and red tiled roofs. The remaining buildings will involve a further expenditure of £15,000. The estimated cost of the second wing, which will contain two lecture-rooms and a corridor with north light for microscopic work, is £5,000. The construction of the third wing will not be embarked upon until the second block has been paid for. Mr. J. M. Brydon is the architect, and the contractors for the present section have been Messrs. Holloway Brothers, of Victoria Works, Battersea. We illustrated the school by a double-page perspective and plan in our issue of Dec. 17th, 1897.

**BRISTOL.**—The restoration of the outer walls of the choir and chapels of Bristol Cathedral goes on slowly, although the strike in the building trade has caused a temporary cessation in the work. Just at this moment the most interesting part of the whole structure has been reached—namely, the Berkeley Chapel—which, being on the south side, is hidden away from the general public, and they are unable to see that the restoration is still in progress. At the south-west angle of the chapel has been opened up part of a staircase leading probably to a priest's chamber; and at the foot the missing portion of the stone that covered the tomb of Bishop Butler, which ought to be shortly restored to its proper place. In the existing staircase leading to the roof three blocked-up windows have been opened; and the removal of the thick ivy which covered the wall has disclosed a handsome hexagonal turret, with enriched battlement. There are also evidences of the former existence of a buttress at the south-west angle of the chapel, and of an outer building near the same spot, to which the mutilated staircase led.

**CARDIFF.**—A further stage in the provision of new Municipal Buildings for Cardiff was reached on Tuesday, when the authors of the design selected in competition, Messrs. Lancaster, Steward, and Rickards, of London, had an interview with the Town Hall Committee, and stated in reply to questions that it could be an easy matter to heighten the front of the building somewhat, and

also to add a dome, if desired. In their opinion, Portland stone would be the best for the external portions of the building. They explained that the building would not take less than four years. The chairman said that the corporation would not come into possession of the site in Cathays Park till December next. The architects subsequently withdrew, and it was resolved that the quantity surveyors be paid 1½ per cent., and that the external portion of the building be of the best Portland stone.

**EDINBURGH.**—After having completed the decoration of the chancel and side chapels of the Catholic Apostolic Church, Broughton-street, Mrs. Traquair began last Christmas the task of painting the great frieze which runs along the nave just under the clerestory windows. It is 100ft. in length by 7ft. in height, and architecturally it is divided into five large panels by the pillars which help to carry the roof. The north side, which has just been finished, is pictorially complete in itself. In the five spaces there have been depicted fifteen scenes in the life of Christ, comprehending the whole period of His ministry on earth. The first picture represents the Annunciation. In the next is the Mother and Child, and in the background two figures embracing, representing the human and Divine. The third scene is the Massacre of the Innocents. In the second panel we have the Baptism of Christ, the Temptation, and the Calling of the Apostles. In the third panel, the Opening of the Eyes of the Blind, the Raising of the Widow's Son at Nain, and the Triumphal Entry into Jerusalem. In the fourth panel are the Last Supper, the Washing of the Disciples' Feet, and the Betrayal; and in the fifth the Entombment, the Resurrection, and the Ascension. The frieze on the south side is set apart for scenes from the Old Testament, and with the painting of these a beginning has just been made.—Public baths are to be constructed at Stockbridge. The site occupies the vacant ground at the north end of Saxe-Coburg-place, between that street and Glenogle-road; and owing to the great fall in the ground between the two levels, the site has proved a difficult one to adapt to the desired purpose. The pond will be 75ft. long by 35ft. broad, and will vary in depth from 3ft. to 7ft. It will be entirely lined with enamelled brick. There will be 72 dressing-rooms arranged around the sides, and the usual accommodation of spray baths, &c., will be provided. There will also be a gymnasium for the use of bathers, and a club-room, 20ft. by 30ft., for the use of clubs frequenting the premises. It is estimated that the total cost of the new baths will be £15,000, and the building will be completed in eighteen months from the present time. Messrs. Kinnear, Moodie, and Co. will do the building and wright work in connection with the baths.

**FELIXSTOWE.**—The new central railway station and the Orwell Hotel, both built in Hamilton-road on the north side of Felixstowe, together with a new branch line, by the Great Eastern Railway Company, were formally opened recently. The station is of red brick, with white stone facings. The area of the platform next to the station is 92ft. broad and 84ft. long. From this, on either side, runs the platform proper. On one side it is 785ft. long, 500ft. being under glass. On the other side it has a length of 650ft. The whole of the covered area is floored with Victoria patent paving stone, and incandescent gas lamps are provided. The builders were Messrs. Kirk, Knight, and Co., of Sleaford. The plumbing has been done by Mr. Geo. Munnings, Walton, and the whole work has been carried out under the superintendence of Mr. Blew, of the G.E.R.'s engineering department, and Mr. F. Webber, at a cost of about £33,000. The station is approached from Ipswich by a loop of about three-quarters of a mile, and it is left by another loop of about the same length, joining the main line at Garrison-lane, near the old structure now to be known as the Beach Station at Ipswich. The Orwell Hotel is at the junction of the high road to Walton and Hamilton-road. The architect is Mr. John Shewell Corder. It is a three-storied edifice in the Jacobean style, of red brick, with Ancaster stone dressings, and has been ornamented with Gunton's terracotta parapets. The coffee and smoking-rooms and the refreshment saloon are on the ground floor. On the first floor are the drawing and billiard-rooms, and several bed and sitting-rooms. The second floor is reserved for bedroom accommodation. Electric bells, speaking tubes, and lifts are pro-

vided. The contractor is Mr. F. Bennett, Ipswich. The plans of the station, loop-line, and hotel were prepared by Mr. John Wilson, of Bishopsgate, engineer-in-chief to the Great Eastern Railway Co.

**GUILDHALL SCHOOL OF MUSIC.**—This institution has outgrown the accommodation afforded by the premises erected for the corporation in Tallis-street, Victoria Embankment, in 1885-7, from designs by the late Sir Horace Jones, city architect, at a cost of £26,005. An annexe has been added on adjacent land in John Carpenter-street. The new building, which has been constructed from plans by Mr. Andrew Murray, the city surveyor, and was opened on Monday last, provides a theatre 47ft. by 55ft., and 30ft. high, fitted at the northern end with a stage (possessing an asbestos fireproof curtain); there is a large gallery at the opposite end of the auditorium. Entrances to the theatre are provided from the old school, and in addition to these there are six emergency exit doors. In the basement are dressing-rooms, green room, &c., all in direct communication with the stage and the older building. Above the theatre are three floors, divided into thirty classrooms by double partitions; each partition is formed of hollow blocks, which arrangement is intended to prevent the passage of sound from the various rooms; for a similar reason the floors are framed independently of walls, partitions, and ceilings. The constructional portions of the floor are of iron and concrete. The warming is effected entirely by hot-water radiators, which are also utilised for the introduction of fresh air: the vitiated air is withdrawn by means of extractor trunks connected with the upcast shaft from the furnace. Electric lighting is provided for the whole building, and a lift affords communication with the various floors. Arrangements will be made for providing refreshment and other rooms for the sole use of the lady students. New general offices will also be constructed. The cost of the new building, which was illustrated by plans and elevations in our issue of July 23, 1897, is estimated at £20,500. The builders were Messrs. Perry and Co.; the stone carving was by Mr. Gilbert Searle; hot-water engineers, Messrs. J. Wontner-Smith, Gray, and Co.; electric-lighting by Messrs. Berghiel and Young, under the supervision of Mr. Hawtayne; the plaster and ornamental decorations by Messrs. Boekbinder and Co.; stage fittings, asbestos curtain, &c., by Messrs. E. and E. Taylor and Co.; hydraulic lift by Messrs. Moffat and Eastmead.

**HARROGATE.**—A technical school is about to be built at Harrogate, from plans by Mr. W. J. Morley, of that town, selected in competition by the assessors, Messrs. Woodhouse and Willoughby. Owing to the peculiar nature of the site, the main entrance is placed at the north-east angle, thus leaving the two sides facing Haywra-crescent and Bower-road unbroken for the various rooms. The staircase is in a central position. On the ground floor are arranged the committee-room, two class-rooms (each to accommodate twenty-five students), for bookkeeping and shorthand, and a room which will form the nucleus of a museum. All these rooms face Haywra-crescent. At the back is the chemical laboratory (for twenty students), with a lecture-room adjoining, and also a balance-room and chemical store. A manual room for woodwork and wood-carving, to hold thirty students, is placed at the south-west corner, and at the north-west, facing Bower-road, is the room for cookery classes, with a scullery and small store-room attached. A cloak-room and lavatory accommodation, separate for each sex, are provided. On the first floor are arranged the art-rooms, comprising an antique and life room, and a room for the head master, both of which are required by the Science and Art Department to face the north, and are shown with a frontage to Bower-street. The building construction and clay-modelling rooms have a frontage to Haywra-crescent, as also has a class-room for dress-making for twenty students. The elementary art-room, lecture-room, and painting-room (the latter facing Bower-road) are placed at the back, and are en suite, so as to be easily converted into one large room, if required for conversaciones, &c. In the basement are provided a laundry for twenty-five practical students, rooms for the caretaker, heating apparatus, coal and other stores. The various rooms are planned with due regard to their uses, and have been kept separate as far as possible for each sex. The exterior of the building is of a simple character, in the Renais-



sance style. A portion of the site is reserved for future extension. In the corridors will be tiles of simple design, and dados of glazed bricks or pitch-pine boarding will be utilised in most of the rooms.

**JARROW.**—The Theatre Royal has been reopened on the completion of internal alterations amounting to a complete renovation. The entire building has been gutted. The chief defect of the old theatre was that the pit was upstairs. The pit has now been lowered some 12ft. so as to bring it to the ground level. The auditorium is 53ft. by 45ft., and 37ft. high. The stage is 47ft. by 30ft., while the proscenium arch is 22ft. wide by 23ft. in height. There is a large scene dock. Eight dressing-rooms have been provided for principals and others, together with lavatory accommodation. In the pit and stalls there is accommodation for 700, in the boxes for 350, and in the gallery for 500, making a total seating accommodation of 1,550. The boxes and gallery are supported on cast iron columns. The proscenium arch, ceiling, and balcony fronts are all enriched with decorated fibrous plaster. The decoration has been carried out in the Early Renaissance style, and it has been specially moulded by Mr. H. Bartlett, of London, from plans supplied by the architects. The stage is cut off from the auditorium by means of a proscenium wall carried right up to the roof. A new lounge has been provided in connection with the dress circle, and new ladies and gentlemen's cloak rooms put in. The bar, too, has been re-fitted and re-decorated. The building is heated throughout by means of hot water. In the centre of the ceiling is a large sunburner, provided by Messrs. Stott, while the lighting of the stage is effected by Stott's patent flash light battens and float. The architects have been Messrs. James Henderson, jun., and John Hall, of Sunderland; Mr. J. S. Earnshaw, of Sunderland, has been the general contractor; Mr. W. R. Dodds, of Jarrow and Newcastle, has been responsible for the decorative plasterwork; and Mr. W. E. Harker, of Grainger-street, Newcastle, has upholstered and furnished the theatre.

**LICHFIELD.**—The new police-station in Wade-street, which has been erected by the Staffordshire County Council, is now complete. The buildings are faced with sanded Leicester bricks, with Hollington stone dressings, and are set back from the street, with iron railings in front. The public entrance is in the centre, with superintendent's office and charge-room on either side. At the side of the charge-room is the tramp office, having a door from the charge-room, and a separate external entrance. Immediately opposite the door at the back of the charge-room is the corridor, having four cells of regulation size opening from it, with lavatory, &c., in the centre. The cell windows overlook the prisoners' yard, which, being covered with an iron grille, renders it impossible for outsiders to communicate with the prisoners. The entrance to the constables' quarters is at the left-hand side of the Wade-street front, and gives approach to a square hall with staircase leading to the living-rooms. At the back of this hall is the cleaning-room and the boot-room. On the first floor are the constables' quarters, consisting of a recreation-room, a kitchen, with pantry adjoining, containing separate locker for each man; a dormitory for six men; a sick-room, a large bath-room, lavatory, scullery, &c. The superintendent's house fronts Frog-lane. Under the cell corridor are provided hot and cold air chambers, with external gratings to supply the cold chamber with fresh air, which will enter the hot-air chamber near the bottom, and so pass between the hot-water pipes and rise from the top of the hot-air chamber through flues into the cells. The foul air will be extracted from the cells by means of flues which are carried into a flue which is specially heated to create a draught. The chimneypieces, &c., of all the principal rooms are of glazed faience, while the walls and ceiling of the cells are of glazed bricks, thus entailing a minimum of work in cleaning. The floors of all the principal rooms on the ground and first floors are of wood blocks. The cost has been about £5,500, and it has been erected from the designs and under the superintendence of Mr. John P. Osborne, F.R.I.B.A., of 95, Colmore-row, Birmingham, the contractor being Mr. John Gethin, of Shrewsbury, and the clerk of works Mr. W. Sier.

**MANCHESTER.**—The new goods depot in Deansgate of the Great Northern Railway Company

was opened last week. It has cost, with site and railway connections, about a million sterling, and has been constructed from the designs and under the superintendence of Mr. W. T. Foxlee and his assistants, Mr. J. A. Thornton and Mr. F. W. Hunt. The connection of the new works with the Cheshire lines is made by a double junction from the east end of the Cornbrook Viaduct, carried upon a viaduct as far as Bridgewater-street, where they diverge into twelve other sets of rails, ten of which are continued over the streets into the warehouse. The remaining two lines are carried down by inclines, one on each side of the site, to a goods yard on the street level. The approach viaduct, of rather more than a quarter of a mile in length, consists of brick arches with steel girder bridges at the street crossings; where it is carried over the lower yard it is constructed entirely of steel, supported by built-up stanchions of the same material, the flooring consisting of jack arches, covered with concrete and rendered waterproof by means of asphalt. The warehouse, which is of fireproof construction throughout, is 267ft. long and 217ft. wide, and when complete will rise to a height of about 75ft. above street-level. The lower floor, which is at street level, contains lines of rails running alongside platforms, with roadways for carts and luries; the upper floor is also occupied by rails and platforms, with carting space, connected by an inclined road with Watson-street. There are thus practically two goods stations, one over the other. The lower portion of the building is faced with blue brickwork in cement, and the upper portion with hard local bricks relieved by blue-brick bands. The floors, which consist of steel girders with jack arches between, are covered with concrete and supported by built-up steel stanchions, these resting upon granite blocks supported upon blue brickwork in cement. The whole of the foundations are carried down to the red sandstone. Communication has been provided between the various floors by means of hydraulic hoists, jiggers, &c., working through numerous hatchways; hydraulic cranes are also fitted on all the platforms. The buildings throughout, as well as the adjacent yards, are lighted by electricity. Under the central portion of the site there exists in tunnel, between 35ft. and 40ft. below the surface, a disused branch of the Bridgewater Canal, and it has been arranged in connection with this waterway to construct a basin dealing with canal traffic, which will be connected to the warehouse by means of hydraulic lifts. A block of offices to accommodate the staff of the goods department is in course of construction at the part of the site that abuts upon Peter-street, and the company are constructing a range of shops extending for a distance of 600ft. or 700ft. in Deansgate. The main contract for the works is being carried out by Messrs. Robert Neill and Sons.

**OUNDE.**—The new boarding-houses which the Grocers' Company are erecting at the schools are approaching completion. The stone used is chiefly from Stamford, and there is also some from Weldon. The building is two houses in one. There is a main entrance to the whole, and when in the hall, the wings will be divided from each other by screens. There are dining-halls, common rooms, reception, matron's, and other rooms on the ground floor, while the first floor is devoted to dormitories, bath-rooms, masters' rooms, &c. The servants' rooms are in the basement, from which a lift will run to the next floor. The rooms are all lofty and of good size. The roofs are covered with blue slates. Steel girders are used for supporting the whole structure. Mr. S. Halliday, of Stamford, is the builder, and Mr. Roberts is the clerk of works.

**RADCLIFFE, LANC.**—The new buildings for day and Sunday school purposes attached to the Radcliffe parish church were dedicated by the Venerable Archdeacon Wilson on Tuesday week. The accommodation is for 450 children—boys, girls, and infants. The buildings comprise a large central hall (fitted with raised platform for public meetings) and five classrooms arranged round the same. The two classrooms at the end of the hall have sliding wood and glass partitions, opening into the hall. The infants' classroom is separate. The cloakrooms are fitted with gangways and numbered hooks. Earthenware lavatories are provided for each department. The lighting is by large corona and pendants, and the heating by hot water. The buildings are of Accrington bricks, with terracotta dressings; the

woodwork is of varnished pitch-pine, and the lower portion of the cloakroom walls are tiled. The contractors were the following:—Messrs. Makin and Sandiford, Radcliffe, excavating, masonry, and bricksetting; Accrington Brick and Terracotta Company, terracotta work; Mr. R. Brain, Burnley, woodwork; Mr. J. Smith, Radcliffe, slating; Mr. T. Evans, Whitefield, plastering and painting; Mr. W. Brierley, Radcliffe, plumbing and glazing; Mr. F. W. Spencer, Oldham, heating; Messrs. Williams and Co., Manchester, tiling; and Mr. W. Walton, Burnley, gates and railing. The work has been executed, at a cost of about £3,500, under the personal supervision and from the designs of Mr. Thomas Bell, of Burnley.

**SALISBURY CATHEDRAL.**—On Monday the thanksgiving service was held on the completion of the restoration of the tower and spire. The cathedral spire five years since caused the Dean and Chapter not a little anxiety. It was then found that the major portion of the stonework of the spire, from the effects of the iron bands and tier, and the action of wet and frost, had split and fractured to an alarming degree, making the structure unstable. The services of Sir Arthur W. Blomfield, A.R.A., were requisitioned, and under his direction the work of restoration was speedily put into force. The turrets and staircases at the four angles of the tower, which have to support so much of the weight of the spire, have been thoroughly overhauled and repaired, and the base of the tower was strengthened with concrete cement. The external stonework, with which the weather had played such havoc, has been almost completely removed, and new stones—weighing in some cases over a ton—have been replaced. In addition, several of the pinnacles have been repaired, and a considerable amount of ornamentation has been renewed. The total cost of this work, which has taken nearly three years to execute, amounted to some £14,000.

**WHISTON.**—The new infirmary buildings which have been erected by the Prescot Board of Guardians on land adjoining the workhouse at Whiston were opened on Friday. The buildings have been erected from plans prepared by Mr. James Grundy, architect, St. Helen's, at a cost of about £20,000. The contract for the work was carried out by Mr. Fred Brown, of St. Helen's. Accommodation is provided for about 300 beds, arranged in thirties, on each of the ten floors. The buildings are of simple brick, and comprise two large blocks of three stories, and two blocks of two stories each, and are fitted with fireproof floors throughout, fire-escape landings, &c.

Owing to the large increase in the traffic to the port of Sunderland, the River Wear Commissioners have under consideration extensive alterations and additions to their docks, at an estimated cost of £375,000.

The foundation-stone of the Bowyer Memorial Schools, about to be built for the parish of St. John, Clapham, at the corner of Gaskell-street and Union-road, S.W., was recently laid by the Princess Christian. Mr. A. Robson is the architect.

The Scotch iron and steel founders have formed a powerful federation on the lines of the Engineering Employers' Federation. It is intended to form a close union with the English employers, with a view to concerting a general policy in all labour disputes.

An important scheme for the Fulford and Braddon streets areas at Rotherhithe has been sanctioned by the Local Government Board. The surveyor has drawn up a report on the subject of covering the area with model dwellings. The vestry have adopted the plan and forwarded it to the London County Council for their approval.

Various additions are being made to the hospital at Boston, Lincolnshire, including a new operating room, out-patients' hall, sculleries, pantries, and offices, and five bedrooms for the nursery staff. Mr. Rowell is the architect, and Mr. H. W. Parker the contractor. The foundation-stone was laid last week.

At Lincoln, a school-chapel is being erected facing Monk's-road. The scheme includes the erection, at some future time, of a church. The cost of the building now commenced will be about £1,400. The school-chapel will be of brick, with Ancaster stone dressings, and will consist of a mission-hall, 60ft. by 30ft., an infants' classroom, 20ft. by 24ft., and two smaller classrooms, all on the ground floor; and in the basement will be a kitchen, coal-house, &c. At the rear of the building will be a boys' yard and a girls' yard, with out-buildings. Later on, eight additional classrooms and library will be provided.



## LEGAL INTELLIGENCE.

**A JOINER'S TEST CASE.**—A case affecting the joinery trade was decided at the Thames Police-court on the 6th inst., when William Young, a joiner, summoned Messrs. Fletcher, Son, and Fearnall, Limited, of the Union Dock, Bridge-road, Poplar, for 8s. 6d., on account of a day's pay in lieu of notice. Complainant based his claim on Rule 6 of the Amalgamated Society of Carpenters and Joiners, which was as follows:—"That every man shall receive two hours' notice on discharge," and "that all joiners shall be paid off as far as possible on discharge, and that all joiners kept waiting for their wages half an hour or more on the usual pay-day shall be paid for waiting according to the overtime rate." Complainant also relied on clause 2 of the Rule 7—"That all joiners working in engine-rooms, stokeholes, and tunnels on old works, and clearing out sunken ships, shall be paid 3d. per hour extra. On all insulated work, new or old, in shop or ship, shall be paid 1 1/2d. per hour extra." Young said he was employed at insulated work, and therefore entitled to the extra pay. He was not paid on the day he and twenty other men handed in their notices. On behalf of Messrs. Fletcher and Co., Mr. Young said had the firm discharged complainant he would have been entitled to his money the same day, but as he discharged himself he had to wait until the usual pay-day. With regard to the insulated work, it was contended that complainant and other men got a labourer to bring down some of that work in order to claim the increased pay. Mr. Mead found that defendants were only liable for 10 1/2d. per hour.

**GEORGE WOOLSCROFT AND SON, LIMITED v. KIRK AND RANDALL.**—This action was heard before Mr. Hemming, Q.C., one of the Official Referees, from the 28th June to the 2nd inst. It was an action brought by George Woolscroft and Son, Limited, tile manufacturers, of Hanley, Staffs., against Messrs. Kirk and Randall, builders and contractors, of Woolwich, to recover the sum of £332 14s. 3d., the balance alleged to be due to them in connection with the tiling of the Cleveland-road board schools, Ilford, as sub-contractors of the defendants, who were the building contractors. On the matter coming before the Master in Chambers, he gave leave to the plaintiffs to sign judgment against the defendants for the amount claimed, but stayed execution until the trial of a counterclaim set up by the defendants against the plaintiffs for a greater amount than that claimed by the plaintiffs, and it was this counterclaim which has lately engaged the attention of the Official Referee. The contention of the defendants was to the effect that the plaintiffs had been dilatory and negligent in the execution and completion of their tiling, and so had caused damage and loss to the defendants by putting them in arrears and behindhand with their own work, and, therefore, preventing them from completing the job as expeditiously as they might otherwise have done, and they therefore claimed the sum of £417 7s. 1d., of which £339 1s. 7d. was for damages from the plaintiffs. The balance of £78 6s. 6d. was claimed by the defendants as a discount which they contended they were entitled to deduct from the plaintiffs' claim; but the Official Referee held there was no agreement to allow it, although the plaintiffs had offered to do so if the account had been amicably settled. On the question of damages the plaintiffs' counsel stated their case was that by the terms of the contract the plaintiffs were only bound to complete their work within three weeks of the "floating" of each floor of the building, and which he submitted the plaintiffs had duly complied with. The plaintiffs also allege delay on the part of the defendants and their sub-contractors in their work, which would have prevented the building being completed any earlier than it was, even if the plaintiffs had finished the tiling earlier; and they also allege that in the course of the building the size and shape of the tiles had been altered, but this the defendants denied. Evidence in support of the defendants' case was given by Mr. Randall, Mr. C. J. Dawson (the architect for the building), Mr. Renshaw, and Mr. May, and at the conclusion of their evidence the plaintiffs' counsel submitted to the learned Referee that no case was made out by the defendants. In reply to the Official Referee, the plaintiffs' counsel said that in order to save further costs by prolonging the inquiry and calling witnesses, he would be willing, without admitting liability, to give the defendants £32 on their counterclaim, upon the basis that it was agreed by the defendants that the question of costs was left to the discretion of the Official Referee. This offer the defendants' counsel accepted, and accordingly judgment by consent was given for the defendants on the counterclaim. On the question of costs, the Official Referee said he should not order the plaintiffs to pay any costs of the counterclaim, as he thought the counterclaim preposterous: it ought never to have been set up, and it could not hold water. The plaintiffs' counsel, however, asked further that the defendants should be ordered to pay the plaintiffs' costs of the reference, contending that the counterclaim should never have been set

up, and he called attention to the fact that before the counterclaim was delivered the plaintiffs' solicitor had, in order to avoid the cost of the reference, offered to reduce the amount of the plaintiffs' judgment by a greater sum than the £32 10s. 8d. which the defendants had then accepted; they would have had to pay the plaintiffs a lesser sum than was now recoverable by the plaintiffs, after deducting from the amount of the judgment the £32 10s. 8d. which the plaintiffs had agreed to the defendants having. This application was resisted by the defendants' counsel. Ultimately the Official Referee decided the question of costs in favour of plaintiffs, and ordered the defendants (Kirk and Randall) to pay the plaintiffs (George Woolscroft and Son, Ltd.) the costs of the reference and all the costs of the counterclaim. Mr. Frank Grover, instructed by Mr. W. Saunders Fiske, of 10, Norfolk-street, Strand, W.C., appeared for the plaintiffs; and Mr. Hudson, instructed by Messrs. Mackrell and Co., of 21, Cannon-street, E.C., appeared for the defendants.

**THE TOTTENHAM COURT-ROAD IMPROVEMENT.**—At the Surveyors' Institute, Savoy-street, on Wednesday, Mr. James Green, the arbitrator appointed by the Local Government Board, sat to determine the value of the property within the area of the Tottenham Court-road improvement scheme. The first case considered was that of Messrs. William Henry and Richard Baker, lessees of the premises, No. 4, Tottenham Court-road. Mr. Vigers and Mr. Horne, surveyors and valuers, estimated the value of the lessees' interest at £23,403. For the County Council, Mr. Andrew Young and Mr. Wilkinson valued the interest at £21,384. The next case, No. 2, Tottenham Court-road, the property of Mrs. Amelia Lansdale, was agreed to, the value being fixed at £3,232. In the case of Mr. Gardner, lessee of 4, Oxford-street, and premises at Boziers-court, the Council council agreed that there was no value and no evidence was offered. The premises, No. 9, Boziers-court, and 1A, Tottenham Court-road, the property of Hay's executors, were valued by Sir John Whittaker Ellis at £23,600. Mr. A. Young and Mr. Wilkinson estimated the value at £14,960.

**IS OWNER OR TENANT LIABLE FOR PAYING EXPENSES OUTSIDE LONDON?**—**BAYLIS AND ANOTHER v. JIGGINS AND ANOTHER.**—Mr. Justice Channell recently delivered judgment in this action. He said the question is whether expenses of paving, &c., recovered in a summary manner from the owner of premises outside the Metropolis under section 150 of the Public Health Act, 1875, can be recovered by him from his tenant under a covenant whereby the tenant covenants to pay "all rates, taxes, and assessments whatsoever, which now are, or during the term shall be, imposed or assessed upon the premises or the landlords or tenants in respect thereof by authority of Parliament or otherwise, except the landlord's property tax." The reported cases on similar covenants are very numerous, but no case exactly covers the present one. In considering cases of this kind, it is necessary to notice what the payment sought to be recovered is for, and the exact word of the covenant. Expenses for abating nuisances and for drainage and other works on the premises are in some respects different from paving and works done in the street upon which the property abuts; and expenses of paving within the Metropolis differ from similar expenses under the Public Health Act outside the Metropolis in this respect: that under the Public Health Act such expenses are a charge upon the premises, whereas under the Metropolitan Management Acts they are not. In the present case the expenses in question were payable under the Public Health Act, and the sum is therefore both a charge on the premises, and it is also beyond doubt a charge on the landlord in respect of the premises. Several of the reported cases which have been decided in favour of the tenants have been so decided by reason of the absence from the covenants there in question either of words covering charges upon the premises or of words covering charges upon landlords in respect of the premises, as, for instance, "Allum v. Dickinson" and perhaps "Wilkinson v. Collyer" when the words were absent; but it is not quite clear that this was the sole ground of the decision. Such cases are no authority in the present case, for here we have the words "imposed or assessed upon the premises or the landlords in respect thereof." In the present case therefore the only question is whether the payment in question comes within the words "rates, taxes, or assessments." Now there are many of the reported cases in which these words occur, but there are generally one or more other words. Thus in "Hartley v. Hudson" the word "charges" occurred in the covenant. In "Budd v. Marshall" the word "duties" occurred. In "Aldridge v. Ferne" the word "outgoings." These cases do not, therefore, include the present. The nearest case to the present is, perhaps, "Wilkinson v. Collyer," where the words were as here, "rates, taxes, or assessments," without further addition; but the words "imposed on the landlord in respect of the premises," which we have here,

were absent. Mr. Turner (for defendant) relied very much on a passage in "Hartley v. Hudson," where Mr. Justice Lindley says, "The expense of the paving, &c., can hardly be said to be a rate, tax, or assessment; hence it only remains to consider whether it is a charge." But as he had got the word "charge," obviously a wider word, and one which he held covered the paving expenses, it is clear that it was not really necessary for him to consider whether the words rate, tax, or assessment were sufficient, and that the passage is a dictum only. I agree that these expenses cannot be considered either a rate or a tax; but I have had a good deal of doubt whether they are not "an assessment imposed on the landlord in respect of the premises." Mr. Turner contended that nothing could be an assessment which was not apportioned according to the value of the premises, and here the apportionment is according to frontage. I do not think that argument conclusive. Some sewer rates, for instance, are raised "per acre," and these would properly be described as assessments, and a sum to be paid out of or in respect of a particular property might be an assessment if the amount were arrived at in proportion to acreage, or in proportion to frontage, just as much as if it were in proportion to rateable value. On the whole, however, having regard to the opinion of Mr. Justice Manisty in "Wilkinson v. Collyer," that *prima facie*, such covenants as this are confined to rates and assessments of a temporary and a necessary nature, and do not include a sum which is a charge on property giving it an increased permanent value, and also to the dictum of the present Master of the Rolls in "Hartley v. Hudson"—"I hold this payment not to be a rate, tax, or assessment within the meaning of the covenant. It is obvious that in leasing at a rack-rent and for a short term the tenant would not be likely to have intended to bear it, but that would be immaterial if the words were clear. I therefore give judgment for the defendant, and, of course, costs will follow."

**TWICE COMPENSATED FOR ILLNESS FROM DEFECTIVE DRAINAGE.**—At Newcastle-on-Tyne, on Monday, before Mr. Justice Day and a special jury, the case of "Brown v. Whickham Urban District Council" was heard. This was an action for negligently and improperly altering certain sewers near to the plaintiff's premises, thereby causing him serious illness. Plaintiff was the tenant of the Dun Cow Inn, at Whickham, and on a former occasion the defendants had caused him serious illness by their defective system of drainage and had paid him £100 compensation. They afterwards altered the system again, and it was alleged on behalf of the plaintiff that the sewer under their control was not properly ventilated, and that the plaintiff's illness arose from this defect. The jury returned a verdict for the plaintiff and assessed the damages at £400. The judge said he saw no reason for a stay of execution, and refused the application.

**DAMAGES CLAIMED FOR BLOCKED STREETS.**—**MARTIN v. LONDON COUNTY COUNCIL.**—This action, heard by Mr. Justice Kennedy and a special jury on several days of last week, was brought against the London County Council for unnecessarily and negligently blocking and obstructing Wellington-street, Deptford, and other thoroughfares leading to that street, in which the plaintiff resided as a leaseholder. It was alleged that in 1897, whilst making a new road cutting Wellington-street diagonally under their statutory powers, the County Council were guilty of unreasonable delay, and of obstructing the approaches to the street at more points, in greater degree, and for a longer time than was needful—namely, over six months—with the result that the receipts of the plaintiff in his business as a greengrocer fell off to such an extent that he had to give up the premises. It was asserted that for some months the High-street ends of Watergate-street and Wellington-street were blocked up entirely (save for a narrow gangway), and a board put up marked "No thoroughfare"; that at the other end Wellington-street was blocked up, and a similar board placed there; that the gangway was almost impassable; and that the whole roadway was needlessly blocked by road-making material. From the cross-examination of the plaintiff it appeared that, before the work was begun, he had written complaining of the falling-off in his receipts due to the pulling-down of houses in his neighbourhood by the County Council, and that his receipts in some weeks in October were higher than they were in July, before the road-making was commenced. A large number of witnesses having been called to prove the delay and unnecessary obstruction in constructing the road, Mr. Dickens, for the County Council, contended that the action was not maintainable—first, because no damage had been proved to have been sustained; secondly, because, even if it had, and there had been negligence, no action would lie, on the authority of "Rickett v. Metropolitan Railway Company," because the damage sustained was not special to the plaintiff himself; and, thirdly, because, if any wrong had been done, it was due to non-feasance, and not to misfeasance. The learned judge postponed his decision on these points, in



order to obtain the verdict of the jury on the questions of unnecessary delay and obstruction, and the amount of damage, if any. For the defence, several witnesses (including Mr. Adams, the manager of the works department, and Sir Alexander Binnie, the chief engineer of the County Council) were called to show that the work proved to be one of exceptional and unexpected difficulty, and that there was no unreasonable delay or obstruction in its execution. His lordship having summed up, the jury, after an absence of an hour and a half, returned into Court, and stated that there was no chance of their agreeing. They were accordingly discharged.

**ARBITRATION AWARD AT OXENHOPE.**—Mr. W. F. Atkinson, solicitor, of Bradford, who sat as umpire in the arbitration case between Mr. John Sutcliffe, of Royd House, Oxenhope, and the District Council of that township, has just given his award. The claim was one for easement and loss of water through the construction of a sewer through the claimant's lands. His witnesses put the damages at £700, and for the District Council they were put at about £18 10s. The arbitrator has awarded the sum of £198 to the claimant, with costs.

**WHAT IS A NEW STREET?**—**ALLEN V. FULHAM VESTRY.**—In the Queen's Bench Division judgment has been delivered by Mr. Justice Day and Mr. Justice Ridley in this special case stated by a Metropolitan magistrate upon the hearing of three summonses issued at the instance of the vestry of Fulham under section 226 of the Metropolis Management Act, 1855, on complaints that W. G. Allen and H. G. Norris had refused to pay £554 12s. 6d. and other appellants other sums apportioned on premises belonging to them in respect of the estimated expenses of paving a portion of Wandsworth Bridge-road called section 4, under section 105 of the Metropolis Management Act, 1855, and section 75 of the Act of 1862. The question mainly was whether this was a "new street" within the Acts, for if it were the vestry were entitled to apportion the expenses on the frontages. Wandsworth Bridge-road, of which section 4 is part, forms a means of approach on the north side of Wandsworth Bridge. Such bridge, together with the said road, was made pursuant to the Wandsworth Bridge Act, 1864, by the Wandsworth Bridge Company in August, 1873. The road then ran through agricultural land, and was bordered by market gardens. By section 62 of that Act it was enacted that when the road was completed it should be deemed a public highway, and be repairable by the Fulham District Board of Works. In August, 1873, the road was made, but the board thought it impracticable as a road, and refused to accept it. After protracted negotiations and litigation, however, an agreement was entered into on September 14, 1876. Under it the Fulham District Board of Works agreed with the company in consideration of the sum of £1,750 to complete and put in repair the Wandsworth Bridge-road, and to make it in all respects fit for the purposes of a public highway within the meaning of the Wandsworth Bridge Act, 1864, and the Fulham District Board undertook the liability of repairing the said road as imposed upon them by the Wandsworth Bridge Act, 1864, and exonerated the company from liability. In 1877 the board made up the carriage-way with flints rolled in over a hard core. In the case of house-built streets the same method of making-up was frequently adopted when the traffic was light. After twelve months the carriage-way was repaired with granite, and this process had been repeated by the local authority down to the year 1897. No channelling or kerbing was done, except that the road was repaired in a permanent way, and in the same mode and to the same extent as new streets with a similar amount of traffic were dealt with. There were no buildings upon the land adjoining the road until 1890. In that year houses were erected on the east side. In the years 1895 and 1896 houses were first built on the west side. On February 24, 1897, the vestry of Fulham, the successor of the Fulham Board of Works, passed a resolution that the road should be paved, and the costs be apportioned on the frontages. It was proposed to pave it with wood blocks laid on a concrete foundation, which was more expensive than macadam. The magistrate found that the road was not originally laid out as a street. It was contended on behalf of the vestry that the said road became for the first time a new street when buildings were erected upon the land adjoining it, and that the vestry had, when that was done, power to require the adjoining owners to pave it. It was also contended that wood paving was "paving" within the meaning of the Acts of 1855 and 1862. It was contended on behalf of the appellants that it was a "new street" when it was made by the company, and that it having, in 1877 and 1878, pursuant to the requirements of the vestry, been, with the exception of the flagging of the footpaths and of the channelling and kerbing of the carriage-way, as well paved as streets with similar traffic were then required to be paved prior to their being taken over by the vestry. Under section 105 of the Metropolis Management

Act, 1855, the vestry could not now say that it was not then a street. It was also contended that, assuming the vestry had power to require the road to be paved, it had no power to require the carriage-way to be made up at the expense of the adjoining owners with wooden blocks laid on a concrete foundation. The magistrate held (1) that the road was not in 1877 or 1878 a "new street"; (2) that it became a "new street" for the first time after the erection of houses therein, and that it was a "new street" in February, 1897; (3) that the vestry was not prevented by anything done previously from requiring the road to be paved; and (4) that wood paving was paving within the Acts. The magistrates accordingly ordered the appellants to pay the vestry the sum mentioned in the summonses. Mr. Glen (for the appellants) said it was their own work that the vestry were discontented with. The company had paid them a large sum in 1876 to do it. The local authority were stopped from saying that the highway was to be repaved at the expense of the frontagers. He cited "St. Giles, Camberwell, v. Hunt," Mr. Macaskie, for the respondents, contended that the magistrate was right. He cited "Pound v. Plumstead Board of Works," "Robinson v. Local Board of Barton," "St. Giles, Camberwell, v. Crystal Palace Company," "Davis v. Greenwich," "St. Mary, Battersea, v. Palmer," and "Harter v. Hammersmith Vestry." He said the question was also raised whether wood paving came within the Act. Mr. Justice Ridley: You need not trouble yourself about that—wood paving is paving. Mr. Glen, in reply, said the cases cited were distinguishable from the present. The vestry here had treated this highway as a street. He cited "North London Railway Company v. St. Mary, Islington." The Court upheld the magistrate's decision. Mr. Justice Day said yesterday that the case was one of some difficulty, depending on the particular history of this particular bit of road. It was a relief to him to know that on the authorities cited the chief responsibility as to whether roads were or were not "new streets" rested with the magistrate. The magistrate here had found that this was a "new street." It was a question of fact which the Court could not review. There was no question of law on which the Court could say that he had gone wrong. The order made by him must be affirmed. Mr. Justice Ridley was of the same opinion. He thought that the view of the magistrate was correct. From the date of the decision of the case of "Pound v. Plumstead Board of Works," in 1871, it had been decided in a long course of cases that a carriage-way which had been repaired by the parish as a highway might become a "new street" when houses in a more or less continuous line were erected along the sides thereof. It was suggested in the case of "Arter v. Hammersmith Vestry" that in the case of a piece of land with no houses on it, but which was newly laid out for the purpose of being a street, it would be a "new street." That was possible, but it was an exception to the general rule that there must be buildings by the sides. The matter was left to the magistrate to decide. He had decided it here, and the appeal must be dismissed.

**IN RE W. A. LEFEVER.**—In the court of Bankruptcy, before Mr. Registrar Brougham, a sitting has been held for public examination. The bankrupt had traded as a veneer and timber merchant at different places in the east of London, and ultimately at 376, Hackney-road. His liabilities were returned at £16,261, of which £12,244 were unsecured, with assets £3,032, and he ascribed his failure to losses and liabilities in connection with accommodation bills, to losses by speculation on the Stock Exchange, and by bad debts. The examination was concluded.

**CLAIM FOR COMMISSION BY CARDIFF ARCHITECTS.**—At Cardiff County-court on Friday (before his Honour Judge Owen), Messrs. J. P. Jones, Richards, and Budgen, architects, sued the executors of the late Mr. Noah Rees (Messrs. Spencer, Corbett, and Evans) for £57 16s. 5d., balance alleged to be due in respect of commission for preparing the plan, &c., for a warehouse at Working-street. Mr. J. Sankey appeared on behalf of the plaintiffs, and Mr. Bailhache defended. The circumstances of the claim were that some time before entering into partnership with Messrs. Richards and Budgen, Mr. J. P. Jones had undertaken to prepare plans for Mr. Rees for a warehouse. Just after the partnership commenced Mr. Jones died, and his partners knew nothing of the arrangement with Mr. Rees until some time afterwards, when Mr. Rees called their attention to it. At the same time he said that it was agreed by Mr. Jones to do the work for 2½ per cent. of the total cost of the work. The partners, Messrs. Richards and Budgen, said it was very unusual to do such work for less than 5 per cent., but agreed to do so as Mr. Jones had arranged. Mr. Rees decided to erect a second warehouse, and placed the work in their hands. In respect of this new work the architects sought to obtain 5 per cent. instead of 2½ per cent., as on the first building. In the witness-box Mr. Richards admitted that no bill

whatever had been rendered to Mr. Rees up to the time of his death. The bill was sent into the executors at 5 per cent. for the second erection. The executors had sent a cheque for 2½ per cent., and plaintiffs now claimed the balance. When the second work was undertaken no intimation was made to Mr. Rees that 5 per cent. would be charged. Judgment was given for defendant, with costs.

**BUILDER V. SOLICITOR.**—At the Gloucestershire Assizes, last week, Edward Saunders, builder, of Cheltenham, sued Charles William Rees Stokes, solicitor, of Tenby, Pembrokehire, for £168 6s. 9d. for work and labour done and material supplied in repairing Wilton House, Lansdown-road, Cheltenham. When the case was part heard Mr. Justice Mathew suggested an arrangement, and after consultation Mr. Stokes consented to judgment for the plaintiff for £140 with costs. Judgment was entered accordingly.

**ACTION AGAINST A BUILDER: A HARD CASE.**—**TYNE V. CONNELLY.**—In the Queen's Bench Division, before Mr. Justice Grantham and a special jury, an action has been brought by Miss Elizabeth Sarah Tyne, a young lady of means, residing with her mother at Colet-gardens, West Kensington, against Mr. John Joseph Connelly, a builder, to recover £1,500 alleged to be due under a deed of mortgage. Defendant pleaded that he had paid the money. Mr. Reed, Q.C., in opening the case, said the question to be decided was as to which of two innocent persons had to suffer for the fraud of a third person. In 1895 the defendant was about to erect certain buildings in Gray's Inn-road, and he consulted a solicitor named Norris, who had acted for the plaintiff in advancing certain sums of money on mortgage. The defendant now contended that he had given the money to Norris for the distinct purpose of paying off the plaintiff's mortgage. It was clear that Norris had not paid the plaintiff, and, therefore, the defendant was liable to do so. Norris was now undergoing a term of penal servitude for fraud. Mr. Dodd, Q.C., for defendant, said his case was that Norris was the plaintiff's agent to collect the money due under the mortgage, that the defendant paid Norris the amount due, and that, therefore, the plaintiff had no right against the defendant. The jury found a verdict for the plaintiff for the amount claimed.

#### CHIPS.

A mass of faultless freestone, weighing from 90 to 100 tons, has just been loosened at the Cae Llwy Quarry, Pencoe. It is supposed to be the largest ever extricated in the county.

A new board school at Ketley, Wellington, Salop, was opened last week. It accommodates 220 children in the mixed department, and 150 infants. Mr. Dalglish was the architect, and Mr. Rowland Millington the builder.

News reaches us from South Africa that the Yost typewriter has been awarded a gold medal at the Agricultural Show held at Pretoria in April last. This makes a total of 18 gold medals awarded to this machine—quite a unique record in the typewriter business.

The memorial to the late Christina Rossetti, designed by the late Sir E. Burne-Jones, was finished before his death, and the carved work in which the paintings will be placed will shortly be completed and placed in Christ Church, Woburn-square, where Christina Rossetti attended for nearly 20 years. The total cost will be about £220, and towards this £180 has been subscribed.

Memorial-stones of a new Wesleyan chapel, at High Brooms, Tunbridge Wells, were laid on Wednesday week. The chapel will be of red brick, and seated for 300 people, the internal measurements being 55ft. by 30ft. Mr. Herbert M. Caley, of Tunbridge Wells, is the architect, and Mr. J. Jarvis the builder.

The members of the city council of Liverpool have resolved to provide themselves with a new council chamber at the lowest possible cost, and accepted at their last meeting the proposal of Sir Thomas Hughes to make alterations in the present chamber at an estimated cost of £8,000, rather than erect an entirely new council house on the site of St. George's Church at a probable cost of £60,000.

At a Dean of Guild Court, held at Dunoon on Friday, the plans of the new police-station and Sheriff Court-house, which are to be erected at the corner of Church-street and George-street, were passed. The buildings are in a Free treatment of the Late Renaissance, and will be built at the cost of the county council of Argyllshire. The architect is Mr. William Fraser, Dunoon and Glasgow.

A prominent landmark has disappeared from West Cornwall by the removal of the tower and spire of Mithian Church, near St. Agnes. The tower was condemned and demolished because of its dangerous state, and an effort is now being made to raise £300 to build a new tower and spire. A bazaar was held in furtherance of the scheme last week.



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## ILLUSTRATIONS.

GLASGOW ART GALLERY.—NATIONAL SILVER MEDAL DESIGN FOR A FOUNTAIN.—PROPOSED NEW PRESBYTERIAN CHURCH AND MANSE, CHATHAM.—KING JAMES'S GRAMMAR SCHOOL, KNARESBOROUGH.—THIRD PREMIATED DESIGN FOR TAUNTON TOWN HALL.—"BUILDING NEWS" CLUB DESIGNS FOR A COTTAGE HOME FOR WAIFS AND STRAYS.

## Our Illustrations.

## GLASGOW ART GALLERY PRINCIPAL ENTRANCE.

THIS important group of buildings now in progress has naturally attracted considerable attention, and as the whole pile approaches completion the skill displayed by the architects, Messrs. Simpson and Allen, not only in the picturesqueness of the general grouping, but in the refinement of its detail, will more and more become manifest. The accompanying drawing at once shows enough to justify this note of commendation, and we are glad to publish so excellent a drawing of so capable a work. The municipal art galleries will hold their own among the notable buildings of Glasgow, and it is of the utmost consequence that the sculpture which forms so conspicuous a part in the composition of the design should be thoroughly well done. Bad sculpture stands at once condemned, while indifferent statues and carvings are dear at any price—indeed, they are worse than that, because when once executed they spoil the building and cannot be removed. We are glad, therefore, to see that the Glasgow Corporation has adopted the advice of their architects—at any rate, to this extent, that Mr. George Frampton, A.R.A., is to personally supervise the sculpture, besides executing the bronze group for the north porch, as well as the six spandrels of bas-relief in the arches of the porch itself. Mr. McF. Shannan is to carry out the three bronze terminal figures of the porch and tower. Mr. Frampton has selected five carvers to do the carving, and these men have been conducted by Mr. Simpson and Mr. Frampton over some of the best work in Paris, at the cost of the Corporation of Glasgow, in order that the best results possible should be secured. There is to be a competition among sculptors for the eight seated stone figures which are to form part of the pavilions, the subjects being Science, Literature, Religion, Commerce, Music, Architecture, Painting, and Sculpture. No one artist is to be allowed to carry out more than four of the eight groups, and the cost of each group is not to exceed £350. The models are to be delivered by Dec. 1 next, and the contract is to be governed by the condition that the groups are to be completed by Jan. 1, 1900. The total cost is calculated to be about £15,000 for the sculpture and carving. We note with much satisfaction this growing determination, on the part of some of our leading architects, to introduce only really good sculpture into their buildings, and we are equally glad to find clients willing to be guided in this direction by their professional advisers. It is generally, of course, an uphill task to induce committees to view this matter in a liberal spirit, and it is not an unheard-of circumstance that there should be some members on most corporations who seek to

gain credit for themselves by advocating economy falsely so-called. Sculpture has ever been the hand-maid of architecture; but good work of any sort must be properly paid for, and we shall be much surprised if the result at the Glasgow art galleries does not more than justify the trouble which evidently has been taken over the matter.

## DESIGN FOR A FOUNTAIN: NATIONAL SILVER MEDAL DESIGN.

MR. WM. HAYWOOD was awarded a silver medal for his graceful design for a bronze and marble fountain, of which the accompanying plate gives a plan, section, elevations, and view. The last named is taken from a photograph of the model which the author worked himself in illustration of his composition, which, it will be admitted, is very suggestive. The work was done at the Birmingham School of Art.

## PRESBYTERIAN CHURCH, CHATHAM.

THE site is a very fine one in the best part of the New Road Avenue, immediately adjoining the New Victoria Park and recreation ground. The church will have accommodation for 780 on the ground floor and in the galleries. The organ-chamber will be behind the rostrum, the key-board of the organ forming the lower part of the rostrum front in the centre, the choir being placed on the platform. The floors of vestibules and staircases will be of mosaic, floors of aisles will be laid with polished maple blocks on concrete. The whole of the internal fittings are to be of varnished pitch-pine. Externally, the church will be faced with squared Kent rag stone, with Monk's Park dressings, the roofs covered with red plain tiles. The building is to be heated by high-pressure hot water. The total cost, including the manse, will be about £6,000. The architect is Mr. George E. Bond, of Rochester.

## KING JAMES'S GRAMMAR SCHOOL, KNARESBOROUGH.

THIS design was placed first in open competition by the professional assessor appointed by the governors. The building will not be carried out in its entirety, the author being now engaged upon modified drawings. The buildings are to be erected in red pressed bricks, with stone dressings to windows and doors, and the technical building will be detached from the main block. Mr. George H. Barrowcliff, of Loughborough, is the architect.

## TAUNTON TOWN HALL.

WE complete the series of illustrations to-day of the first, second, and third premiated designs for this building by giving a view, elevation, section, and two plans of Mr. Henry T. Hare's design, which was accorded the third prize. The selected design, by Messrs. Samson and Cottam, appeared in the BUILDING NEWS for June 10 last. The second premiated design, by Mr. J. M. Brydon, was illustrated last Friday. With regard to Mr. Hare's design, the drawings speak for themselves, and we have endeavoured to give each of the three designs equal illustration, so as to show them to equal advantage. The materials proposed in this case to be used were red-brick facings, with Bath stone dressings, and roofs to be covered with stone slates. The roofs to be of fireproof construction.

## "BUILDING NEWS" DESIGNING CLUB: A COTTAGE HOME FOR WAIFS AND STRAYS.

WE give to-day elevation, plan, and details of the design by "Pantile," placed by us third in this competition. It was described and criticised in our last issue, p. 40, when we published the designs placed first and second.

Tenders from builders have been sent for the erection, at Wolverhampton, of the new works of Messrs. Chubb and Sons, safe and lock manufacturers. The site has a frontage to Railway and Fryer-streets, and two other thoroughfares, and the buildings will be on an extensive scale.

The Great Northern Railway platform at St. Alban's was thronged on Saturday morning, the 2nd inst., at 6.30 with about 360 of those employed in the building trade in that city, and who were just going to commence their annual outing. Portsmouth was the place selected to be visited, and this town was reached shortly before eleven o'clock. A visit was made to the dockyard by a large number of the excursionists, and after dinner some journeyed to the Isle of Wight, while others strolled round the town. The return journey commenced about nine o'clock, and the party reached St. Alban's in the early hours of Sunday morning.

## THE ROYAL INSTITUTE OF BRITISH ARCHITECTS EXAMS.

THE following have passed the June examinations of the Royal Institute:—

PRELIMINARY.—L. P. Abercrombie, C. J. H. Ascroft, S. B. Ashworth, H. W. Asman, A. H. Atkinson, F. Barclay, H. M. Barker, M. S. Bigwood, H. T. Bill, R. H. Boyd, A. C. Broadbent, W. Broadbent, C. A. Broadhead, J. T. W. Brooke, A. E. Brooker, E. D. Brown, J. Brown, E. A. Brymer, A. A. Carder, W. A. T. Carter, R. M. Chalmers, A. L. Chapman, S. W. Clark, H. H. Clegg, A. R. Conder, V. C. Cook, E. C. R. Dibdin, H. H. Dodd, L. W. Ensor, J. W. H. Farrow, A. E. C. Fenouillet, J. R. Fothergill, R. R. Gall, H. W. Gammidge, A. E. Gelder, C. R. B. Godman, V. R. Gould, W. L. Guest, E. Harding, J. A. Harrison, O. B. Hatchard, T. Hedges, A. Herklots, W. H. Hobday, A. H. Johnson, L. A. Jones, S. A. Kelly, H. Kenchington, W. Leaning, A. H. Lewis, J. Love, G. H. Lovegrove, B. J. McAdam, A. McDonald, J. C. Mackenzie, H. N. Maund, W. Michellmore, J. Miller, P. Minor, A. C. Notley, E. Ogden, C. T. Palmer, E. O. Payne, W. S. Payne, T. S. Peace, A. M. Peart, R. T. W. Purchas, A. R. F. Raven, G. Raymond, A. J. Redfern, W. B. Rees, W. F. Richardson, A. R. Robertson, J. G. Robertson, G. M. Roe, S. Salisbury, E. M. Simpson, G. S. Simpson, M. Skinner, E. R. Sladen, P. J. Smith, M. S. Stillman, F. G. Stockdale, F. A. Stowell, H. M. Tait, E. R. Taylor, A. Tedman, R. W. Thomas, F. E. Tomson, H. Wakeford, C. F. Ward, W. Ward, A. E. Webb, R. D. Wells, P. J. Westwood, J. Wilson, D. Wood, C. L. Wright.

INTERMEDIATE.—R. P. S. Twizell, T. J. Bee, S. Harrison, R. T. Barker, J. G. Ross, C. H. F. Comyn, J. E. Fawcett, A. E. Lacey, L. F. Ward, J. Quail, J. H. Gibbons, N. Thomas, C. H. Heathcote, S. G. Highmoor, H. Moger, H. Gelder, A. Woodroffe, J. F. J. Goodacre, P. J. Turner, R. D. Wells, G. A. Brown, J. M. Ross, A. S. Dorrell, J. I. F. Jones, H. S. Barrett, C. J. Strachan, R. B. Brook-Greaves, H. I. Triggs, E. G. Heathcote, P. T. Hopwood, F. R. Foster, W. Higenbotham, N. Thorp, J. T. Alexander, H. C. Bishop, F. W. A. Buckell, F. B. Chester, W. W. Ellison, P. E. Gloyne, K. J. S. Harris, J. H. Higson, J. Holt, G. F. M. Merriman, J. L. Nicholson, H. W. H. Palmer, A. R. F. Pierce, E. E. Price, E. E. Shepherd, E. A. Toombs, W. J. Walford, H. F. Williamson, W. Wrigley, C. F. Young.

FINAL.—J. C. Baines, P. C. Blow, V. E. Böhser, R. W. Carden, E. M. Charles, A. Cowie, S. C. Denmead, A. R. Gough, J. S. Harrison, A. Herbert, G. McMichael, L. Moore, C. Riddey, C. W. Surrey, A. W. Vercoe.

## CHIPS.

The laying of memorial-stones for a new school-chapel in Corporation-road, Darlington, took place on June 30. The building is to accommodate about 500, and will cost £1,200.

The School Board for Stafford have appointed Mr. N. Joyce, of that town, as architect for new schools to be built in the Stone-road, a proposal to invite competitive plans being rejected.

At Ruabon, where excavations are proceeding in the old Bryn Fields, the workmen, in cutting a deep trench, unearthed a cistern consisting of two upright stones surmounted with a cross-stone, which inclosed a large sepulchral urn of terracotta containing cremated remains. The urn is bowl-shaped, tapering to a narrow base, and is ornamented over the greater part of the surface.

The Victoria Wesleyan Church, Blowick, Southport, was opened on July 6th. The cost of the building has been £4,700. The seats are in amphitheatre form, and the building presents other locally novel features. The architects were Messrs. Green and Brocklebank, of Liverpool.

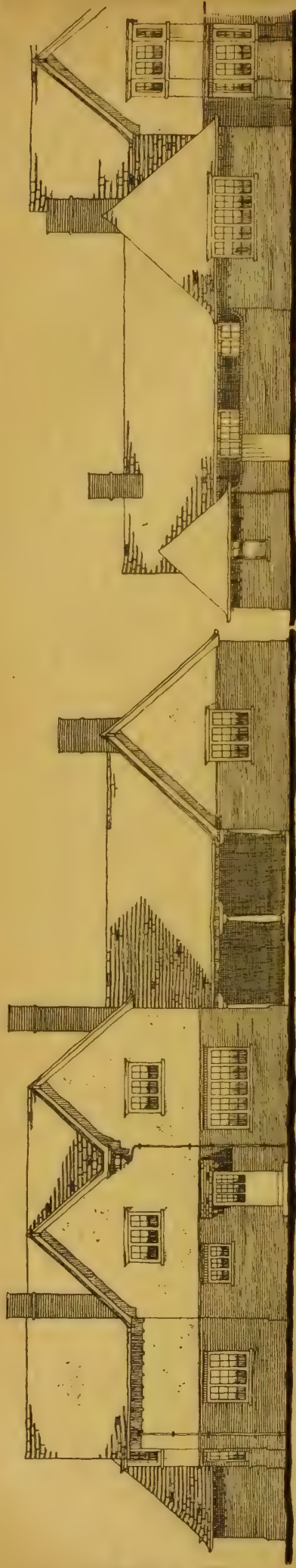
Whilst excavating across the street opposite Baillegate Wesleyan Chapel, Lincoln, last week, running down the centre of the street was discovered a line of wall, and on this wall was found the base, with part of shaft attached, of a Roman column. The latter is about 12in. diameter. The mouldings of the base are of a somewhat more elaborate character than those previously discovered.

The work in connection with the National Harbour at Dover is going on rapidly. At the head of the Admiralty Pier machinery is being put into position for pile-driving, which is to be commenced forthwith. The conversion of the beach at the foot of the Shakespeare cliff into a block-making yard is also being carried out; a sea-wall is in course of construction along the front of the cliff; and to the eastward the cliffs are daily being blasted down for the purpose of reclaiming an extensive area of foreshore which shall serve as one of the quays of the new harbour.

A wing is being added to the East Suffolk Hospital in Anglessea-road, Ipswich. Mr. Fearnley Bishopp, of that town, is the architect, and the tender of Mr. S. A. Kenney, also of Ipswich, has been accepted, at £5,862, for carrying out the work.

The new trunk line of the Great Central Railway is so far approaching completion that the Leicestershire and Northamptonshire Provisional Committee of the Surveyors' Institution were able to journey last week from Annesley, where the new works begin, to Leicester over the new route. Messrs. Logan and Hemingway and Mr. Henry Lovatt, of Wolverhampton, are the contractors for this section, and Mr. Parry is the engineer for this section, and Mr. H. Chalcraft the resident engineer.





Front Elevation

Side Elevation

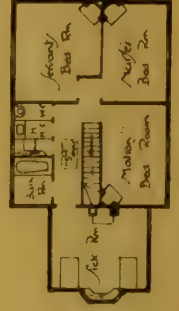
PLACED THIRD



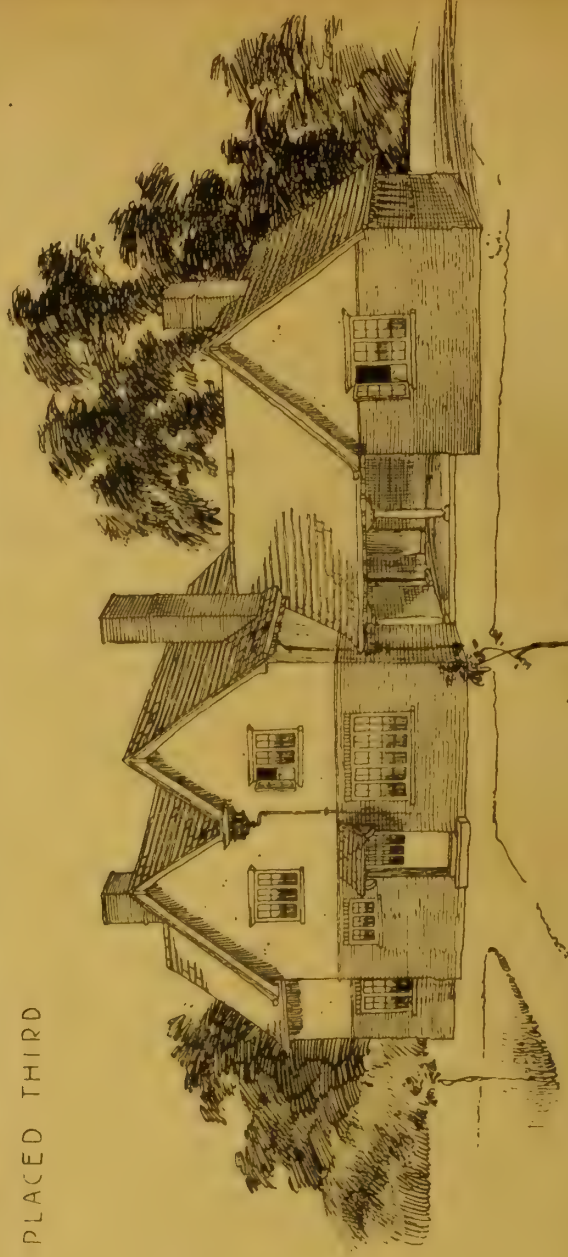
Section thro Hall



Ground Plan



Chamber Plan



A COTTAGE HOME FOR WAIFS & STRAYS.  
DESIGNED BY PANTILE

Scale for elevation  
Scale for plan

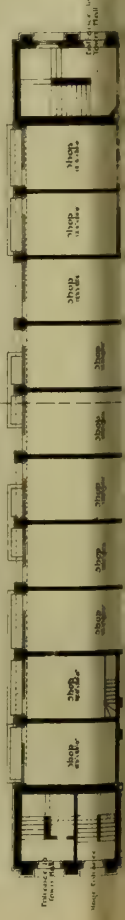
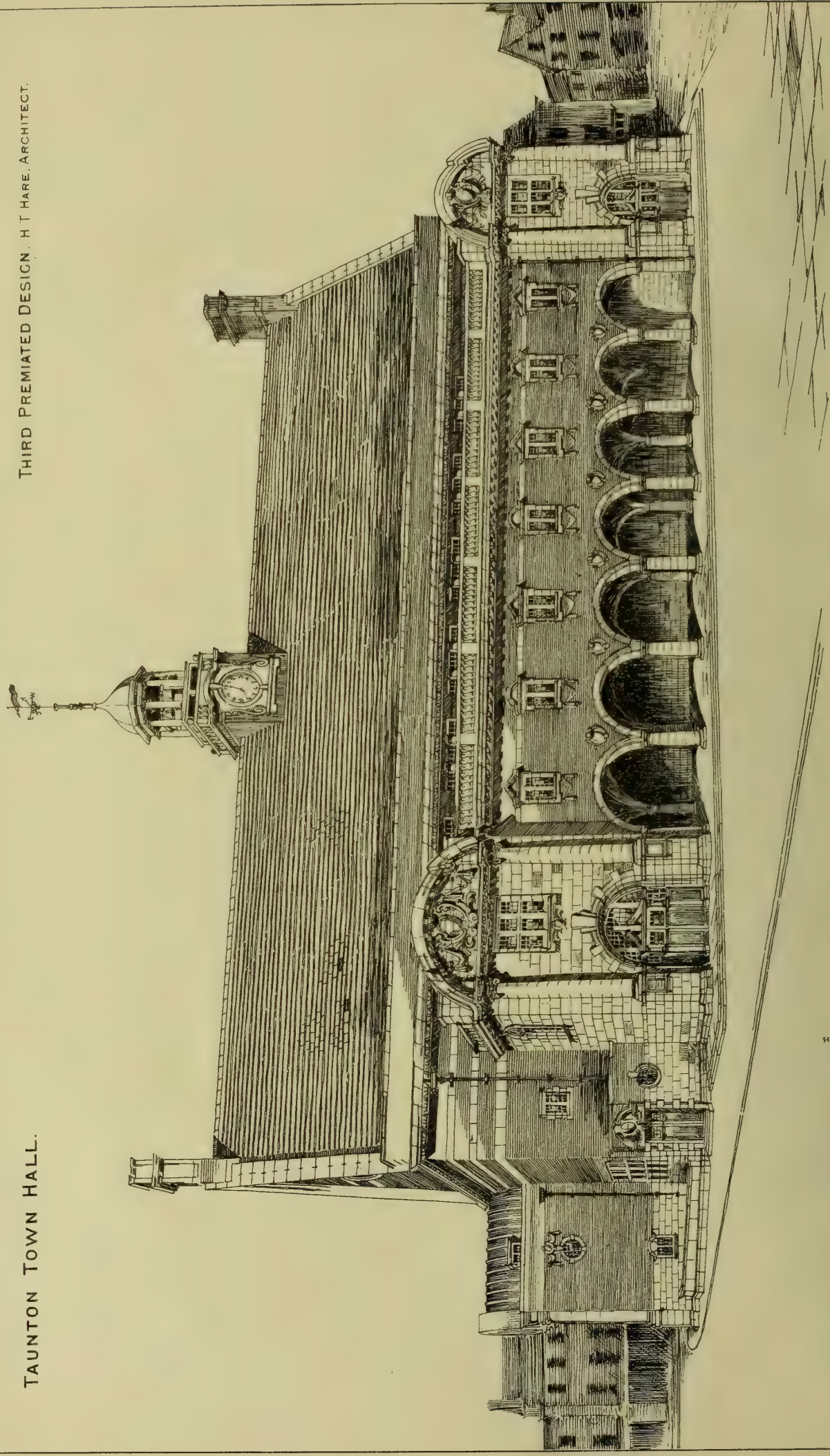




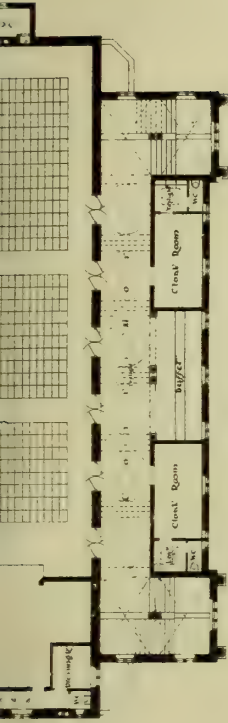


TAUNTON TOWN HALL.

THIRD PREMIAED DESIGN. H. T. HARE, ARCHITECT.

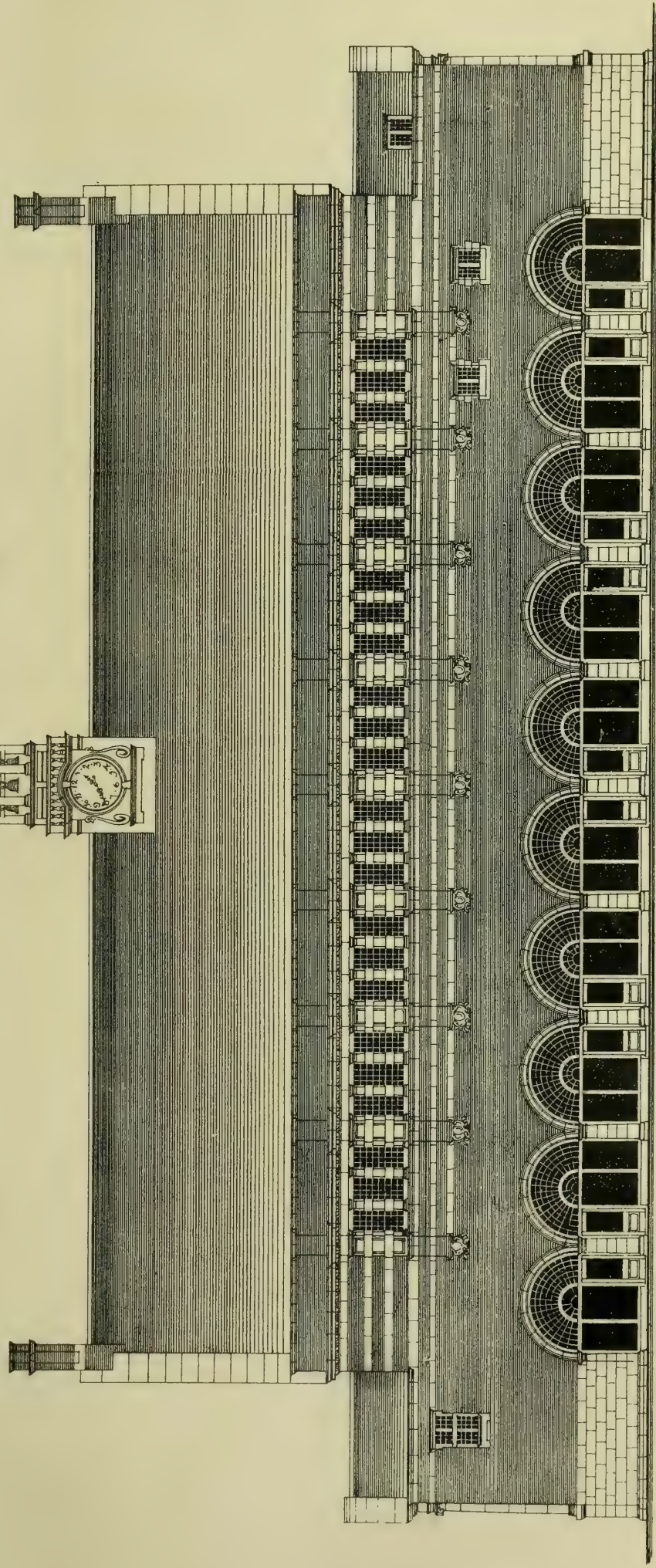






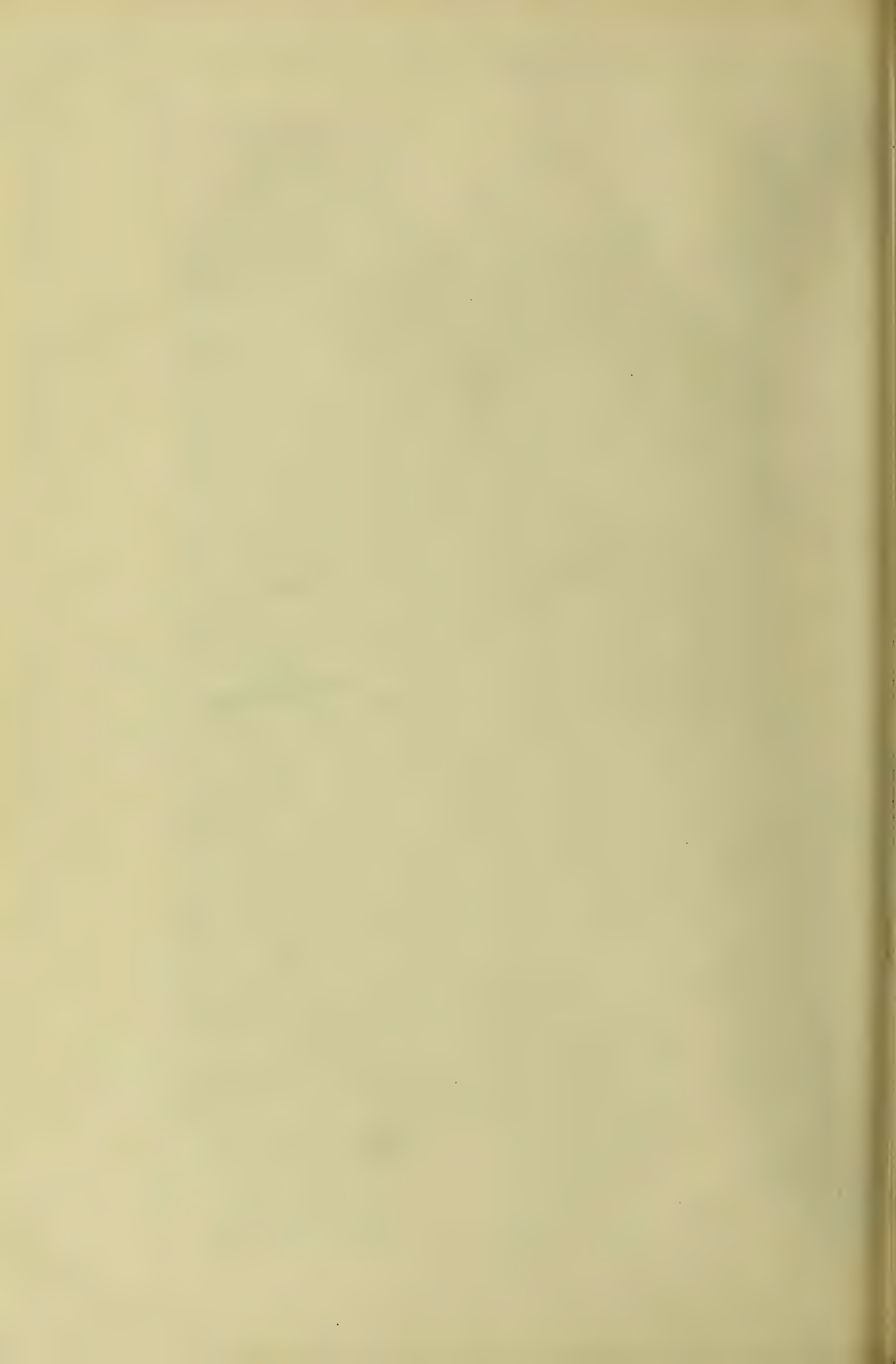
ИЗДАТЕЛЬСТВО

GROUNDED PLAN



# JOINT ELEVATION



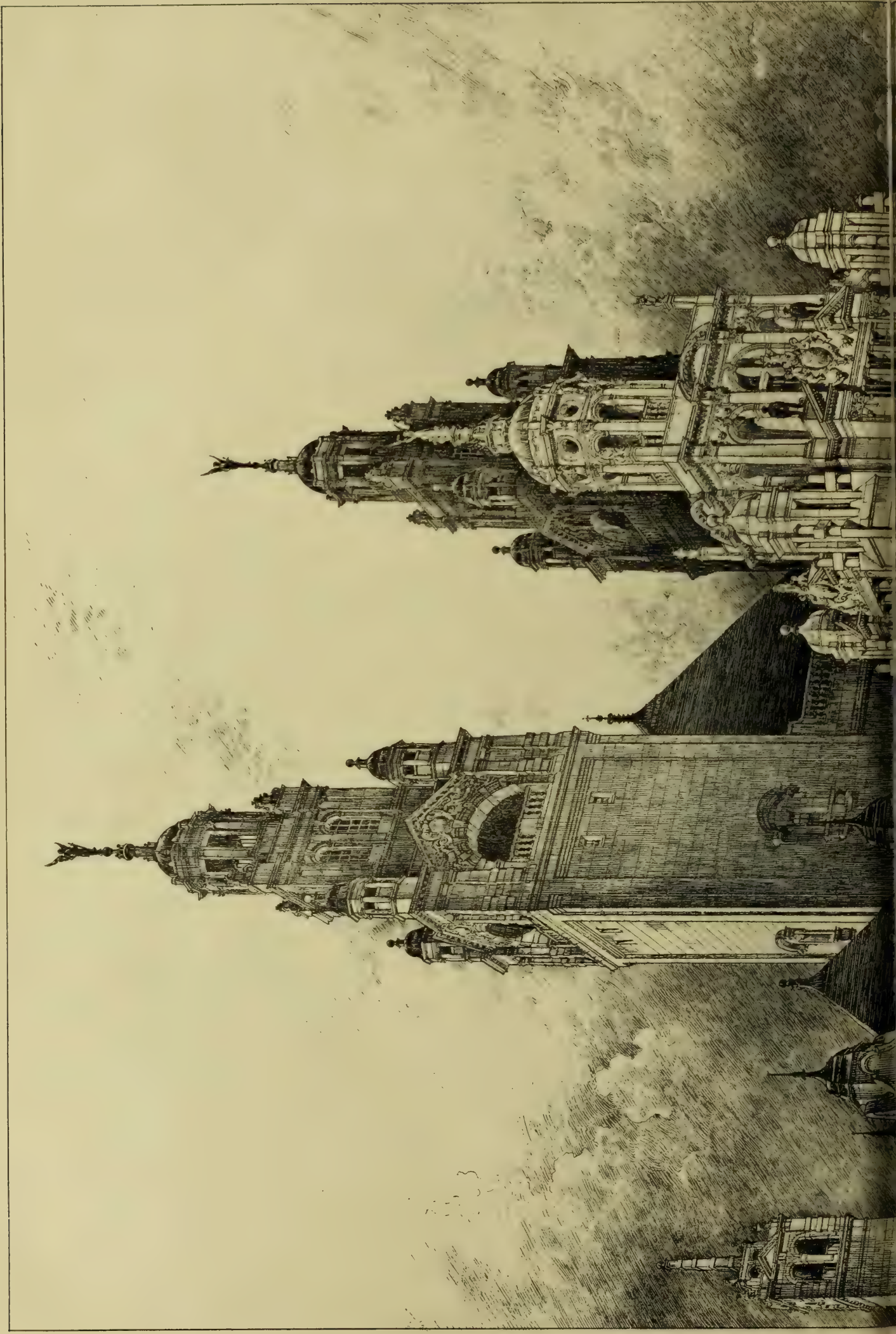








THE BUILDING NEWS, JULY 15, 1898.





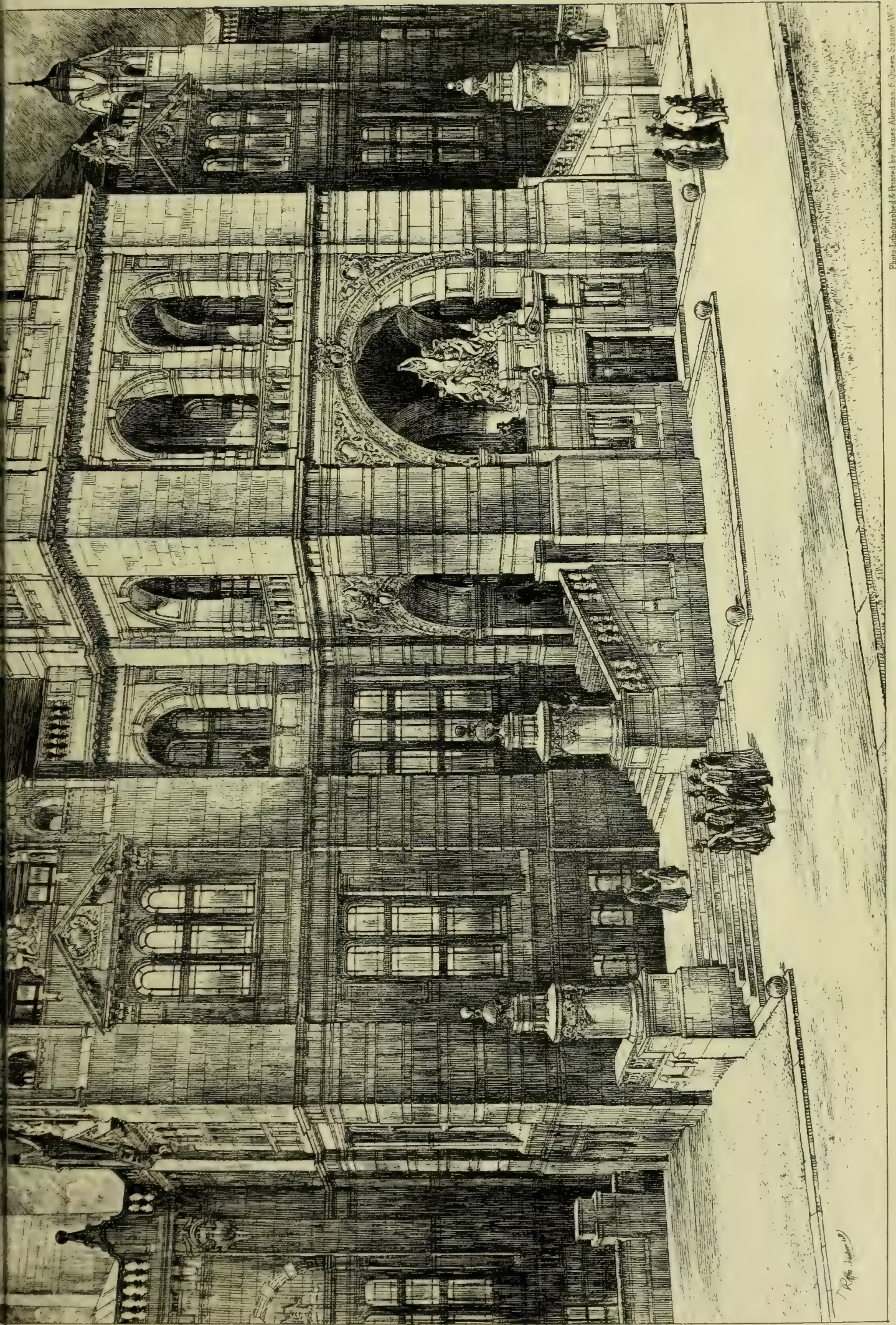
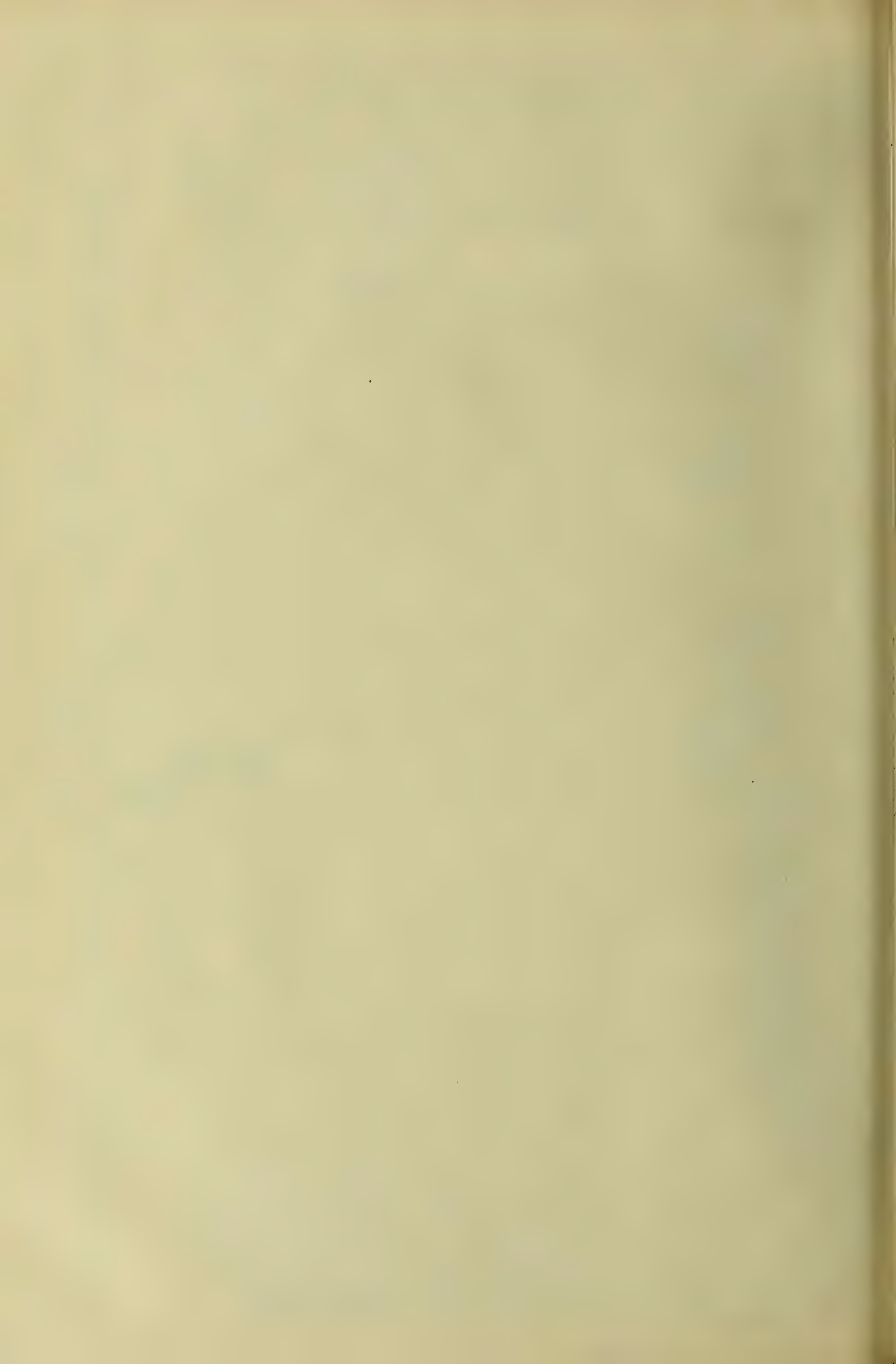


Photo Lithographed & Printed by James Acland, 6 Queen's Square, W.

# GLASGOW ART GALLERY, PRINCIPAL ENTRANCE.

JOHN W. SIMPSON & E. J. MILNER ALLEN, ARCHITECTS.

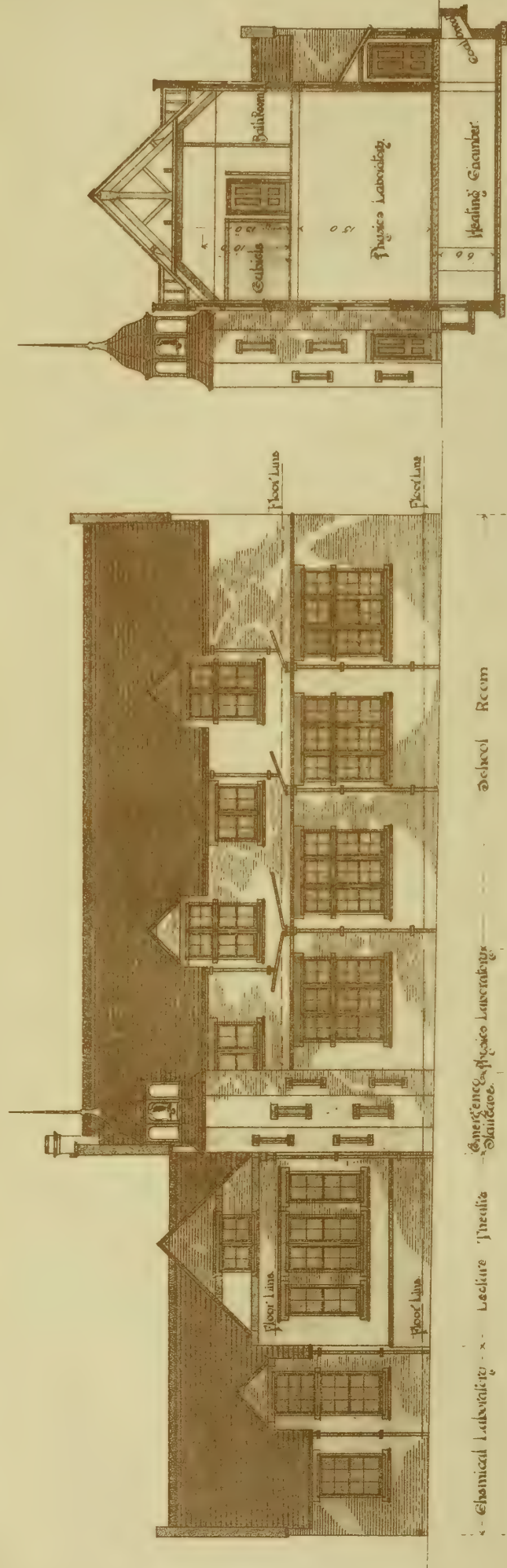




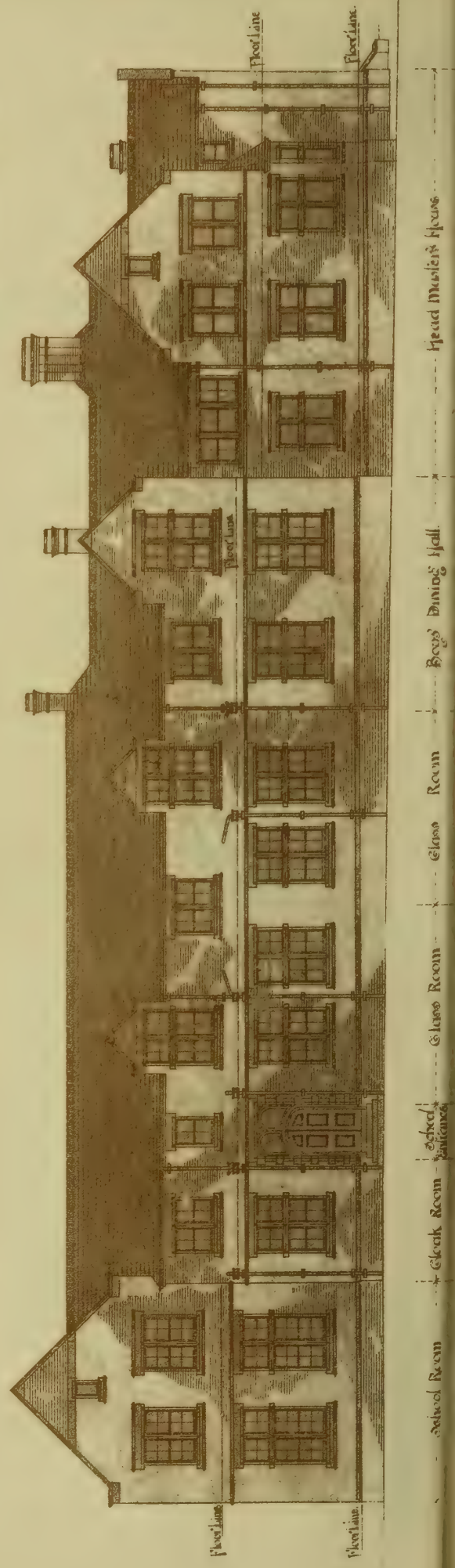








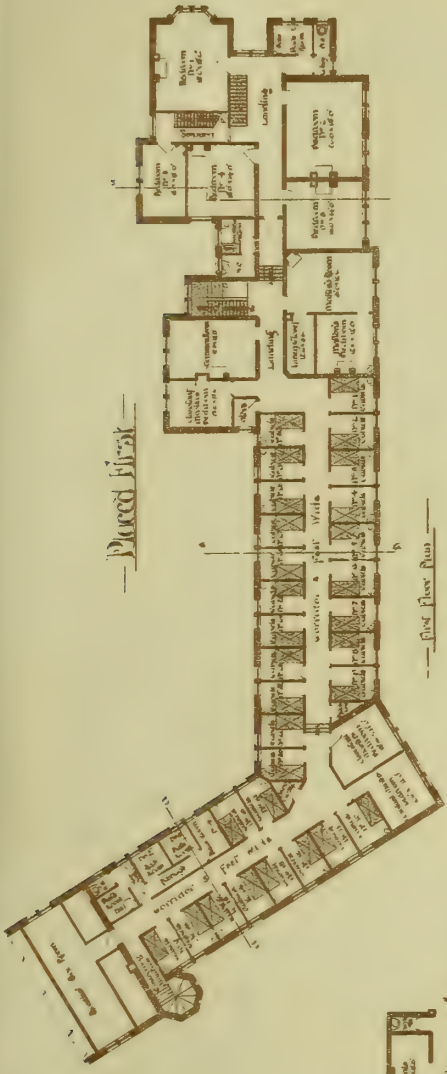
Section on line A.A.





# KING JAMES' GRAMMAR SCHOOL KNARESBOROUGH

GEO H BARROWCLIFF ARCHT

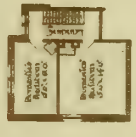


— First Floor Plan —



— Second Floor Plan —

— Ground Plan —



— Third Floor Plan —



— Fourth Floor Plan —



House

ex bed.

— Elevation to Playground —







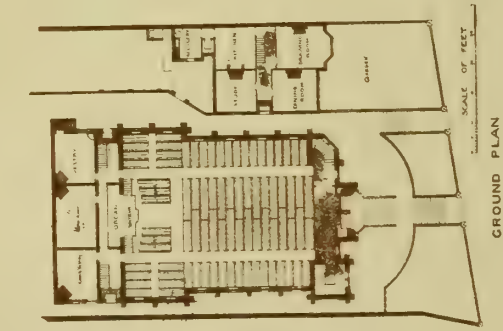




THE BUILDING NEWS, JULY 15, 1898.

# PRESBYTERIAN CHURCH AND MANSE CHATHAM

GE. Bond  
Architect



SCALE OF FEET  
0 10 20 30 40 50 60 70 80 90 100  
GROUND PLAN

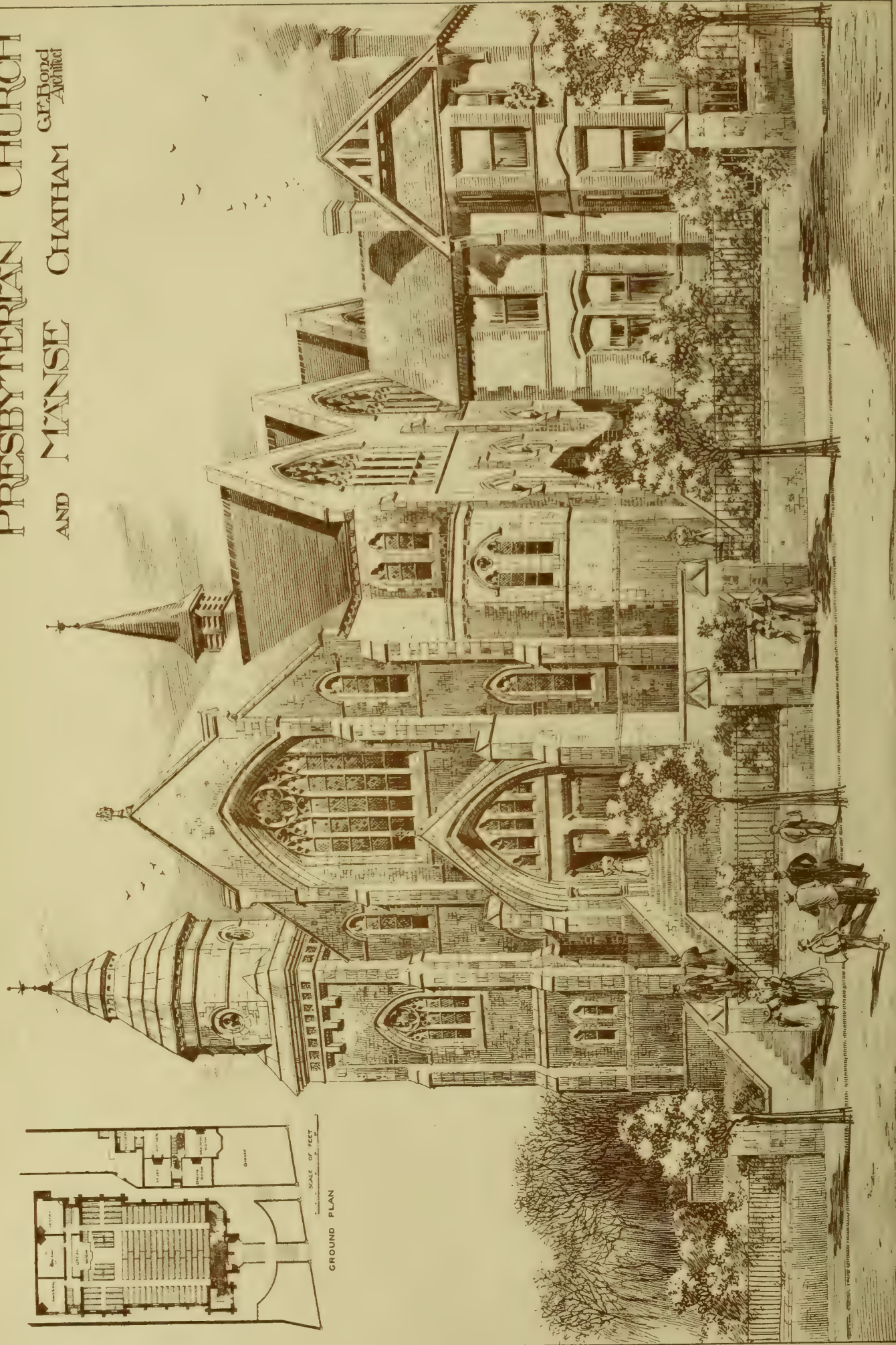
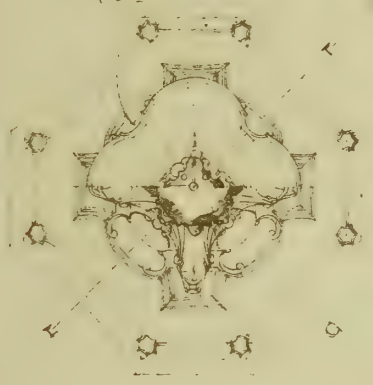
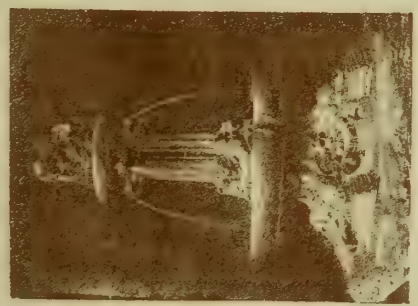


Photo Engraving & Stone by James Abernethy, Queen's Square, W.



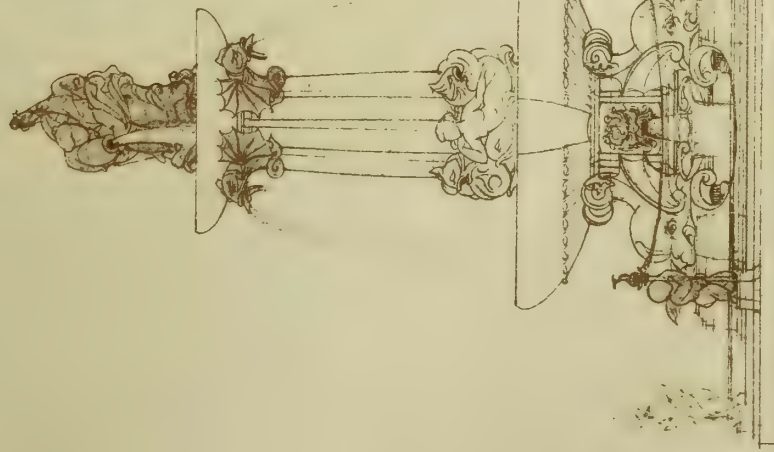
DESIGN FOR  
FOUNTAIN

— LE MURGE - AND - BROUKE -



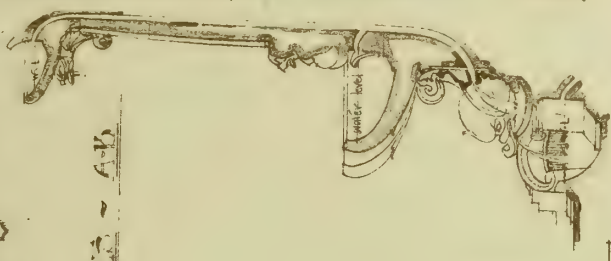
NOTE: These basins are connected  
and each other

SECTION -

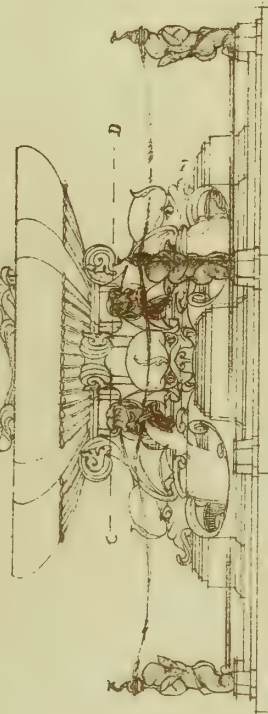


— ELEVATION OF C -

CD - DRESS - AB



— ELEVATION OF M -



— SECTION OF EF -



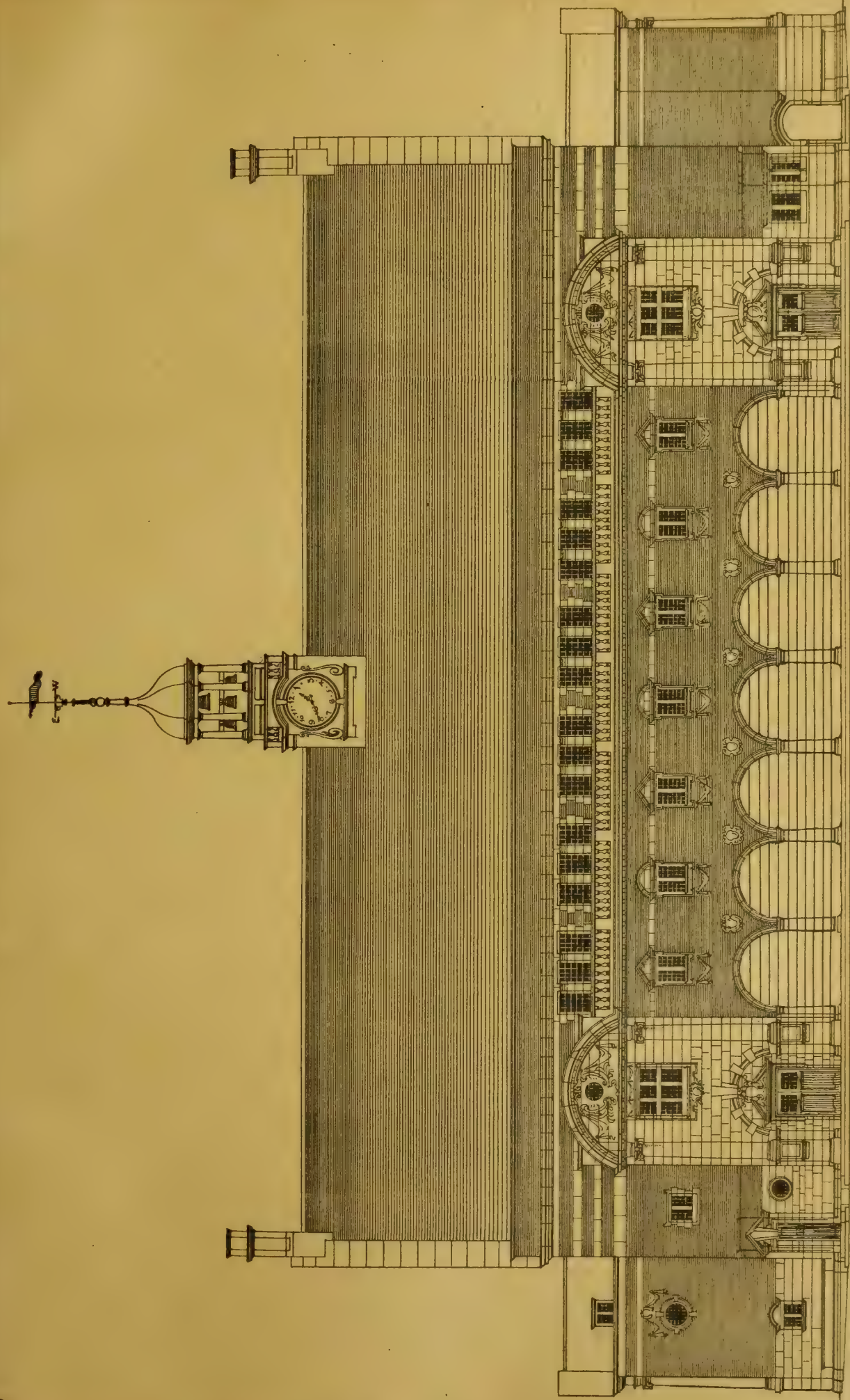
NATIONAL SILVER MEDAL AWARDED · W<sup>M</sup> HAYWOOD

· William Haywood ·









THIRD PREMIAED DESIGN FOR THE NEW TOWN HALL, TAUNTON.



### PROFESSIONAL AND TRADE SOCIETIES.

**BARRY MASTER BUILDERS' ASSOCIATION.**—A meeting of this association was held on Tuesday week, Mr. G. Rutter presiding. A long discussion took place on the Workmen's Compensation Act and the question of forming a mutual insurance company in connection with the association. It was at length decided to insure individually for this year with some insurance company, and during that time arrangements could be made to start a mutual insurance company. Unless the premiums are lowered considerably, at the present rate it will take nearly all the profit to keep up the premium. The association decided to become affiliated to the West of England and South Wales Federation of Building Trade Employers. The Trades Council's fair trade clause and penalties to contractors which they are anxious to have inserted in all the Barry Urban District Council contract forms was discussed at length. The association expressed the opinion that the Trades' Council were considerably exceeding their duties in asking the local authority to insert such a clause as that, seeing that the largest percentage of the money spent on contracts let by the council had to be paid by builders and contractors for private improvements. It was hoped that the Barry District Council would well consider before granting this request.

**BIRMINGHAM ARCHEOLOGICAL SOCIETY.**—The third excursion of this society for the present season was held on Saturday. At Wolverhampton the church was first visited. It is one of the most interesting ecclesiastical buildings in the Midland Counties. The width of the nave is almost excessive, while the chancel is remarkable for its length and narrowness. The Early English arches of the tower, which is of no great width, cut off the body of the church from the chancel in a singular manner. The monuments of the Lane family were examined, and much interest attaches to the bronze sepulchral statue of Admiral Leveson-Gower, by Le Sullur, a kind of effigy of which there are perhaps not half a dozen examples in the British Islands. The cross in the churchyard may be of Runic origin. By a long drive, the party reached the secluded village of Claverley. The church here exhibits examples of almost every style of architecture from Saxon to Georgian times. The font is a fine specimen of Norman work. Very interesting are the monuments to the Gatacre family, resident here since Anglo-Saxon days, and famous lately for the exploits of General Gatacre in Egypt. Two of these memorials are of a kind almost unknown in England, being sepulchral slabs incised and filled in after the manner of brasses, but of white marble. Ludstone Hall was next seen. It is of Jacobean date, and has much similarity to Castle Bromwich Hall. It has been restored with care and consideration by the owner, Mr. Cartwright. The moat remains intact, expanding at one point into a picturesque pool. The apartments in the house are full of interest, all the old details having been preserved where that was possible, and in other cases reproduced. From Ludstone the party returned to Wolverhampton, and thence by rail to Birmingham.

**CONGRESS OF ARCHEOLOGICAL SOCIETIES.**—The tenth annual congress of Archaeological Societies was held on the 7th inst. in the Rooms of the Society of Antiquaries at Burlington House, London, Lord Dillon presiding. At the congress held in 1896, Mr. Lionel Cust, director of the National Portrait Gallery, was invited to prepare a form to be filled up by persons possessing portraits of historical interest, with a view to compiling a complete catalogue of such portraits existing in private collections. This schedule has now been printed. The president explained that the portraits to be included in the National Portrait Catalogue were only such individuals as were either sufficiently celebrated for their good deeds or notorious for their bad deeds. Mr. Stanley Leighton, M.P., brought forward a proposal to offer an inducement to the owners of historical portraits to have them scheduled by exempting all portraits considered by Mr. Cust to be of adequate merit from legacy duty. Mr. T. W. Shore, delegate of the Hampshire Field Club, seconded the motion, and, in spite of some opposition, the resolution was carried. Attention was directed to the Blue-book issued July 30, 1897, containing information collected by our foreign Ministers as to the means adopted in the different European countries for the protection of

ancient monuments. The statement is made in this Blue-book that the only two nations whose Government did absolutely nothing for preventing the destruction of ancient remains were England and Russia. As it was quite hopeless to expect any help from the Government, it was proposed that copies of the Blue-book should be forwarded to the county councils and antiquarian societies throughout the country, with a suggestion that these bodies should ascertain what ancient monuments it was desirable to take steps to preserve, and how this could best be effected. It was alleged that old structures were often swept away quite unnecessarily, in order to make a job for an architect and a builder. The Rev. Dr. J. C. Cox mentioned that, as a member of the Northampton County Council, he had found his colleagues, irrespective of party, anxious to save old buildings wherever it was possible to do so; and he gave the 14th-century bridge over the Nene, and the Queen Eleanor crosses as instances in point. Mr. G. L. Gomme said that the London County Council had already prepared a schedule of ancient buildings, with a view to their preservation. Eventually the Congress resolved to communicate through its secretary with the various county councils on the subject, calling their attention to the recently-issued Blue Book on the preservation of ancient monuments abroad, and also to the steps taken by the London County Council in the matter. In the afternoon the reports of the committee on Effigies, and of the National Photographic Record Association, were discussed. A fine series of photographs of antiquities was exhibited by Sir Benjamin Stone, M.P., president of the National Photographic Record Association. It was unanimously agreed that this Association had inaugurated a most valuable work, and that it was desirable that the local archaeological societies should give the Association their hearty co-operation. In the evening the members dined together at the Holborn Restaurant.

**PALESTINE EXPLORATION FUND.**—The annual meeting of the general committee of this fund was held on Tuesday week at 38, Conduit-street. The chair was occupied by Mr. James Glaisher, F.R.S. The report of the executive committee having been read and adopted, the meeting was addressed by Dr. Bliss (who will shortly go to Palestine to resume the work of excavation), by Professor Hull, Mr. Henry Harper, Dr. Löwy, Colonel Goldsmid, and Mr. Walter Morrison. It was stated in the report that a letter had been received from the British Consul at Jerusalem informing the committee that permission to excavate in Palestine had again been granted by the Sultan, and that arrangements had been made for commencing excavations on sites in the neighbourhood of Tel-es-Safi, the supposed site of Gath, about midway between Jerusalem and Ashkelon. The cost of these researches will be about £100 a month.

The new Congregational Church at Scarborough, which is situated in Manor-road, in the populous north-west ward, was opened on Wednesday by the Rev. Dr. Barrett, of Norwich.

A competitive exhibition of metal-wrought articles will be held by the Founders' Company on Wednesday and Thursday, Oct. 26 and 27. The competition will be open to all founders, designers, craftsmen, and apprentices engaged in the business within the City of London or in the Metropolitan area. Successful exhibitors will be entitled to the freedom of the company, and money prizes varying from £10 to £1 will also be awarded.

An adjourned meeting of the Edinburgh Town Council has been held to consider the question of their site for the Usher Hall. The proposal to place the hall in the West Meadows was defeated by 27 votes to 10, and by a majority of 20 to 17 a resolution was adopted in favour of offering £65,000 to the North British Railway Company for the area at Port Hopetoun, and in the event of the offer not being accepted, of taking no further steps towards acquiring the area for this purpose.

A new departure has been taken by the Mersey Docks and Harbour Board in deciding to let by contract the works required in the construction of some new sheds and making improvements at the Queen's, Trafalgar, and Victoria Docks, at a cost of £30,000. Hitherto it has been the practice to carry out nearly all the work of this description by the board's own staff; but the works already in progress, and about to be undertaken, are so heavy that it would lead to considerable delay if these additional works were also imposed upon them, while the further accommodation to be given by these new works is immediately necessary.

### STATUES, MEMORIALS, &c.

**PEEBLES.**—The fountain which has been erected in Peebles in memory of the late Professor Veitch was formally handed over to the magistrates and town council on Saturday. Erected to designs by Messrs. Sydney Mitchell and Wilson, Edinburgh, the fountain consists of a square base set diagonally with the angles rounded off. The sides are panelled, the panels being filled in with polished grey Aberdeen granite, on one of which is cut the following inscription:—Erected by friends in Peebleshire and elsewhere, in memory of John Veitch, LL.D., Border Poet and Philosopher, Professor of Logic, Rhetoric, and Metaphysics in the University of St. Andrew's, 1860-64, Professor of Logic and Rhetoric in the University of Glasgow, 1864-94; born at Peebles 24th October 1829, died at Peebles 3rd September 1894. From the base rises a moulded and decorated Renaissance column, on the square die of the base of which there is a sunk panel filled in with an alto-relievo bust of the Professor in bronze, executed by Mr. Webster, sculptor, Edinburgh. Above the square die is a circular moulded base, and the column proper rises above this from a cluster of acanthus leaves, carved out of the solid granite, topped with a carved capital on which rests a lion in bronze supporting a shield bearing the Peebles arms. The shaft of the column is decorated with festoons and droops of cherub heads and lyres in bronze. The whole fountain, with the exception of the bronze work and the Aberdeen grey granite panels of the base, is executed in axed Corrennie granite. There are two drinking basins with bronze cups, and a dog trough is also provided. The fountain, which stands 14ft. 6in. high, has been built by Bailie Ramsay, Peebles. The decorative modelling and granite work is by Mr. Kerr, sculptor, Haymarket, Edinburgh; and the whole has been executed under the superintendence of the designers, Messrs. Sydney Mitchell and Wilson, of Edinburgh.

### CHIPS.

A representative committee have approved a scheme for laying out a recreation ground recently presented to the town of Ramsgate. There will be one first-class and four second-class cricket pitches, two football grounds, four tennis courts, and a cycle track.

Three stained-glass windows, erected in the parish church of Beaconsfield in memory of Lady Lawson, were unveiled on Thursday in last week by Sir Edward Lawson.

The Duke of Portland laid at Nottingham on the 7th inst. the corner stone, with Masonic ceremonial, of a new wing of the General Hospital, which is part of a scheme of extension costing £50,000.

The whole of the work in connection with the restoration of the Catholic church of St. John the Evangelist, Easingwold, has been intrusted to Mr. Anthony Lyons, builder and contractor, of Norton, Malton, including new roof, new stone buttresses, new porch to west of entrance, &c.

The Salford Town Council have resolved to purchase 21,583sq. yds. of land at the westerly end of Great Cheetham-street East, as a playground for the children of that district.

The result of the poll taken to ascertain if the ratepayers of Hastings were in favour of the corporation guaranteeing 3 per cent. interest per annum on £100,000 towards the completion of the harbour, is that there is a majority of 1,077 in support of the town subsidy.

At Madron, Col. W. R. Slacke, R.E., one of the inspectors of the Local Government Board, has held an inquiry into the application of Madron Urban District Council to borrow £724 for works of water supply for Tolarne, and £1,425 for works of water supply, and £130 for works of sewerage for Heamoor. Mr. Martin, C.E., of Exeter, produced and explained the plans and details of the scheme.

At the parish church of St. John, Margate, a series of improvements has just been effected from designs by Mr. R. Dalby Reeve, of that town. They include a belfry screen in teak at the west end of the church, and a low font cover, both perpendicular in style, executed by Messrs. Harry Hems and Sons, of Exeter, and a new choir vestry.

The Haltwhistle Rural District Council have engaged Mr. Harry W. Taylor, A.M.I.C.E., of St. Nicholas Chambers, Newcastle, and Birmingham, as their engineer, for the preparation of a scheme of sewerage and sewage disposal for the west end of Haltwhistle.

On Thursday in last week foundation-stones were laid at Brill, near Thame, of a proposed enlargement of the Wesleyan chapel and the building of a new schoolroom. The cost of the alterations and the new schoolroom amounts to over £500, the contract being placed in the hands of Messrs. Wells and Son, builders, of Thame, Mr. W. A. Wells having also prepared the plans.



## Engineering Notes.

**BUDE RAILWAY.**—The London and South-Western Railway will open in August the extension line from Holsworthy to Bude. Immediately after leaving Holsworthy, the new line crosses the Deer Valley, over which it is carried by a viaduct of nine arches, each of 50ft. span, the height from the permanent way to the valley being 89ft. As the district between Holsworthy and Bude does not contain any good building material, the choice was limited to stone and bricks brought from a considerable distance. In these circumstances it was determined to construct the viaduct wholly of concrete. This work has been carried out with success. The piers and arches were built with concrete blocks, while the foundations and abutments were made of concrete in mass, the whole of the material being produced by a mixture of broken stone found in the neighbourhood with inland sand brought by rail from Plymouth and Bideford. There is a second viaduct at Woolston similar in construction to that crossing the Deer Valley, but only 60ft. high. At the outset only a single pair of rails has been laid down, but land has been taken and bridges and viaducts have been constructed for a double road. The total length of the line is ten miles three furlongs, with a branch of about three furlongs, extending to the basin of the Bude canal for goods traffic. Between Holsworthy and Bude there is only one intermediate station. This is at Whitstone, situate midway. A mile and a half to the south-west of Bude is the bay of Widemouth, which is to be converted into a fashionable bathing place, and connected with the Holsworthy and Bude line by means of a branch railway running from Marhamchurch. Messrs. John Aird and Sons are the contractors, and they have executed the work in about 18 months. The line was designed by Mr. W. R. Galbraith, the chief engineer of the London and South-Western Railway, and it is being completed under his supervision and that of his partner, Mr. R. F. Church, the resident engineer being Mr. E. Connal.

**DOUGLAS, ISLE OF MAN.**—The faulty construction of Douglas breakwater, which, instead of being solid like the landing portion of the Queen's Pier, has an interior of rubble in the style of construction known as pocket, and is also built on an artificial rubble mound, has long been a source of concern to the insular authorities, owing to subsidences which involve the middle length of the work, and make it feared that any great storm may breach it and throw the inner wall into the bay. Experts have reported on the state of the breakwater, and show that it will take an expenditure of many thousands of pounds to avert the threatened danger and make it secure. The scheme for securing it has just been completed by Mr. Neville, the insular engineer. Arrangements have been made to use diamond drills. Special iron staging will be erected on the south side of the breakwater, and on this the boring apparatus will be placed and worked to cut holes through the cross-section of the breakwater. The borings will be about 3in. in diameter. Through these iron bars the full diameter will be run, and bolted on each side. The calculation is that in this way the walls can be secured from tumbling down, and the rebuilding of the middle portion of the structure avoided.

**WESTON-SUPER-MARE.**—The existing pier (or rather bridge) from the shore to Birnbeck Island is now being extended beyond the pavilion to a natural basin, which at low water contains a minimum of 12ft. of water. The present bridge or pier was opened on June 5, 1867, and the length of it is 1,040ft., whilst the distance across the island to where the new low-water pier will abut is 400ft.; the length of the new pier will be 950ft., and though the structure is to be in keeping with the existing pier, it will differ mainly in the fact of width, which is to be from 14ft. to 15ft., as against 20ft., the width of the present pier. There will be refuges and side-wings, whilst seating accommodation will also be carried the whole length. There is to be a tramway from end to end, adapted for passenger as well as luggage traffic. The supports of the new pier are to be at a distance of about 45ft. to 50ft., with a stiffening cluster of piles; they will be of steel. A pier-head will be constructed, with the usual timber piles and fenders, gratings and landings for disembarking passengers. The

stones are already in for the girders, and the holes drilled for the new pier. On Boxing Day of last year the buildings and offices on Birnbeck Island were destroyed by fire, and the directors have had these offices, &c., rebuilt in stone at a cost of £2,000, whilst other improvements have also been made. The seating accommodation on the island has been increased to the extent of 500 persons, and the standing room for 1,000.

### CHIPS.

A function took place in connection with St. Mary's Church, Broughton, near Chester, on Thursday in last week, when Dr. J. C. Bridge, organist of Chester Cathedral, opened the new organ, which has been erected by Messrs. Nicholson and Lord, of Walsall, at a cost of about £275.

New board schools are being erected at Plumstead, and special consideration has been given to the ventilation, which will be carried out on the Boyle system.

On Saturday, Whitmore Reans Hall, Wolverhampton, the residence for many years of the late Mr. Thomas Mills, which has been acquired as the training home for the members of the Evangelist Brotherhood, was dedicated by the Bishop of Lichfield. The building and extensive grounds were purchased twelve months ago for £2,750. Since then improvements have been effected by the erection of dormitories and other rooms for the accommodation of the brotherhood at a cost of £1,700.

The Sheffield City Accountant has prepared a statement showing the cost of the new town hall recently built from Mr. E. W. Mountford's designs. The site, consisting of 6,412 square yards, cost £49,000; the cost of the erection was £110,632 10s. 7d.; and furnishing £22,496 4s. 10d.; total, £182,128 15s. 5d. This is £12,110 15s. 5d. in excess of the amount the corporation have power to borrow for the new town hall, and the city council are recommended to apply to the Local Government Board for their sanction to borrow the balance owing.

The West Riding County Council have, after many delays and disappointments, secured a site for the proposed fourth county lunatic asylum. At their meeting on Wednesday it was decided to buy the Storches Hall Estate, Thurstowland. It comprises 639 acres, of which one-third is woodland, and the price is £43,250.

A lecture-hall and classrooms have just been added to the school buildings at the rear of Well-street Chapel, Coventry, at a cost of £500. Mr. Garlick, of that city, is the builder.

The Board of Trade have, after modification, confirmed an order made by the Light Railway Commissioners, authorising the construction of a light railway between Fountainhall Railway Station and Lauder, in the counties of Mid-Lothian and Berwick.

A committee of the House of Commons have reported the Bill promoted by the Midland Railway Company for the construction of important railway extensions in the West Riding of Yorkshire. The capital authorised for these lines is £2,700,000, with power to borrow a further sum of £700,000. These extensions have now been sanctioned by both Houses. Over thirty miles of line are to be constructed.

Mr. W. O. E. Meade-King, M.I.C.E., on behalf of the Local Government Board, held an inquiry at the Town Hall, Wolverhampton, on Tuesday, with regard to an application by the Corporation for permission to borrow £1,855, for laying out an open space in connection with the partial demolition of the Exchange Hall. The hall was purchased in March last for £2,500, on the understanding that it is to be pulled down to a level with the churchyard for the purpose of a permanent public improvement. It is intended to lay out a public open space on the roof of the vaults of the hall on a level with the churchyard. There will be a pavement of rock asphalt, a balustrade of stone, trees would be planted in tubs, and seats would be provided. It is proposed to utilise the vaults for a cold store and ice factory, to be worked and used by the corporation.

The Bill promoted by the Mersey Docks and Harbour Board, for the construction of the five branch docks and the three new graving docks, and the enlargement and improvement of six of the existing docks, at a cost of £3,562,000, has passed through both Houses of Parliament without opposition.

Archbishop's House, in Vauxhall Bridge-road, the residence of Cardinal Vaughan, has been sold to a firm of builders, and will be demolished to make room for a block of flats. The house is a dingy, gloomy edifice, and without historical association, and was constructed originally as a club-house and library for the Guards. It was purchased by the Roman Catholic community in 1870, and became the residence of the late Cardinal Manning.

### TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the BUILDING NEWS, 332, Strand, W.C., and not to members of the staff by name. Delay is not infrequently otherwise caused. All drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

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Advertisements for the current week must reach the office not later than 3 p.m. on Thursday. Front-page Advertisements and alterations in serial advertisements must reach the office by Tuesday morning to secure insertion.

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### NOTICE.

Bound copies of Vol. LXXXIII. are now ready, and should be ordered early (price Twelve Shillings each), as only a limited number are done up. A few bound volumes of Vols. XXXIX., XL., XLI., XLVI., XLIX., LI., LIII., LVIII., LIX., LXI., LXII., LXIII., LXIV., LXV., LXVI., LXVII., LXVIII., LXIX., LXX., LXXI., LXXII. may still be had, price Twelve Shillings; all the other bound volumes are out of print. Most of the back numbers of former volumes are, however, to be had singly. Subscribers requiring any back numbers to complete volume just ended should order at once, as many of them soon run out of print.

RECEIVED.—S. T. and Co.—F. T.—A. James.—G. P. C.—N. B. and Co.—H. Tudor.—G. Mervyn.—A. Stewart.—C. D. and Co.

"BUILDING NEWS" DESIGNING CLUB.

DRAWINGS RECEIVED.—"Chess," "Pantile," "Oak," "McGilligan."

AN OLD MEMBER. (The farm is the last subject for this session. The work of the Club will recommence after the holidays towards the end of October.)—F. W. F. (You will find the third design for the Home for Waifs and Strays illustrated to-day.)—DON JUAN. (The awards will be announced when the Club reopens.)

## Intercommunication.

### QUESTIONS.

[11981].—**Technical Education Board.**—How can a student or apprentice in an architect's office enter the School of Arts and Crafts, and what are the conditions and fees, and the time the studio opens? I think the classes for practical work, like masonry, woodwork, and leadwork, &c., will be of use to students like myself. Any information will, through your columns, oblige yours—A. G.

[11982].—**Electric Lighting Installation.**—Are there any elementary manuals that will be of use to an architect in specifying for electric-lighting ordinary buildings, wiring and fittings? Please reply in next issue.—SWITCH.

[11983].—**Ironwork.**—Where can an architect go to see the various improvements in fire-grates, rain-water goods, iron casements, and sanitary goods, before specifying goods?—A. L.

[11984].—**Jointing of Stoneware Pipes.**—Will some practical reader inform me of the most secure way of jointing stoneware pipes, and the least expensive way? Is cement jointing not liable to crack?—A. FOREMAN.

[11985].—**Chain at Base of Dome.**—Will someone who has had experience of dome-building give a description of a chain to let into the base of a dome, 20ft. diameter, and oblige—ARCHITECT'S ASSISTANT.

[11986].—**Scantlings.**—Is there any handbook giving the scantlings of timber for joists, rafters, and beams for different spans and loads published? For instance, take a floor 18ft. by 12ft. I want to find the depth and thickness of joists, or, if the floor has two binders, the scantling of



binders, the bridging, and ceiling joists. Calculating according to formulae is troublesome, and takes too much time.—A DRAUGHTSMAN.

### REPLIES.

[11977.]—**Soundproof Walls.**—A wall built hollow with a cavity of 2½ in., say a 9 in. wall and a 4½ in. wall tied together with cramps, and the hollow filled in with some non-conducting material, such as slag-wool, will materially lessen the transmission of sound. A wall of two half-brick thicknesses with a 2 in. cavity tied together would do if the building does not exceed two stories. But in London the L.C.C. would not pass such a wall as a party-wall. In these circumstances the remedy had better be confined to packing the ends of joists with slag-wool, which should not touch the party-wall or floor boarding. The floors themselves might be pugged with mortar and chopped hay, or have a layer of the wool. This would considerably deaden the sound.—G. H. G.

[11980.]—**London Building Regulations.**—The height of walls allowed for single-story buildings one brick thick comes under clause 11 of the first schedule. It provides: "No story inclosed with walls less than 13 in. in thickness shall be more than 10 ft. in height between the floor and the ceiling thereof, or between the floor and the tie of the roof." Safe floor loads for warehouses may be taken at 250 lb. per square foot; for public buildings, 150 to 200 lb. may be taken; and for dwelling-houses, 150 lb. per square foot. I am not aware that the London County Council have fixed any floor-loads for the classes of buildings named; if they have done so, they are published in some recent regulations or by-laws. It would be of service if the municipal authorities of every town published minimum loads per square foot, and scantlings of timbers, as these would be something to work upon. Such data are quite as necessary as the composition of mortar, the thickness of concrete, and other details which are published under the Building Act.—ARCHOS.

### CHIPS.

The Bishop of London has dedicated the new mission premises and Sunday-school of St. Peter's, Regent-square. The buildings have been erected from plans by Sir Arther W. Blomfield, A.R.A.

Mr. G. E. Vint, of Sheffield, assistant-surveyor, Eastern Division, has been appointed, at £90 per year, to the post of surveyor and waterworks manager of Holmfrith District Council.

The Bishop of Aberdeen and Orkney has been presented with a pectoral cross of solid silver gilt, measuring 4½ in. in length. In the centre the Atonement is represented by the figure of Christ on the cross; the whole is enriched with five amethysts, one above the figure and two below, with one on either transept. On the reverse side the Incarnation is represented by the figure of the Blessed Virgin and the Holy Child portrayed in line engraving. Messrs. Singer, of Frome, were the artists employed.

In the case of James Harries Jefford, of Victoria-avenue, Upton Park, E., builder, the order of discharge from bankruptcy has been suspended for three years, ending June 9, 1901.

The death is announced from Marlotte, at the age of 65, of the distinguished landscape painter Allouge, who, with Bernier, was one of the first to reveal the picturesqueness of Brittany, and whose two "Cours de Fusain" made him famous.

In the Stoke district of Ipswich a new Liberal club has just been opened. It faces Austin-street, and contains an assembly-hall 52 ft. by 20 ft., capable of division into three smaller ones. Mr. Edgar Catchpole, of Ipswich, was the builder.

The York City Council have received a report from the town clerk stating that he had received from the Local Government Board sanction to borrow £1,805 for street improvements in Skeldergate, Barker Hill, and Spurrigergate; £354 for the purchase of old cottages in Bootham, and laying out the ground adjoining the Abbey walls; and £5,036 for carrying out improvements in Parliament-street, Heslington-road, South Bank, and other streets.

The church of the Good Shephard at Seaton was recently reopened after internal decorations of the chancel and sanctuary. The illumination was carried out by Messrs. F. Drake and Sons, of The Close, Exeter, from designs by Mr. Vials, A.R.I.B.A., of Crewkerne.

A new Wesleyan chapel in Marlborough-road, St. Alban's, was reopened in last week. The chapel cost £6,800, and has been built from plans by Mr. Gunton.

Mr. Herbert Lees has resigned his position as headmaster of the Carlisle School of Art, and has been appointed by the corporation of that city to the position of consulting art master at Tullie House at a salary of £50 per annum. With the exception of a short interval at Sunderland, Mr. Lees has given the whole of his professional life of over 40 years to Carlisle.

A select committee of the House of Commons have passed the Bill for altering certain local Acts of Parliament, under which the Brighton Intercepting and Outfall Sewers Board seek power to make and maintain certain sewers and works, and to borrow for those purposes sums not exceeding in the whole £127,500.

### PARLIAMENTARY NOTES.

**THE BROOK HOSPITAL, SHOOTER'S HILL.**—Dr. Farquharson asked the President of the Local Government Board on Monday if he had had his attention called to a discrepancy of £70,000 between the estimate of the architect for the Brook Hospital and the final cost of that building; and if he would consent to supply the House with a return showing the actual cost of each of the hospitals of the Metropolitan Hospitals Asylum Board in comparison with the original estimate for the same. Mr. Chaplin.—There is a large discrepancy, amounting to upwards of £60,000, between the estimate of the architect and the cost of the hospital buildings, and the subject is receiving my attention. If the hon. member gives notice of a motion for a return, I will consider the question.

**LONDON COUNTY COUNCIL (GENERAL POWERS) BILL.**—This Bill came on Tuesday before the select committee of the House of Lords. Mr. Freeman, Q.C., described the improvements proposed on Part II. of the Bill by the construction of a new street in continuation of Rotherham-street, Westminster, the widening of York-road, Battersea, and the Albert Embankment, and the reconstruction of the Rosemary Branch-bridge of the Regent's Canal. The only opposition to this part of the Bill was that of the South London Tramways Company. Sir Alexander Binnie, chief engineer of the London County Council, said that all the improvements mentioned in the Bill were very necessary to the public interest. After hearing Mr. Peter Dodd, surveyor of Wandsworth district, the chairman said that a clause would be inserted to protect the railway company. The committee were of opinion that in the case of the watermen and ferryman petitioners the intention of section 32 of the Thames Tunnel (Greenwich to Millwall) Act, 1897, had not been carried out, and desired an undertaking to be given on the part of the London County Council as to compensation. The preamble of the Bill was therefore passed.

The Manchester City Council at its last meeting decided to postpone the consideration of a report of the Chairmen of the Free Libraries and Art Gallery Committees with regard to the question of acquiring the Royal Infirmary site, in Piccadilly, for public purposes. A meeting of the infirmary trustees is shortly to be held, and it was suggested that their attitude on the question might possibly be changed.

The St. Helen's Corporation has been informed that the Local Government Board has sanctioned the borrowing of £17,500 for proposed improved lighting arrangements of the borough. The electric lighting and traction committee have instructed the borough surveyor to prepare plans for the concentration of the whole of the electric plant, both for lighting and traction purposes, at the Boundary-road site.

The Shanklin Urban District Council, at a meeting on Thursday night in last week, unanimously resolved to invite Princess Henry of Battenberg, Governor of the Isle of Wight, to visit Shanklin on or about the 27th inst., to perform the ceremony of opening the new water supply.

Professor Flinders Petrie and those associated with him in the work of Egyptian exploration are exhibiting at the University College, London, such of the antiquities obtained from their excavations at Denderah and Hierakonopolis as the Egyptian authorities have allowed to be taken away after they had exacted their heavy toll for the Ghizeh Museum.

The Lord Mayor of Liverpool has opened, in connection with University College in that city, Ashton Hall, a museum and school of hygiene. The building was presented by the late Mr. George Holt, and remodelled with funds provided by Mrs. and Miss Holt and the Technical Instruction Committee. It contains a well-lighted museum, laboratories, and lecture-room, the latter fitted with an electric arc lamp. The museum rooms are well fitted, and are already stocked with numerous exhibits.

The Basset recreation ground at Camborne was formally presented to the urban district council by the lord of the manor last week. It consists of two large fields at Crase, and will be laid out at a cost of £500 by the council.

An appeal has been made to the Minister of Agriculture for assistance in obtaining a grant for the establishment of a State forest near Edinburgh. It is proposed to improve and develop the courses of instruction in forestry now conducted in Edinburgh by the provision of a State forest within easy access from the city; such a forest, while serving as a model for landed proprietors, agents, and factors throughout the country, and as a station of experiment and research, would also be available for practical training in connection with these courses. It is estimated that a capital expenditure of £40,000, with an annual grant of £500, would suffice to provide the required area.

### WATER SUPPLY AND SANITARY MATTERS.

**HORNSEA.**—The additions which have been made to the waterworks were inaugurated last week. These works were provided in 1879 at a cost of £12,000, but they have long been inadequate, the storage being limited to about a 24 hours' supply. The additions comprise an aëriator, filtering beds, and new reservoirs. By this means, a fortnight's supply will be assured. The water from the existing bore is lifted by a pump to a perforated spreader, 22 ft. above ground, which sends the water in the form of spray to the ledges of an aëriation table. From this it flows down a weir, and is precipitated into two settling tanks, each of which has a capacity of 10,000 gallons. After filtration, the water is conveyed through the distributing mains to the service reservoir, which is 135 ft. long, 5 ft. wide, and about 10 ft. deep, with a capacity of 400,000 gallons. The cost of this improvement has been £2,000. The work has been carried out, from the designs and under the superintendence of Mr. F. Gaskell, surveyor to the urban district council, by Mr. Brumby Robinson, Hull; and Mr. J. E. Holme, Hornsea.

**INSANITARY PROPERTY IN LIVERPOOL.**—A meeting of the insanitary property and artisans' dwellings committee of the Liverpool Corporation was held on Friday, Alderman Bartlett presiding. The chairman announced that the whole of the 900 houses included in the fourteenth presentment had been dealt with by the committee, with the exception of about 90, for which final offers had been made, but not accepted. Those 90 houses were held by nine persons, and the prices to be paid for them were to be fixed by an arbitrator to be appointed by the Local Government Board. The town clerk had been pressing the board to make the appointment so that the work under the presentment might be completed. All the properties about to be arbitrated upon had been carefully valued for the corporation by independent valuers, and, in about six instances in which those valuations had somewhat exceeded the final offers, further offers had been made and accepted. The committee had several times decided, on application from owners of some of the remaining houses for higher prices, not to increase the offers they had made as they were now determined to make a firm stand. The prices paid for the front and back houses which had been purchased had averaged about £37 per house.

The Bakewell Board of Guardians have decided to add to their workhouse buildings a new female infirmary and new female vagrant wards, at an estimated cost of £6,500.

The trustees under the will of Lady Forrester are erecting a convalescent home for Shropshire patients at Llandudno, at a cost of £60,000, including the site.

Mr. F. H. Tulloch, M.I.C.E., has held an inquiry into the application of the Uxbridge Rural District Council for sanction to borrow £13,000 for sewerage and sewage disposal for Eastcote and Northwood.

Mr. H. L. Tacon, of Rotherham, has been appointed architect in connection with an important scheme of alterations and improvements intended to be carried out at the Pattrington Workhouse.

The consecration of All Saints', South Merstham, Surrey, took place on Monday week. During the last four years the population of the parish of Merstham has doubled by the sale of over 160 acres of land for building sites. This new part is about a mile from the parish church, and is divided by two lines of rail—the South Eastern and the new line of the London, Brighton, and South Coast Railway. The foundation-stone of the first part of the church, consisting of east end, two bays of nave, and north and south transepts, with side aisles, was laid by the Princess Frederica on July 6th, 1897, in commemoration of the Queen's reign, and it has now been completed. The architect is Mr. H. Hall, of Doughty-street.

A plain but highly-polished granite tomb has just been placed over the remains of the late Dean Vaughan, in Llandaff Cathedral graveyard. It is a low structure, rising only about 2 ft. from the ground, with convex slab on the top, and bears the inscription, "Chas. John Vaughan, born 1816, died 1897." Lower down the slab is the text in smaller letters, "Not that we loved God, but that He loved us." The memorial is the work of Mr. Clarke, of Llandaff.

The executive committee intrusted with the Robert Louis Stevenson Memorial have now come to a definite decision regarding the form which the commemoration is to take. A fund of about £1,400 has been raised, and it has been decided that a mural monument, with a medallion portrait in high relief and architectural framework, shall be placed in the Moray aisle of St. Giles's Cathedral, Edinburgh. The executive have secured for the execution of the memorial the services of Mr. St. Gaudens, the American sculptor.



## Our Office Table.

THE Select Committee on the Museums of the Science and Art Department came on Tuesday to an important decision relating to the work of the Director for Art, which, under existing arrangements, is divided between the museum and art education of the country. After some discussion, it was agreed to incorporate in the report of the chairman (Sir Francis Powell) a paragraph from the alternative draft prepared by Lord Balcarras, recommending that in future the purchasing functions now exercised by the Director for Art should be confined to the museum director after consultation with the keeper, "who possesses the expert knowledge so necessary in view of the skilful forgery and sophistication of art objects"; the proper functions of the Director for Art being described as the supervision of the art schools and classes, which are increasing annually. By this restriction the committee have placed on record an expression of opinion that, if the art schools and classes are to be effectively guided by the Director for Art it will be necessary to relieve that official of his extensive functions in connection with the four museums; and, in support of this view, they point out that the Director for Science never interferes in purchasing for the science museum, his work being exclusively educational.

THE London County Council considered and adopted on Tuesday the proposals of the Highways Committee for taking over the lines of the London Tramways Company, the suggestion of the committee being that after the property had been acquired, the lines should be worked by the L.C.C. This will involve a loan of £800,000. A discussion took place on the exemption of places of worship from charges for the paving of new streets. It was decided *nem. con.* to instruct the Parliamentary and the Local Government and Taxation Committees to prepare and submit to the Council a Bill to be introduced in the forthcoming session of Parliament whereby owners of ground values in London can be called upon to contribute directly towards the local taxation of the county.

FOR the purposes of the Building Act the district of Fulham (hitherto comprising the whole of the parish of Fulham) has been divided by the L.C.C. into two districts—viz., North Fulham, comprising that part of the parish lying to the north of Fulham-road and High-street, Fulham, down to Putney Bridge; and South Fulham, comprising that part of the parish lying south of the above roads. At a meeting of the County Council on the 5th inst. the Council appointed Mr. Stanley F. Monier Williams, A.R.I.B.A., F.S.I., district surveyor for South Fulham, and Mr. Frederick W. Hamilton, A.R.I.B.A., district surveyor for North Fulham.

THE annual distribution of prizes at King's College, London, took place on the 6th inst., the Right Hon. James Lowther, M.P., in the chair. In architecture and building construction silver medals and prizes were awarded to Mr. W. H. Wright and Mr. Gilbert Henry Lovegrove (the latter gaining the Mathematical Scholarship and a prize), the Engineering Society's prizes going to Messrs. Minnitt and Summers, and the Tennant Prizes for Geology to Mr. G. H. Lovegrove, and for Mineralogy to Messrs. E. A. Beldam and L. C. Burton. The proceedings were attended by a large number, for whose amusement there were interesting exhibits, drawings, music, &c.

TO restore to their original appearance antique pieces of furniture which have become unsightly on account of too frequent varnishing or be-smearing by unskilled hands, the following method may be employed:—Take equal parts of strong alcohol and good oil of turpentine, and heat this mixture in a bottle by placing it in hot water. With this warm liquid paint the article, whereupon the old varnish will dissolve at once. The varnish is removed by scraping and wiping, and the spreading, scraping, and cleaning is repeated as often as necessary until the surface has become entirely clean again, so that the object may be rendered glossy or dull as desired. This process is especially recommended, since it does not change or attack the colour of the wood, as is often the case if lye is used.

THE Public Control Committee of the London County Council have received a letter from the departmental committee of the Home Office which is considering the questions of the manufacture

and supply of water-gas, asking for the opinion of the Council on the subject. The Public Control Committee now report that, having considered the matter, they have come to the following conclusions, which they have communicated to the departmental committee:—(1) That considerable danger arises from the introduction of water-gas in the process of the enrichment of coal-gas; (2) that non-carburetted and non-odorised water gas should not be allowed to be used under any conditions, since it is devoid of smell which would give warning of any escape of the gas; (3) that 25 per cent. should be the maximum amount of water-gas allowed to be introduced in the enrichment of coal-gas, the proportion of water-gas being ascertained by determining the amount of carbonic oxide in the enriched coal-gas (coal-gas enriched to this extent would correspond in poisonous character to the Dowson gas which is already in use for heating purposes and for gas-engines, and would exclude the use of carburetted water-gas); (4) that when it is proposed to supply poisonous enriched gas to houses and the interior of buildings a proper inspection be made of the service-pipes by a responsible officer appointed by the local or other suitable authority, who should certify that the pipes are in a sound condition and that there is no escape of gas, and that the cost of such inspection be borne by the gas company.

MR. CHAPMAN, British Consul-General at Florence, describes in his last report the recent improvements and alterations in the chief Florentine art galleries and museums. At the Uffizi, the decoration of the Niobe Room has been restored, and old tapestry substituted for the paintings, while the jewelry room has been entirely rearranged. Two new rooms have been opened for sketches, pastels, and miniatures, but the most important improvement is the new arrangement this year, in four new rooms, of the collection of portraits of painters, which are disposed chronologically, and at the same time according to nationality. In consequence of the opening of these rooms a double staircase leading from the first to the upper floor has been built, so as to render the access to the vestibule more imposing. The reliefs of the Rapace Salustre formerly kept there have been removed and replaced by four tapestry hangings, the reliefs being placed with the collection of busts of Florentine princes, in the Hermaphrodite Room. In the Ancient and Modern Gallery, three rooms have been added—one called the Perugino, after a large picture of the Assumption by that master, and the other two taking their name from Botticelli, several of whose pictures they contain. The large room has been divided into three, where the works of the chief Tuscan painters from the 13th to the 18th centuries have been arranged and classified. A new staircase leading to the Palatina Gallery has been built in the Palazzo Pitti from the designs of the late Professor del Moro, the architect who superintended the building of the façade of the cathedral. There has been discovered this year in the Ognissanti Church a fresco representing a crucifixion below and Virgin above stretching her hand over some figures, who are said to represent Amerigo Vespucci and his family.

THE annual excursion of the society known as the "Quatuor Coronati" was this year in the Yorkshire locality. On the first day the Dean kindly conducted the party over the cathedral, and Mr. J. Bowman Whytehead, clerk to the Chapter, conducted for the rest of the day to the York Abbey ruins, the museum, the city gates, the Merchant Vintners' Hall, and to inspect the city plate at the Mansion House. The second day was devoted to Byland Abbey, Helmsley Castle, and Rievaulx Abbey, the drive over the Yorkshire Wolds in some open carriages being much appreciated by the fifty who took part. Among the London contingent we noticed Dr. Wynn Westcott, Dr. Charters White, Mr. F. A. Powell, Mr. Henry Lovegrove, Mr. W. F. Busbridge, Dr. Mickley, Mr. G. W. Speth, Mr. Sydney Klein (the well-known scientist), Mr. J. J. Thomas, Mr. R. Honendon, Mr. J. W. Stevens, and others.

AT the annual conference of the Association of Municipal and County Engineers, held at the Royal Hotel, Edinburgh, Mr. Claude O. Robson, of Willesden, presiding, Mr. Duncan Cameron, city surveyor of Exeter, the inventor of the septic tank system of sewage treatment, read a paper on the subject. After one year and ten months' working at Exeter, he said, and

dealing with a flow averaging 540,000 gallons per day, the tank showed no signs of requiring the removal of the deposit, and he was watching how long it would be before any of it had to be removed, as he proposed to work it to its utmost limit. One of the most notable points observed in the Exeter tank had been the hitherto unrecognised energy stored in sewage as evidenced by the production of marsh gas. The works and public paths adjoining at Exeter had been lit with the gas and incandescent mantles. He had not had more than ten such lights burning at one time; but it was apparent, even under the conditions of leakage existing, that more than twice this number could be kept constantly alight, and this estimate was made during the cold, wet weather of last winter. The gas was innocuous, and could only be detected ordinarily by applying a light.

LAYING pipes under lawns without excavating is described by W. M. Parker, of San Francisco, Cal., in the *American Gas-Light Journal*. The apparatus employed is very simple, consisting merely of a light iron-plate frame, with attachments for a vertical water-pressure pipe that has a horizontal branch connected through a swivel with the line to be driven under the surface. A short section of the end of this pipe is inclosed between two bearings on the framework, and is provided with ratchets for revolving it on its axis. Any kind of a feeding device may be applied, and the end of the pipe terminates in an auger or bit. Short sections of pipe can be successively inserted at the ratchet end, and quite a length of pipe driven underground by the combined action of the pressure feed and the auger head with its central water-jet.

SO far this year the exports of slate from the United States have, says the *American Contractor*, been double those of 1897, and as there has been no change in price, the only explanation left is that the American slates are becoming more and more popular. Indications are that the ratio of increase will be maintained throughout the year. The growth of the trade has come entirely from sales in Great Britain, 90 per cent. of the exports in 1897 having gone to that country. Australia also is a good customer of this product, taking 8 per cent. Of the 2 per cent. left, Canada took nearly all. The slate men attribute the remarkable growth in this export business which has grown up almost entirely in the last three years to their alertness in cultivating opportunities as they arise, the chief one having been the long strike of the Welsh quarrymen, when their men stepped in to fill the breach with American slate.

### CHIPS.

AT Axminster, the tower of the parish church is being restored at a cost of £1,000, and a new roof of lead, carried on oak beams, is also being put over the chancel.

A Committee of the House of Lords have passed the Bill authorising the Corporation of Coventry to borrow £250,000 for the construction of additional gasworks, and also a Bill empowering the Middlesbrough Corporation to borrow £150,000 for the purpose of enlarging their present gasworks. These two Bills have already been passed by the House of Commons.

THE Earl of Rosebery has presented to the inhabitants of Queensferry a large piece of land to the east of Kirkliston-road, to be used as a public recreation ground, under the control and management of the local parish council.

TEN persons were killed on Tuesday by an explosion of gas in a tunnel in course of construction under Lake Erie, in connection with the Cleveland (Ohio) Waterworks.

THE question of the class of workmen's dwellings to be erected on the land in Milk-street, Birmingham, which was cleared by the corporation of that city some time ago, was considered on Tuesday by the joint committee, composed of members of the Improvement and Health Committees. The plans were approved, and it was decided that a report should be presented at the next council meeting, recommending the approval of the plans prepared by Mr. Tart, the manager of the Improvement Department. The rent of the houses will work out at an average of about 1s. 6d. per room.

THE Southampton Town Council having applied to the Local Government Board for sanction to borrow £2,500 for technical instruction purposes, the board sent down Colonel A. G. Durnford, R.E., who held an inquiry at the municipal offices on Thursday in last week into the subject matter. Mr. Gutteridge, of Southampton, the architect, explained the plans.



## MEETINGS FOR THE ENSUING WEEK.

SATURDAY (TO-MORROW).—Architectural Association. Visit to Swakeley's, near Uxbridge, by permission of Mr. H. J. Barrett. Train from Paddington Station, 2.25 p.m.

St. Paul's Ecclesiastical Society. Visit to Horsham, in company with the Lewisham Antiquarian Society. London Bridge Station (L.B. and S.C.R.) 2 p.m.

## CHIPS.

The town council of Wednesbury have raised the salary of the borough surveyor by £25 a year.

At Tuesday's meeting of the town council for Newport, Mon., the engineer for the waterworks, Mr. Baldwin Latham, of London, reported with reference to the new works at Wentwood that the aqueduct with iron pipes provided for in the original plans, and which he estimated to cost £50,332, would be substituted for one constructed of brickwork, which he estimated to cost £37,420, and which would also yield a million gallons of water a day more.

St. Paul's Church, Bury, Lancs, is being restored internally, from plans by Messrs. Paley and Austin of Lancaster. The side galleries have been removed, the roof of nave repaired, and new choir-stalls and a font are to be erected. The churchyard also has been resealed and planted with trees.

During the past few weeks extensive alterations have been made on the roof of the large hall of Carrubber's Close Mission, Edinburgh, which was reopened on Saturday. The alterations carried out have transformed one of the dingiest of meeting places into one of the brightest of the city's halls. In the centre of the roof six large panelled roof lights have been introduced, and in the side galleries the under-framing with coloured and obscured glass of eight large cupolas has been removed. The electric light has been introduced, and the ventilation improved. The alterations have been carried out under the direction of Mr. Robert Wilson, architect, 2, Queen-street, Edinburgh.

Mr. William Walden, of Boscombe, has been elected highway surveyor in the Christchurch Rural District, at a salary of £130 a year.

Fifty thousand marks have been collected for a monument to the father of the Empress of Germany, the late Duke Frederick of Schleswig-Holstein, and three sculptors of that province have been requested to compete. The Duke is to be represented in *mufti*, as the Schleswig-Holsteiners knew him.

Mr. H. P. Bulnois, C.E., engineering inspector of the Local Government Board, attended at the Castleton Urban District Council Offices on Wednesday week, to make inquiries respecting the council's application to borrow £2,250 to pay for additional land required for sewage disposal works. Mr. Clayton (principal assistant to Mr. J. Diggle, the engineer for the sewage works scheme) explained the plans and proposals.

The Barton Regis Board of Guardians have sealed an agreement for the purchase of land at Westbury-on-Trym suitable for the erection of the new workhouse. The plot, which is 7½ acres in extent, is situated in the Southmead district of Westbury-on-Trym, and the price agreed on is £2,000.

The foundation-stone of the new art gallery and free library at Bury, Lancs, will shortly be laid by Mr. Oswald Wrigley, one of the donors of the Wrigley collection of art treasures. The building will be erected by the corporation at a cost of about £13,000. The architects are Messrs. Woodhouse and Willoughby, and the contractors Messrs. Thompson and Brierley. It has been decided to substitute hard Wiltshire stone for the red sandstone originally specified for the elevation, at an additional cost of over £1,000.

The hospital recently erected in connection with the Hawkhead Asylum of the Govan District Lunacy Board was formally opened on Friday. The site of the hospital is to the east of the asylum, and it includes sections for the treatment of recent and acute cases, infectious cases, and sick and infirm cases. There are separate rooms for each patient, and accommodation is provided for 144 altogether. With the erection of the hospital the asylum buildings are now complete, the work of construction having been going on since 1891.

On the summit of the Higher Cross Stone Farm, near Todmorden, a party of archaeologists have found a burial place of the Neolithic age. In an earth circle, about 30yds. in diameter, they discovered no less than seven urns, some of them containing charcoal and calcined bones. The urns were buried not far under the surface of the earth. A central urn is larger and more elaborate than the others, and has a device worked upon it with great skill. Most of the urns have fish-bone impressions made upon them. Close to one or two small incense cups were found. Three of the urns were got up almost intact, and these and the two incense cups were removed to Todmorden Free Library.

## Trade News.

## WAGES MOVEMENTS.

BRISTOL.—We are glad to hear that the intervention of the Board of Trade in the Bristol building trade dispute has been successful. Mr. Alfred A. Hudson, Q.C., who was sent down as conciliator, held a court of inquiry at the offices of the Chamber of Commerce at Bristol, on Tuesday, and, after hearing representatives of the Master Builders' Association and of the federated trade, succeeded in effecting a compromise.

HAWICK.—The master masons of Hawick have agreed to the demand by the men for 9d. per hour. The employers refuse to have weekly instead of fortnightly pay-days. The other point still in dispute has reference to walking time and special conditions in regard to work at a distance. The strike still continues.

LANCASHIRE.—The dispute in the Lancashire building trade culminated on Saturday in a general lock-out throughout the county. The difficulty originated in Bolton and other towns. The operative masons asked for a reduction of hours and for increased pay, some also objecting to working stone dressed abroad. They served notices on the employers, and the masters retaliated by serving notices upon the men, intimating that their engagements would terminate on Saturday. All operative masons throughout Lancashire ceased work on Monday.

NOTTINGHAM.—It has been reported at the headquarters of the bricklayers' labourers in Nottingham that more men have been signed on this week, and that work is constantly being resumed, though slowly. A general meeting was held at the assembly rooms on Monday evening, when some correspondence, which has taken place between the men's officials and the Master Builders' Association, was considered. Several speeches were delivered, and a motion was unanimously agreed to, reaffirming the original resolution, so that the strike will be continued.

SWANSEA.—The strike of operative masons at Swansea, which has lasted ten weeks, terminated on Monday, the workmen having agreed to accept the masters' offer of an advance from 8d. to 8½d. per hour, instead of 9d. demanded.

The Nurses' Home, Ashton-on-Mersey, near Manchester, which has been erected from the designs of Messrs. Whitelegg and Whittaker, architects, of Brazenose-street, Manchester, at a cost of about £1,000, was formally opened on Saturday last. This institute contains two wards (each for two patients) on the first floor and an accident ward on the ground floor, with accommodation for the nurses. It is built in the half-timber style, with tiled roof, and immediately adjoins the St. Mary's Schools, which were designed by the same architects and opened a short time ago. Mr. John E. Dean, of Ashton-on-Mersey, was the builder.

The tall chimney shaft at the Edinburgh gas-works, 330ft. high, having a cap weighing 30 tons, is to be demolished, and the work of removing this well-known landmark in the valley as seen from Prince's-street and the neighbouring hills, has been intrusted to Mr. W. J. Furse, of Nottingham.

The Earl of Rosebery unveiled a memorial to Edmund Burke, placed in the parish church of St. Mary and All Saints, Beaconsfield, on Saturday. The place given it is about the centre of the wall in the north aisle. In design it is a tablet. The head, carved in Derbyshire alabaster, is copied from the portrait by Sir Joshua Reynolds, painted in 1775, and now in the National Portrait Gallery, the inscription being—"Edmund Burke, Patriot, Orator, Statesman, lived at Butler's Court, formerly Gregories, in this parish, 1769 to 1797. This memorial, placed here by public subscription, records the undying honour in which his name is held.—July 9, 1898." The design was drawn by Messrs. Bucknall and Comper, of Old Queen-street, Westminster; the sculptor of the head was Mr. Alfred Drury; the entire work was carried out by Messrs. McCulloch, of Magee-street, Kennington-park; the decoration by Mr. Bernard Smith.

The Keighley School Board decided on Monday to invite from six architects competitive plans for the new Ingrow-lane Board School.

Colonel L. V. Loyd has just presented to Wolvey Parish Church a brass eagle lectern. In addition, Colonel Loyd has had the chancel walls stripped of the ugly plaster, and the stonework pointed. The high-backed and uncomfortable pews are being altered at his expense. He is collecting funds for the restoration of the church.

The contracts for the proposed new Constitutional Club buildings at Farley have been let, and secured by local contractors. The estimated cost of the building and site is upwards of £2,000.

## LATEST PRICES.

## IRON, &amp;c.

	Per ton.	Per ton.
Rolled-Iron Joists, Belgian.....	£6 0 0 to	£6 10 0
Rolled-Steel Joists, English.....	6 10 0 "	7 0 0
Wrought-Iron Girder Plates.....	5 15 0 "	6 10 0
Bar Iron, good Staffs.....	7 0 0 "	8 0 0
Do., Lowmoor, Flat, Round, or Square.....	17 0 0 "	17 5 0
Do., Welsh.....	5 15 0 "	5 17 6
Boiler Plates, Iron—		
South Staffs.....	7 17 6 "	8 5 0
Best Snedshill.....	10 0 0 "	10 10 0
Angles 10s., Tees 20s. per ton extra.		
Builders' Hoop Iron, for bonding, &c., £8 15s.		
Builders' Hoop Iron, galvanised, £15 10s. 0d. per ton.		
Galvanised Corrugated Sheet Iron—		
No. 18 to 20. No.		
6ft. to 8ft. long, inclusive gauge.....	£10 15 0 "	£11 0 0
Best ditto.....	11 5 0 "	11 10 0
Cast-Iron Columns.....	£8 0 0 to	£8 10 0
Cast-Iron Stanchions.....	6 0 0 "	8 10 0
Rolled-Iron Fencing Wire.....	7 0 0 "	8 0 0
Rolled-Steel Fencing Wire.....	7 0 0 "	7 10 0
" Galvanised.....	10 10 0 "	11 10 0
Cast-Iron Sash Weights.....	4 0 0 "	4 2 0
Cut Clasp Nails, Sin. to 6in.....	8 15 0 "	9 15 0
Cut Floor Brads.....	8 10 0 "	9 10 0
Wire Nails (Points de Paris)—		
0 to 7 8 9 10 11 12 13 14 15 B.W.G.		
8/8 9/0 9/8 10/8 11/0 12/0 13/0 14/9 16/9 per cwt.		
Cast-Iron Socket Pipes—		
Sin. diameter.....	£5 10 0 "	£5 15 0
4in. to 6in.....	5 5 0 "	5 10 0
7in. to 24in. (all sizes).....	4 15 0 "	5 0 0
[Coated with composition, 2s. 6d. per ton extra; turned and bored joints, 5s. per ton extra.]		
Pig Iron—		
Cold Blast, Lilleshall.....	106s. to 110s.	
Hot Blast, ditto.....	57s. 6d. to 62s. 6d.	
Wrought-Iron Tubes—Discount off Standard Lists f.o.b.		
Gas-Tubes.....	75p.c. Fittings 77p.c.	
Water-Tubes.....	70 "	72s
Steam-Tubes.....	62s "	63s
Galvanised Gas-Tubes.....	60 "	62s
Galvanised Water-Tubes.....	55 "	57s
Galvanised Steam-Tubes.....	45 "	47s
10cwt. casks. 5cwt. casks.		
Sheet Zinc, for roofing and work- ing up.....	£22 10 0 to	£23 10 0
Sheet Lead, 8lb. per sq. ft. super.	15 5 0 "	16 5 0
Pig Lead, in lwt. pigs.....	14 10 0 "	15 0 0
Lead Shot, in 28lb. bags.....	17 10 0 "	18 10 0
Copper Sheets, sheathing and rods.....	60 10 0 "	61 10 0
Copper, British Cake and Ingots.....	51 15 0 "	52 15 0
Tin, Straits.....	72 12 6 "	73 12 6
Do., English Ingots.....	75 10 0 "	76 10 0
Spelter, Silesian.....	18 0 0 "	19 0 0

## TIMBER.

Teak, Burmah.....per load	£13 0 0 to	£14 5 0
" Bangkok.....	9 5 0 "	10 5 0
Quebec pine, yellow.....	2 18 0 "	4 18 0
" Oak.....	3 15 0 "	5 0 0
" Birch.....	3 0 0 "	4 13 0
" Elm.....	4 3 0 "	5 3 0
" Ash.....	3 18 0 "	5 3 0
Danitic and Memel Oak.....	2 0 0 "	3 0 0
Fir.....	2 13 0 "	4 3 0
Wainscot, Riga p. log.....	4 18 0 "	5 18 0
Lath, Danitic, p.f.....	4 10 0 "	5 10 0
St. Petersburg.....	5 0 0 "	6 10 0
Greenheart.....	8 0 0 "	8 10 0
Box.....	4 0 0 "	15 0 0
Sequoia, U.S.A. ....per cube foot	0 1 8 "	0 1 10
Mahogany, Cuba, per super foot		
1in. thick.....	0 0 5 "	0 0 6
" Honduras.....	0 0 4 1/2 "	0 0 5
" Mexican.....	0 0 4 "	0 0 5
Cedar, Cuba.....	0 0 4 "	0 0 4
" Honduras.....	0 0 3 1/2 "	0 0 4
Satinwood.....	0 0 5 "	0 1 0
Walnut, Italian.....	0 0 3 "	0 0 7
Deals, per St. Petersburg Standard, 120—12ft. by 1 1/2in. by 1 1/2in.:		
Quebec, Pine, 1st.....	£18 15 0 to	£21 15 0
" 2nd.....	13 5 0 "	15 15 0
" 3rd.....	6 15 0 "	9 5 0
Canada Spruce, 1st.....	10 15 0 "	12 5 0
" 2nd and 3rd.....	8 5 0 "	9 5 0
New Brunswick.....	7 5 0 "	8 15 0
Riga.....	9 5 0 "	13 5 0
St. Petersburg.....	9 15 0 "	16 5 0
Swedish.....	8 15 0 "	16 5 0
Finland.....	9 15 0 "	16 5 0
White Sea.....	5 0 0 "	18 0 0
Battens, all sorts.....		
Flooring Boards, per square of lin.:		
1st prepared.....	£0 9 6 "	£0 17 8
2nd ditto.....	0 8 0 "	0 13 8
Other qualities.....	0 6 3 "	0 7 0
Staves, per standard M.:		
Quebec pipe.....		
U.S. ditto.....	£35 0 0 "	£42 10 0
Memel, cr. pipe.....	220 0 0 "	230 0 0
Memel, brack.....	190 0 0 "	200 0 0

## OILS.

Linseed.....per ton.	£16 12 6 to	£17 2 6
Rapeseed, English pale.....	23 10 0 "	23 15 0
Do., brown.....	22 0 0 "	22 5 0
Cottonseed, refined.....	15 15 0 "	16 5 0
Olive, Spanish.....	32 10 0 "	33 0 0
Seal, pale.....	30 0 0 "	30 5 0
Cocunut, Cochinchina.....	29 0 0 "	29 10 0
Do., Ceylon.....	24 5 0 "	24 10 0
Palm, Lagos.....	23 10 0 "	24 0 0
Oleum.....	18 15 0 "	19 15 0
Lubricating U.S.....per gal.	0 6 3 "	0 7 4
Petroleum, refined.....	0 0 4 1/2 "	0 0 4
Tar, Stockholm.....per barrel	1 0 0 "	1 5 0
Do., Archangel.....	0 12 6 "	0 15 0
Turpentine, American.....per ton	23 15 0 "	24 0 0



# THE BUILDING NEWS

## AND ENGINEERING JOURNAL.

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FRIDAY, JULY 22, 1898.

### SPECIAL SERVICES.

A LARGE number of miscellaneous duties, more or less intimately allied to architecture, that may be described as occupying the borderland between estate agency and building, sometimes fall to the architect. These unrelated services are the heritage of modern requirements and professional architecture. The old master builders and art craftsmen knew nothing whatever about such things as quantities, procuring tenders, interviews about easements of light and support, making plans for laying out estates, letting plots, taking levels for roads and sewers, obtaining sanction of local authorities, examining and passing accounts. These are matters which have come into existence during the last century, due to the enlargement of the boundaries of professional practice. The modern practitioner cannot afford to exclude them, for they materially add to his emoluments, being of frequent requisition. The increase of specialism in architecture, or the relegation of particular branches to a few practitioners, has made it more necessary for the younger men in the profession to go in for these duties. Estate planning and agency opens a large and sometimes lucrative field. The development of new estates near our large towns is of frequent occurrence. It is not a class of work always congenial to the educated architect; but it is one he has a rightful claim to enter into. There is a great temptation to make building a commercial rather than an artistic matter, to produce designs that will captivate the ordinary builder or speculator. At present we cannot see any higher incentive to work of this description. The architect, however, has a better opportunity of raising the standard of house-building than the speculative builder whose building estates about London and our large towns are deplorable.

Our chief object is here to refer to the remuneration of architects for services of this kind. Generally these have been by agreement with the freeholder or leaseholder of land, and vary in most cases. We have known several instances in which an architect or surveyor has at his own cost made plans of estates, showing how they can be laid out, trusting to fortune to recoup him. A local auctioneer or estate agent will sometimes employ a draughtsman to prepare a bird's-eye view of an eligible estate, showing winding roads amongst trees and lakes, dotted about with ornate villas of various designs. The idea takes; the highly-coloured design is hung up in the window of the estate agent, and exposed to view at various shops and railway stations. The plots are built upon, but the buildings fall far short of the expectations of purchasers. The woodland aspect of the estate disappears, the lake and open recreation spaces are covered with villas of a very indifferent kind, and the buyers of plots are disgusted. Things might have been different if the plan had been adhered to; if a properly-prepared plan had been made from an accurate survey, and if the landowner had laid out the roads and plots himself and required every lessee to build a house according to a design previously agreed upon, or in accordance with the plans and specifications prepared by the freeholder or his surveyor. But the fact is simply this: the freeholder or landlord wants his land covered over at the cheapest rate, and the employment of an architect to set out the estate and plan the roads and build-

ings is too costly. The Revised Schedule of the Institute does not lay down any definite rate for making a plan of an estate, laying it out and arranging for building upon it, except that the charge is to be "regulated by the time, skill, and trouble involved." No doubt these are the only reliable factors—the time employed is indeed the main criterion of the trouble or skill involved. In future, however, the professional man actually engaged in setting-out roads, taking levels, and preparing the drawings for roads and sewers, and obtaining the sanction of local authorities, will, if he is justified in referring to the new schedule, be able to charge 2 per cent. on the estimated cost, and an additional 4 per cent. on the cost of work executed for making working drawings and specifications of roads and sewers, obtaining tenders and superintending works, valuing extras, &c., making in all 6 per cent. for the constructive work—a remuneration by no means excessive in the case of a small estate. For the preliminary setting-out roads and making drawings from levels for roads and sewers, 2 per cent. is indeed small, and insufficient for some kinds of estate, especially where the levels are laborious to take and the sewerage complicated; and we are inclined to think a better division would have been 3 per cent. for this and 3 or 4 per cent. for working drawings and specifications. Another duty is letting the plots, and for this the old charge is retained—namely, a sum not exceeding a whole year's ground rent in ordinary cases. For approving plans submitted by lessees, and for inspecting buildings during their progress to insure that they fulfil the conditions of lease, certifying for same, the charge is fixed at 1½ per cent. up to £5,000, and above that by special arrangement. This is the customary subdivision of percentage.

Valuations of property form an important special service, and the charges for these are determined by scale: 1 per cent. on the first £1,000, thence to £10,000 ½ per cent., and above that amount ¼ per cent. Valuations for mortgage is a common duty of the architectural practitioner. Here a minimum charge of two or three guineas is usual, unless by agreement, and if an advance is not made, one-third of the above scale is charged. Dilapidations are variously charged, the revised schedule fixing 5 per cent. on the estimate; but the charge in no case is less than two guineas. Reports on buildings, inspection of sanitary work, and advising are other incidental services not easily assessed, and are generally paid for by the time taken or trouble incurred; but in all such cases the fees should be based on some scale having reference to the importance of the business.

### EYE AND HAND TRAINING.

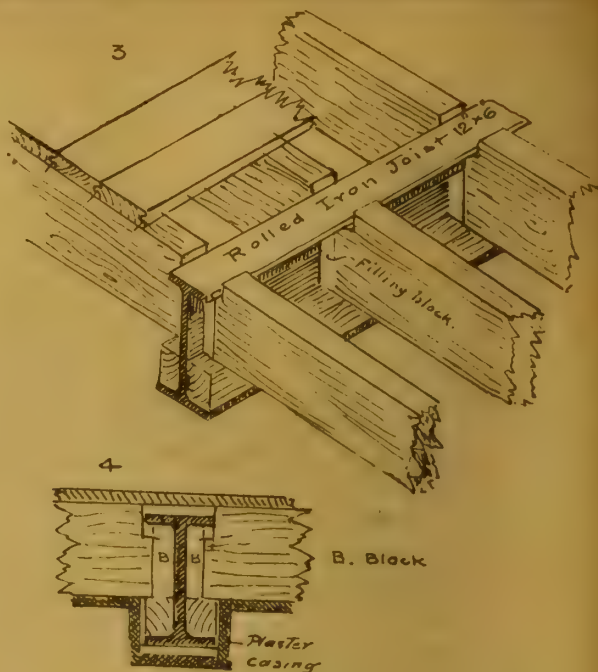
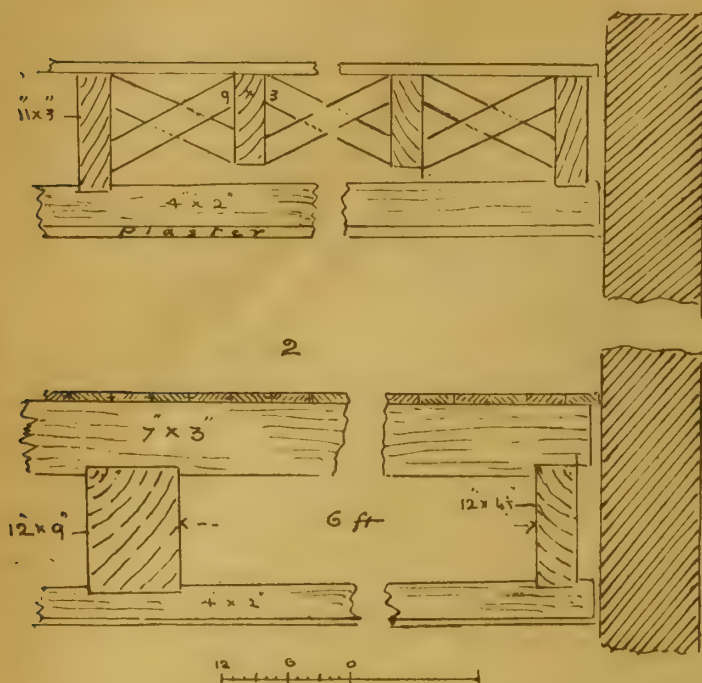
THE annual exhibition of the work contributed by the board schools of all parts of London recently on view at the Hugh Myddelton School, St. James's-walk, Clerkenwell Green, is of general interest for several reasons, as showing methods of instruction in the training of hand and eye, which are based on rational and physical laws; as indicating how much can be made both interesting and instructive in the development of this important function of education. The three upper floors of the school are filled with exhibits, from the elementary conceptions of the infant mind as seen in the wonderful variety of object-lessons and clay models of flowers, animals, and other objects, to applied design, monochrome decoration, and modelling in clay. Lord Reay, who opened the exhibition, said truly that improvement was shown in several sections. The earlier exhibitions we have seen were crude and often amusing attempts at expressing the natural instinct of art. In the present display we find several very clever essays in

adapted design by the art classes, such as frieze ornaments, designs for tiles, vases, silk hangings, &c. We see, for instance, a well thought out frieze ornament, flatly treated, by D. Blakey; an original design for a vase by Herbert Haskell; a plaque by Edward Dring; an original design for 6in. tiles by Grimsdale; a very beautiful and delicate design in green and gold for a silk hanging, by a girl pupil from Lavender-hill School, and several clever stencil designs for friezes and decorative designs in monochrome. One frieze (stencil design) was composed of a series of sailing boats just indicating the form and motion of each vessel, and very effective. The designs suitable for panels and house decoration are a feature. We may here refer to the system of memory drawing: getting the pupil to draw on brown paper in white chalk simple elements of design, such as a few curves or straight lines, and then to try and make some elementary ornament out of them. Hundreds of these brown-paper sketches are to be seen, from a few simple curves to geometrical and natural combinations of form. In this way the pupil who has any aptitude in composing or combining soon learns to draw ornament, and several very meritorious specimens are on view, suitable for panels, wall-paper designs, dadoes, and friezes. Standard IV. is doing useful work. The designs are drawn by the pupil with a brush without any outline, and many of the specimens adopted from plant life are wonderfully decorative. The modelling in clay shows a new departure in this class of work. A plant is first modelled from nature, and then the pupil adapts it to ornament in clay. We believe much may be expected from modelling as a means of training the eye and artistic instinct, and this kind of work has been very much neglected in our schools. Both modelling in clay and cardboard are encouraged by the Board schools. The former develops the sense of form, light, and shade in the abstract, valuable for all engaged in carving, cast and wrought ironwork, sculpture, &c.; while the modelling in cardboard is useful as an auxiliary to the constructor in wood, to the craftsmen engaged in carpentry, masonry, and metal-work. The study of solids and planes is greatly helped by its means—so long as the modelling is confined to constructive and geometrical exercises, and is not allowed to pander to the craze for mere imitation. Several very good specimens are shown, and we believe the board of inspectors have recommended that cardboard modelling should be taught in Standard IV., as an excellent preparation to manual training in wood and metal-work.

Another very interesting experiment in teaching the infant mind has been carried out under the supervision of the lady teacher of the infant classes, and the numerous exhibits in the different stages of children's work on the Kindergarten system are worth attention. The children, who are quite infants, are allowed to combine play with the exercise of the imagination, for which purpose they have pieces of string or cord given them, which they bend and arrange on paper to represent different outlines. Several of these attempts show loops representing bowls, mugs with handles, vase-like outlines. This kind of "string" exercise or "laying," as it is called, is a source of amusement and instruction; the forms are fixed by gum to the cardboard. Threading beads, arranging sticks and rings are other modes employed, and is really teaching art in the concrete. Some of the work of the five-year-old children show the interest they take in imitating leaf forms, flowers, ships, natural history, and geographical subjects. The life of a bee, the history of a loaf of bread, showing every stage in the construction of beehives and the making of bread are subjects which seem to attract attention, and awaken the



Fig. 1



infantile imagination. The specimens of the flower-painting and the brush-work show how these systems of teaching form are helpful in bringing out the latent art faculty of the child, and training the hand and eye for the various applications of art. We have not referred to the woodwork exhibits. These are mainly in the form of chess-boards, trays, brackets, racks for letters, plate-boxes, inlaid work, showing considerable manual skill. Models also are shown illustrating the graduated exercises adopted in manual training, from simple groove-making in wood to planing and framed work. In awarding the prizes in this branch, the judges had some difficulty, owing to the general excellence of the work. The wood-carving is also of much merit. The evening continuation schools have sent capital specimens, and we may, in conclusion, draw attention to the screw-cutting and making. The needlework turned out from the evening Continuation Schools was very encouraging, also the work from schools for the deaf and blind. On the whole, there is still perhaps a little too much reliance on the imitative processes and simple copying, and the advice we have given before is still necessary. Let a definite end or some practical purpose be kept in view.

#### THE NEW GOVERNMENT BUILDINGS.

WE were enabled some two months since to publish the names of the gentlemen chosen by the Council of the Royal Institute of British Architects, at the request of the Government, as a list of eight architects specially qualified to design the new War Office and Parliament-street buildings for the combined departments of the Board of Trade, the Education Department, and the Local Government Board Offices. We gave the names without comment, beyond remarking that the selection had been made with a view to securing suitable buildings in a Classic style. While admitting, however, the difficulty of naming eight architects whose reputation in this respect was beyond question for the particular works contemplated, we felt how singularly inadequate these nominations really were, the omissions being even more remarkable than the inclusions of some names which, in our judgment, had very little to recommend them. We

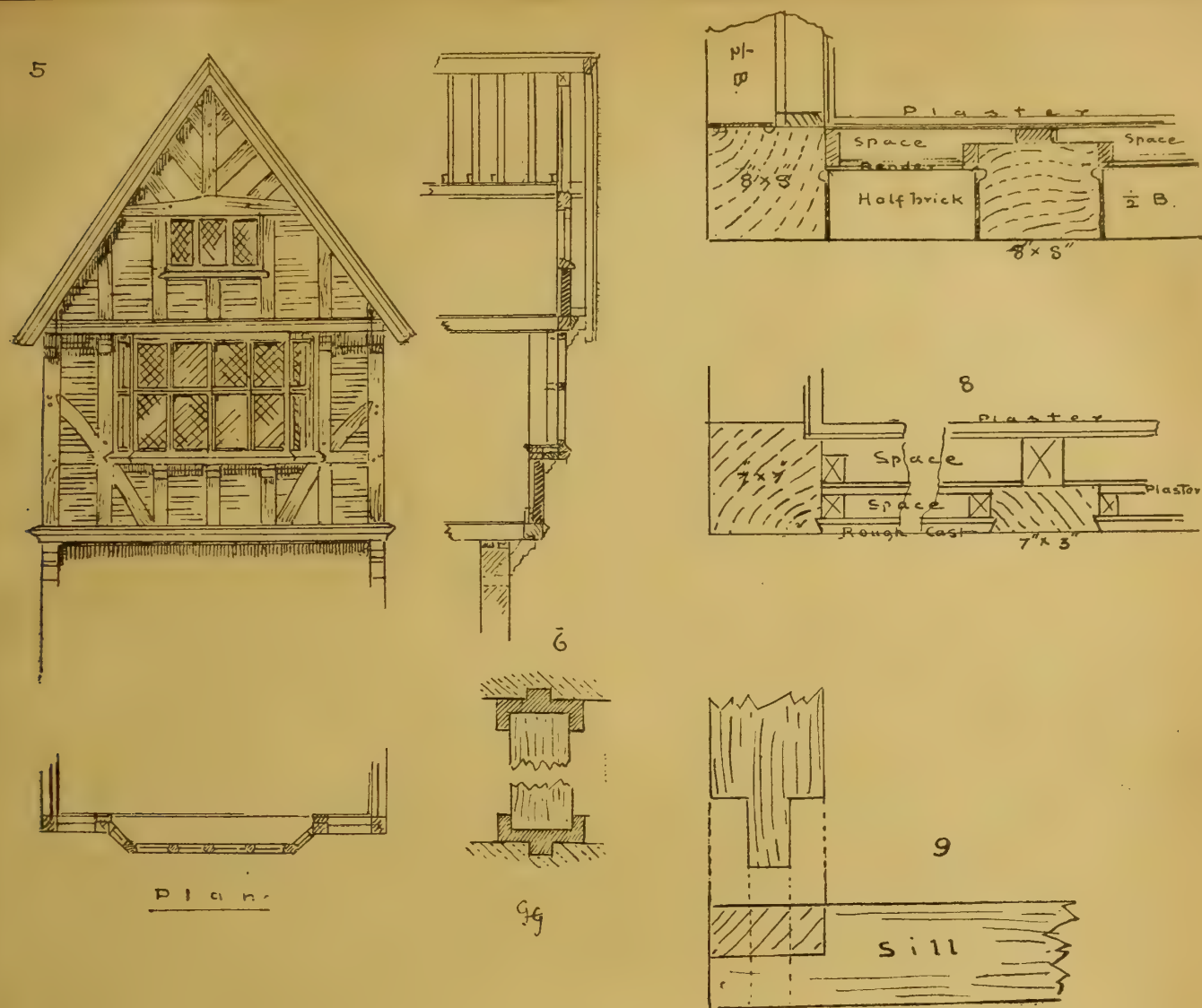
expressed no opinion at the time, not wishing to make invidious distinctions. Nor have we now any objections to urge against any of the eight architects in question, except in connection with the style and character of the buildings intended to be erected.

What we have to deal with to-day is the decision of the Government, and without any hesitation we at once record our approval of the choice which has thus been made, and offer our congratulations to all concerned. Mr. William Young is to design the new Admiralty buildings facing the Horse Guards, and Mr. J. M. Brydon is the architect chosen for the combined offices in Great George-street. In both cases we are very glad to find that the original proposal limiting the work of these gentlemen to designing merely the façades to plans already prepared by the Office of Works, has been very considerably modified if not entirely abandoned, although Sir John Taylor will be consulted as to the internal arrangements where special departmental considerations have to be observed. No architect would object to such an arrangement, and if Sir John Taylor is enabled to represent the various—and, in some ways, possibly conflicting—requirements of all the departments interested, the manifest failures in the planning of so many of our Government buildings will in these instances be avoided. Both Sir Gilbert Scott, in connection with the Home and Colonial Offices, and Mr. Geo. Edmund Street, at the Law Courts, are constantly blamed for the defects in these buildings which were really not due to any fault of the architects; but, as a matter of fact, these defects were brought about by the unfair and absurd limitations by which both Sir Gilbert Scott and Mr. Street were hampered. We sincerely hope for every good reason that wiser counsels will prevail with the Parliament Street buildings, and we urge upon the authorities the manifest advantage of giving Mr. Young and Mr. Brydon as free a hand as possible, feeling assured that the result to all concerned will more than justify the confidence thus accorded. Every architect worthy of the names is, of course, only too glad to embody in his plans the particular requirements for which his buildings are erected. The real difficulty is in obtaining sufficiently definite particulars as to what these special requirements actually are; indeed, it is not

infrequently the case that buildings planned for one purpose are in practice used for another. Take the Law Courts, which we have already mentioned, where rooms designed as refreshment halls, with approaches specially contrived to facilitate such a purpose, are now employed as Courts in connection with the Queen's Bench. Street did all in his power to induce the authorities to build more courts; but his plans were not adopted, and then when it was too late he was, much against his will, compelled to convert his refreshment-rooms into extra law courts. Scott is blamed too for his façade in Parliament-street, whereas he was obliged by the Home Office to employ a style which was in no sense his own, and, moreover, his façade to this day has never been completed;—seeing that the cupolas, on which the composition so much depends for good architectural effect, have not been built, because no Government has had the good sense to provide the small sum necessary for the finishing of the building.

Neither Mr. Young nor Mr. Brydon are to be fettered by any plans, we are glad to be assured, notwithstanding the reference made in the House on Tuesday by Mr. Akers-Douglas; and in the proper sense both these gentlemen are elected as the architects of their respective buildings, including the planning of them as well as their architectural clothing. Of Mr. Young's works as a Classic architect justifying the assurance with which we have spoken of him, we may name the Glasgow Municipal Buildings, Chelsea House for Lord Cadogan; Gosport House, N.B., for Lord Wemyss; Duncombe Park for Lord Feversham, Culford Hall for Lord Cadogan, The Hall, Panshanger, for Lord Cowper, and Lord Iveagh's house, Elvedon Hall; and ball-room wings at Dublin and Farmleigh, for the same nobleman. Most of these we have illustrated. With Mr. J. M. Brydon's work we have also had an intimate acquaintance. His buildings speak for themselves, and his preference for English Classic work has grown with his experience of the style. We have not forgotten his design for the Kensington Town Hall, so unfairly put on one side many years ago now, to make way for the commonplace building which now stands in the High-street under the shadow of St. Mary Abbots. Mr. Brydon's buildings in his Classic manner are the Town





Plan

6

9g

9

Sill

Hall, Chelsea, and the Public Library there, the S.W. Polytechnic, the Bath Municipal Buildings, the Technical Schools in the same city, and the Pump Room extension scheme. Besides these, he is now building the Art Gallery and Library at Bath. The whole series well accord with Prior Park, and with the old Classic buildings for which Bath is so justly famous. The hospitals in Covent Garden and Euston-road are other well-known works of his, and the London School of Medicine for Women, opened during the last few weeks by the Princess of Wales, is worth mentioning for its evidence of Mr. Brydon's taste in Classic design.

#### MODEL SPECIFICATIONS.—XXII.

CARPENTER — FLOORS AND HALF-TIMBER WORK.

WE illustrate, Figs. 1, 2, and 3, different kinds of floors. The first shows a floor constructed of ordinary joists with herring-bone strutting 2½ in. by 1½ in., spiked to joists every 6 ft. apart; the joists are 9 in. by 3 in., with 11 in. by 3 in. joists every fourth or fifth. The ceiling joists are 4 in. by 2 in. notched to these (see clause 10). Sketch 2 shows a floor with binders 12 in. by 9 in., 6 ft. apart, with bridging joists notched to them, 7 in. by 3 in., and ceiling joists, 4 in. by 2 in., notched to binders. Section 3 is a floor having I-shaped rolled iron or steel joists, 12 in. by 6 in., resting on stone templates on the walls every 6 ft. or 7 ft. apart, carrying bridging joists 9 in. by 3 in., the girders being cased below with plaster or wood linings. The wooden joists rest on fir fillets 3 in. by 2 in., bolted through iron

joists with ½ in. bolts, nuts, heads, &c. These joists may be herring-bone strutted between binders if necessary. Small blocks are also fixed on each side of iron joists to take ends of wood joists, to fill up space between flanges (see section 4). We give an isometrical sketch of this arrangement, Fig. 3 (see clause 10, p. 58).

The sketches we give of half-timber work will explain themselves. The methods shown have been recommended, though other systems are used. The timber employed is generally, in old or substantial work, English oak; but pitchpine and fir are used. The sills and heads are bevel-halved at corners and mortised to receive the angle-posts (see sketch 9). The intermediate studs should not be less in thickness than 4 in., though it is better to make them the same depth as the angle-post. Fig. 7 shows the intermediate angle-posts 8 in. square, with half-brick filling between, the inner face being rendered; the usual plan is to make the angle-posts square, say, 9 in. by 9 in., and the intermediate studs the same width by, say, 4 in. thick, these being tenoned into the sill and headpieces, and secured by oak pins 1 in. diameter projecting ½ in. from face of framing, and backed with 9 in. brickwork cemented over on the outside; or if there is no brickwork, the timbers are made, say, 6 in. thick, and are lath-and-plastered on the inside on battens, with an outside stucco filling in between the uprights, which are grooved, the stucco being on laths fixed to fillets at the sides of uprights. Sometimes, for greater security and dryness, a middle coating of plaster is put between the outer and inner sides, and these are battened inside for the inner plastering coat (see sketch 8). The overhanging stories (see

section 5) are carried on the ends of the joists which project, and have wooden brackets as shown. Sometimes the ends of the joists carry the sill for upper story; but the usual plan is to frame the sill to the joists with angle-straps and coach-screws, and to mould the outer face and edge. Braces and nogging pieces are introduced often to strengthen the framing. The timbers can be oiled and left to show the natural colour of wood, or coated with thin Stockholm tar, or painted. All joints should be made with red and white lead and boiled oil. As to the modes of filling, different methods are used. In old work the brick filling is often a brick thick, and is built so as to fill in the space between two upright timbers, being rendered inside. The timbers are battened for plastering inside, allowing an inch or more cavity; or the timbers are about 4½ in. deep, and the brickwork is rebated to them. Half-brick filling in the manner shown (see plan 7), is lighter, and allows a larger cavity. There is less weight on the framework, the brickwork is rendered on the inside; the bricks outside can be arranged "herring-bone," "diagonal," or in any other patterns. If the filling is of plaster-work, a ½ in. thickness of plaster and Portland cement, finished with a coat of rough-cast of lime, sand, and clean gravel, flush with timbers, is often used. The old builders filled in the inner spaces with a kind of wattle-work plastered over with mortar or clay and chopped straw. An outer coating of stucco or rough-cast was used.

11. *Double Framed Floors.*—The floors of reception-rooms to be constructed of Memel fir girders 13 in. by 11 in., placed not more than 10 ft. apart on 3 in. tooled York stone (templates 2 ft. 6 in. by



9in.), fir binders, 11in. by 8in., not more than 6ft. apart, framed into girders and resting on tooled York templates, 2ft. by 9in. The bridging joists to be of Memel fir, 6in. (or 7in.) by 2in., 12in. apart; and the ceiling joists 4½in. by 2½in., 12in. centre to centre.

(Fredgold gives the following scantlings for double-framed floors in Baltic fir. For a length of bearing of 12ft.: girders 11in. by 8in., 10ft. apart; binders 10in. by 8in., 6ft. apart; joists 9½in. by 2½in., 1ft. apart; ceiling joists 6in. by 2½in. For a bearing of 16ft.: girders 12½in. by 10in.; binders 11in. by 8in.; joists 10½in. by 2½in.; ceiling joists, 6in. by 2in. For a bearing of 20ft.: girders 14in. by 11in.; binders 12in. by 7½in.; joists 12in. by 3in.; ceiling joist 6in. by 2½in.)

The floor of saloon or picture gallery to be constructed as follows:—Of Memel fir girders, 16in. by 13in., placed 10ft. apart, ends cased in cast-iron shoes, 12in. long and of ¾in. metal, resting on 6in. York templates, 3ft. by 12in.; binders 12in. by 9in. (or 11in. by 8in.), spaced 6ft. apart, with 12in. by 4½in. binding joists near walls, with ends cased in cast-iron shoes, 9in. long, ¾in. thick, and resting on 3in. York stone templates, 2ft. by 9in. in walls, the other ends framed to girders, or supported on ¾in. cast-iron stirrups bolted to girder with ¾in. bolts, nuts, &c. Or—

The floors of principal rooms to be constructed of girders of four 11in. by 3in. fir timber deals, bolted together with ¾in. wrought-iron bolts, heads, nuts, and washers, six to each girder. They are to be fixed 10ft. apart on 3in. York stone templates 18in. by 14in., and to rest 9in. at each end in the wall. The binders to be 7in. by 4in., and 12in. longer than span, and to be placed 6ft. apart, the ends resting on 3in. tooled York templates 14in. by 14in. on the walls, and the other ends on cast-iron stirrups bolted to the girder with ¾in. bolts, nuts, and heads. The bridging joists to be 7in. by 3in., notched to binders, and the ceiling-joists to be 4in. by 2in., notched to binders.

12. *Fugging*.—All floors to be pugged, or to have a layer of silicate cotton as follows: On the under-side of joists (or ceiling joists) fix the Expanded Metal Company's galvanised-iron wire-netting, ¾in. mesh, to be fixed by wire U hooks, and fill in with a 1½in. layer of silicate cotton (or felt), and spike 2in. by 1in. fir battens under joists for plastering.

Fix 1½in. by 1in. fillets to the upper sides of joists, and lay ¾in. rough deal boarding between, 1½in. below top of joists, and fill in level with a layer of silicate cotton (or felt), supplied by Messrs. Jones and Co., Kentish Town, or McNeill and Co., Buxhill-row.

13. *Half Timber and Brick*.—(See plan 7.) The timbers to be of English oak sawn solid, wrought, and oiled on the exposed sides as shown in the detail, grooved round inner edge, and for all external strings and mouldings, and rebated for door and window-frames. The angle-posts to be 7in. (8in. or 9in.) square, and the intermediate studs to be 7in. (or 8in.) by 6in. These are to be tenoned on to the sill and headpieces each 7in. (or 8in. or 9in.) square, which are to be bevel-halved and mortised. The tenons are not to come through, but be drawbored and pinned. The timber to be pinned at each joint with two cleft oak pins, 1in. diameter, projecting ¾in. from face of framing. The carved angle braces to be 7in. (or 8in. or 9in.), by 6in. tenoned into upright studs, and butt-tenoned to angle-post. The horizontal timbers to be covered on their top side with 4lb. lead turned up into cavity. Or—

Frame the upper projecting stories as shown in drawings with oak (Crown Memel or pitch-pine) timbers filled in with 4½in. (or 9in.) brickwork.

The timbers to be of the following scantlings:—Sill-piece and head-pieces to be 11in. by 11in. (or 9in. by 9in.), bevel-halved and mortised at angles, the angle-posts to be 11in. (or 9in.) square, grooved, and tenoned at ends, and rebated for window and door-frames. The intermediate studs, 7in. by 4in. (or 8in. by 4in.), grooved, and the braces to be of same scantling, and tenoned to the studs and angle-posts. Two oak pins, ¾in. diameter, and projecting ¾in., to be used at each joint. The whole to be framed and put together, as shown in the detail, with solid moulded brackets to support overhanging stories, with 2in. (or 3in.) barge boards, wrought and moulded under edge with square ends screwed to rafters and finished with moulding under the tiling. The purlins and rafters, where exposed, to be wrought (the barge-boards may be fixed to roof-timbers by 2in. by ¾in. wrought-iron angle-straps every 3ft. apart, and of the full depth of barge, with 2½in. coach-headed screws, and the horizontal part to two or more rafters, the strap being screwed to them by 3in. screws, and the ends turned down and bolted through with ¾in. bolts, nuts, and beads, &c.) Or—

14. *Half-Timber and Plaster Work*.—(See sketches.) The timber framing to be, as shown on detail

drawing, of best Baltic fir. The sill to be 7in. by 7in., or 9in. square, with angle-posts 7in. (or 9in. square), tenoned to sills, and head-pieces all grooved for external stucco, with intermediate studs and braces 7in. by 4in., skew-grooved outside for stucco-work, with fillets 1in. by 1½in. fixed to uprights for middle coating of plaster. The horizontal timbers to be rebated only for stucco. Bittens, 2in. by 1½in., to be fixed inside of uprights for internal lath and plaster. Or—

The framing to be as follows:—A sill-piece to be 9in. (or 11in.) by 5in. thick; 7in. by 4in. skew-grooved for stucco intermediate studs, rebated for window and door-frames, with angle-posts 9in. (or 11in.) square, tenoned to sill and head-pieces. The curved braces to be 4in. thick and 7in. on face, the whole to be put together with inch oak pins, projecting ¾in. beyond framing, and the intermediate posts to be rebated for door and window-frames, with mouldings rebated to the posts (or planted) to cover the joint. The whole of the outside face of timbers to be coated with Stockholm tar or painted.

15. *Quarter Partitions*.—The quarter partitions marked on plan to be framed as follows:—Memel fir sills 4in. by 4in. bearing on walls 4½in., with heads 4in. by 3in. bearing on walls 4½in., with 4in. by 4in. wall-posts and door-posts; 4in. by 3in. braces and 4in. by 2in. quarters or studs placed 12in. to centres. Insert nogging-pieces (2in.) every 3ft. apart, the upper one a foot below ceiling to form a picture-rail. Fix securely, and provide and fix all necessary bridging pieces between joists 4in. by 3in., 2ft. apart, fixed securely on 3in. by 2in. fillets. Or—

16. *Trussed Partitions*.—The trussed partitions on first and second floors to be mortised and tenoned together as shown in detail, having 9in. by 4½in. sills with cast-iron shoes 9in. long and ¾in. thick, bearing 9in. on walls at each end on 3in. York stone templates 2ft. 6in. by 9in.; heads 4½in. by 4½in. bearing on walls at ends 4½in., braces 6in. by 4½in. (or 4½in. square), queen posts 4½in. by 4½in. and wall posts 4in. by 4½in., door heads 4in. by 4½in., studs 4½in. by 2in., 12in. to centres, and nogging-pieces 4½in. by 1½in. every 3ft. apart, the top row 12in. from ceiling for picture-rail. The whole to be framed together in a workmanlike manner, with forged iron straps to end of braces, bolts, nuts, heads, plates, &c., and allow ½wt. for mmp.

17. *Sound-proofing*.—The sides of partitions to be covered with galvanised wire netting, of the Expanded Metal Company, Limited, Upper Thames-street, and the space between the studs filled with silicate cotton or felt, supplied by Messrs. Jones and Co. or McNeill. Fix 2in. by ¾in. battens to studs to secure plastering.

18. *Story-posts, &c.*—The story-posts, 9in. by 9in. or 11in. by 11in., to have cast-iron boxed and tenoned caps and bases, ¾in. or ¾in. in thickness and 4in. deep, screwed to post. The iron tenons to be mortised into stone heads and thresholds, or all solid door frames to be shod with cast-iron shoes, ¾in. thick and 4in. deep, screwed to frames, the tenons mortised into thresholds. (See Fig. 6.)

#### SOME INSTANCES OF PILES AND PILE-DRIVING, NEW AND OLD.—III.\*

(Continued from p. 60.)

##### BROOKLYN DOCK.

WE come next to the valuable paper of W. J. McAlpine, Past-President American Society Civil Engineers, on "Pile-Work at the Government Graving Dock, Brooklyn," which was presented to the Institution of Civil Engineers, 1863. Extracts as follows:—"The absence of any reliable data in the textbooks upon the weight which may be safely imposed upon piles has led the author to present the subject, under the hope that it may call out the recorded experiences of other engineers, for the purpose of comparison with, and perhaps a correction and extension of, the formula prepared from an extensive set of experiments made for the purpose in 1847. Piles are used under the three following conditions—first, to compact a soil which is not quite firm enough alone to support the superstructure; second, as columns of support, when the material immediately below the structure is very loose or fluid, and is underlaid by a firm material to or into which the piles are driven; and third, when the support is mainly derived from the adhesion of the material into which they are driven, and slightly from their sectional area. The first two of these conditions

will not be discussed, but the present paper will be confined to the practical hints growing out of the author's experience in driving a large number of piles of different kinds of timber and of different dimensions, and with rams of different weights and falls, and the use of various kinds of power. The Government Graving Dock at Brooklyn, N.Y., is a structure of granite masonry weighing 50,000 tons, the walls of which commence 36ft. below the sea-level, and the excavation was carried 4ft. deeper. A considerable portion of the foundation had to sustain a weight of 3 to 5 tons per square foot. A line-of-battle ship weighing 5,000 tons would require to be mainly supported on its narrow keel within a length of 200ft., which gives an estimated weight upon the keel of about 20 tons per lineal foot. The grillage and foundation distribute this weight, but the centre piles are probably subjected to a weight of from 10 to 15 tons each. The material removed from the excavations was a fine silicious sand, mixed with minute particles of mica and a little vegetable loam, and fully charged with water, rendering the mass somewhat fluid, resembling quicksand, which it did become to a depth of several feet wherever it was much trodden by the workmen. Borings were made and trial piles were driven to a depth of upwards of 50ft. below the excavation. These indicated the same character of material to that depth, and it was believed to extend 50ft. or more below the borings. The structure rested on about 7,000 piles, which were driven in rows 2½ft. apart, and at a transverse distance of 3ft., all from centre to centre. Intermediate piles of very tough second-growth oak were frequently driven. The main piles were chiefly round spruce spars, very straight, from 25ft. to 45ft. long, averaging a driven length of 32ft. They were not less than 7in. in diameter at the smaller end, and on an average of 14in. in diameter at the larger end.

The heads of the piles were always protected in driving by bands of iron 3in. by 1in., and occasionally iron shoes were used; but they did not increase the penetration, as the resistance was chiefly from the lateral friction, and the tenacity of the pointed wood was sufficient to displace the material at the bottom. During the progress of this portion of the work a careful record was kept, which showed the distance moved by every blow on every pile used in the structure, and the weight and fall of the hammer at each blow. From this record it was ascertained that the number of blows required to drive 6,539 piles in the foundation an average depth of 32ft. was 2½ to each foot of pile, and the distance moved uniformly diminished from the first to the last blow, ranging from 8in. at the beginning to no movement at the end, and the average distance driven by the last five blows was 1in. The effect of driving the intermediate piles by compressing the material was to bring them all to the point of ultimate resistance. The piles were secured at the top by a mass of concrete masonry 3ft. around the heads, and by a grillage of timber, plank, and concrete, 2½ft. thick at the top. The piling machines were strongly and accurately made, with the ways bound with smooth plates of iron. The rams were of cast iron, swelled out at the bottom to concentrate the weight at that point. They weighed generally about 2,200lb., but some were used of 1,500lb. The leaders generally gave a fall of 30ft. to the ram; but some machines were tried with leaders of various lengths up to 57ft. A considerable number of piles were driven by a Nasmyth steam-piling machine, with a ram of 3 tons and a stroke or fall of 3ft., and making 60 to 80 strokes per minute. The other machines were generally operated by steam power, giving an average of a blow per minute; but occasionally the hammers were hoisted by manual or horse-power. It was observed that the heaviest ram, when striking blows of the same effect as lighter ones, did the least injury, either to the head of the pile or to the protecting iron ring, and this injury was still less with the Nasmyth hammer. It was also found that no advantage was gained by increasing the fall of the ram beyond 40ft., as the friction on the ways then prevented any increased velocity to the ram when falling from a greater height. This experiment was repeated many times in the machines with the longest leaders by tripping the hammer at various heights, from 35ft. upwards, until the maximum penetration of the same pile was ascertained. A few of the piles, under peculiar circumstances, had to be driven with a follower, which was made of very tough oak, and well banded at both ends. The effect of the blows of the ram was about one-

\* A Paper by HORACE J. HOWE, member Boston Society of Civil Engineers, and read before that society.





FORSLAG TILL HUFVUDBYGGNAD A TJÖLOKOLM.—(ACCEPTED DESIGN.)

L. J. WAHLMAN, *Architect.*

third as much as when directly striking the head of the pile. The Nasmyth hammer was capable of driving the piles to a much greater depth than any of the other machines, and, although the force of its blows is much less than those of the ordinary rams when falling nearly 30ft., it produces a much greater effect. With the former, piles were driven 35ft. in 7 minutes, while with the other machines similar piles required one hour or more to drive them the same distance. Two trial piles were driven with each of these machines, with the following results:—

## PILE DRIVEN BY THE NASMYTH MACHINE.

The first	4 blows drove it	4in. each blow
Next 8	" " " "	3 1-2 "
22	" " " "	3 "
25	" " " "	2 "
40	" " " "	1 3-4 "
56	" " " "	1 1-2 "
32	" " " "	1 1-4 "
64	" " " "	1 1-8 "
73	" " " "	1 "
Last 49	" " " "	1-2 "

373

This pile was nearly the same size as the other trial pile, and was driven 43ft. in 7 minutes with 373 blows, and was not iron-shod.

## PILE DRIVEN BY A RAM WEIGHING ONE TON FALLING FROM 1-2FT. TO 35FT.

The first	100 blows drove it	a few feet
260	" " " "	30in. in all
265	" " " "	from 1-2in. to 1 1-2at each blow
110	" " " "	1 1-4in. at each blow

735

This pile was driven 45ft. with 735 blows. It was 20in. in diameter at one end and 14in. at the other, and was shod with iron, and occupied 166 minutes in driving—viz., 264 blows in 46 minutes, 265 blows in an hour, and 110 blows in an hour. The ordinary piles were smaller and shorter than these trial piles, and the ram in the common machines began with a greater fall than above stated, on the trial pile, and there was not so marked a difference between the two machines in the first part of the operation, as was shown afterwards when the pile had penetrated deeper. At first the force of the blows in each of the machines was absorbed by the vibrations of that part of the comparatively slender, elastic column which was above ground; but when it had been driven a considerable distance into the earth, these vibrations for the instant removed the partially fluid material from contact with the pile for nearly the whole of its penetration. In the case of the Nasmyth machine, the blows succeeded each other at intervals of a second of time, and before the material which had been displaced by the vibrations of the preceding blow could subside again into close contact with the sides of the pile, and therefore nearly the whole force of its blows was employed in the displacement beneath the pile. In the other machines the blows were given at intervals of a minute, by which time the vibrations caused by the preceding blow had

ceased, and the semifluid material had partially subsided around the pile, so that a considerable portion of the force of the blows was consumed in overcoming the friction along the sides, and in the removal by new vibrations, leaving only a comparatively small part of the force to displace the earth at the bottom of the pile. As before stated, the pile derives its support mainly from the frictional surface in contact with the earth, which is measured by the force of the blow due to the weight and velocity of the ram. The ram, however, does not fall in free space, but meets with great resistance along the ways, depending upon their smoothness and the strictly vertical position of the machine at all times. In wet foundations the material obtains a degree of fluidity when disturbed by the operation of driving which lessens the resistance to the penetration of the pile; but the superior gravity of the earth to that of the water causes it subsequently to settle in close contact with the sides of the pile, and if not afterwards disturbed gives a greater coefficient of support than if the same pile had been driven through the same kind of material in a dry state. In using comparatively slender piles the vibrations caused by the blows enlarge the passage and loosen the material, and although they absorb much of the power, they doubtless increase the penetration at each blow. It would be hazardous, however, to trust to the effect of this subsidence in a superstructure which is liable to vibration, and to convey these vibrations to the piles; but when there is a large mass of matter intervening, like that of the masonry of the piers of a bridge, there is no danger from this cause. Experiments were made at different times during the progress of the construction of the dry-dock to ascertain the weight which the piles driven in the manner described would sustain. For this purpose one end of a lever of oak timber, 60ft. long, was firmly secured to a cluster of piles with a short arm resting on the trial pile. The bearings were angular steel bars resting on planed plates of iron. The outer end of the lever was slowly weighted with successive weights, which towards the latter part of the trial were allowed to remain several hours, and in a few cases a whole night. A number of the foundation and coffer-dam piles were withdrawn by a similar process, and the power required was also ascertained. Many of these trials were made on piles of nearly the same size and driven in exactly the same manner, and the results were in all cases nearly alike, giving 125 tons as the weight required to move a pile driven 33ft. into the earth to the point of ultimate resistance [ $s = o$ ] with a ram weighing one ton (2,240), and falling 30ft. at last blow. These trial piles averaged 12in. diameter in the middle. The complete record of the driving before referred to also enabled the selection of piles for some other experiments of different sizes and driven with rams of different weights and falls. As these trials had to be continued until the final weights applied produced a visible movement of the pile, and as some allowance must be

made for the friction and imperfection of the lever attachments, and for the support of the sectional area of the pile, it was believed that the extreme supporting power of this pile due to its frictional surface was 100 tons, or one ton per superficial foot of the area of its circumference. From an analysis of these experiments, the following general laws seem to have prevailed in these cases: (1) that the effect of lengthening the fall of the ram was to increase the sustaining power of the pile (driven as before mentioned) in the ratio of the square root of the fall; (2) that by adding to the weight of the ram the sustaining power of the pile was increased by 0.7 to 0.9 of the amount due to the ratio of the augmented weight of the ram; (3) that a pile driven by a ram weighing 1 ton and falling 30ft. will sustain an extreme load of 100 tons. The author is of the opinion that under the most favourable circumstances the pile should not be loaded with more than *one-third* of the results given by his formula, and where there is any danger of a future disturbance of the material round the pile, or when there is any vibration in the structure which may be communicated to the piles, the load imposed should not exceed *one-tenth*. In the preceding discussion the bearing support due to the sectional area of the pile has not been considered, as it forms so small a portion of the support. Numerous experiments have been made which give results of from 5 to 10 tons per square foot." The formula is as follows, in terms of " $h$ " and " $w$ " only:—

$$L \text{ (tons)} = F 80 [0.228 \sqrt{h} + w \text{ (tons)} - 1]$$

The discussion which followed was an interesting one. Sanders's formula was generally spoken well of, while the above was spoken of as applicable only to the conditions which prevailed at the Brooklyn Dock. I will quote only T. D. Ridley, who said:—"Eleven years ago (1857) I drove a large number of piles for the foundations of the viaduct which carried the Border Counties' Railways across the River Tyne at Hexham. The bed of the river consisted of compact boulder gravel and sand, which latter material, when it contained water and had a superincumbent load, was perhaps the most difficult substance through which it was practicable to drive piles. After the first few blows none of the piles descended more than 3in. for each stroke, and at depths ranging from 16ft. to 33ft. they responded only 1/2in. to the final falls of the hammer. Rams weighing 2,000lb. to 2,400lb. were found to be of little use in this case, and the piles usually failed under the high fall of 16ft. to 20ft. which was required to force them downwards. Seeing the injurious effect, a ram of 5,000lb. was used, and by giving a fall of from 8ft. to 12ft., and never exceeding the latter limit, the piles were successfully driven. The conclusions there formed as to the superiority of a heavy hammer with a low fall over a light ram with a long stroke in difficult ground had been



amply confirmed by subsequent experience." The practical nature of McAlpine's first two conclusions is seen if we suppose the case of a set of specifications calling for a certain weight of hammer, while the contractor is using another weight. Opinions differ on this point. McAlpine says the sustaining power varies as the square root of  $h$  (that is, according to the law of falling bodies); Sanders as  $h$  directly; while Trautwine, also from experiment (see "Pocket-Book"), says the cube root of  $h$ , &c. Only McAlpine has made experiments of the kind indicated in his conclusion No. 2. It might be well to say here that specifications should also cover any correction for batter of piles, or for the effect of rest already mentioned. In this last case the contractor would claim the benefit, if any, resulting therefrom. In several of the preceding papers there has been mentioned the fact, well known among pile-driver men and the profession, of the increased resistance, under some circumstances, of the pile after a period of rest. Exact data, with time limit, if any, are wanting. Also data on the effect of a persistent quiescent load. It is customary to tap a pile before pulling it with the hammer line or tackle.

#### THE LONDON COUNTY COUNCIL AND THE WORKS DEPARTMENT.

AT Tuesday's sitting, Mr. N. W. Hubbard brought up a report from the Asylums Committee which recommended that the erection of the superstructure of the Horton Asylum should be carried out without the intervention of a contractor, and that the plans should accordingly be referred to the Works Manager for that purpose. Lord Welby, on behalf of the Finance Committee, moved as an amendment that the recommendation should be referred to that committee for a special report for consideration at the next meeting of the Council. He pointed out that it was the opinion of the Finance Committee that this job, which would cost some £280,000 to £290,000, was too large for the Works Department so soon after its reconstruction. He was not sure that the opinion was not shared by the manager of the department himself. Mr. Campbell seconded the amendment. Mr. Dickinson trusted there would be no delay in this matter. He did not agree with the action of the Finance Committee. The work had already been put out to tender, and the lowest received was £12,000 in advance of the price submitted by the works manager. Lord Onslow said that the difficulty here had arisen from the fact that the Finance Committee was also practically the Works Committee. The Finance Committee certainly ought to have some opportunity of expressing their opinion upon such a large expenditure of money by the department. Mr. Howell Williams was glad that at last there was an opportunity for the department to show that it was capable of carrying out large works. Sir J. Hutton pointed out that in the recommendation as originally presented the amount of £284,000 was mentioned as the price at which the manager of the Works Department estimated. As the recommendation was now put there was no price mentioned at all. He was a friend and supporter of the department; but he did not think this work was one which should be intrusted to it. He thought that such action could only result in a loss. He should support the amendment. Mr. John Burns, M.P., said it was significant that only three contractors had tendered for this work. They were told that the price of materials had risen 10 per cent. If that was so, why not put this amount on the top of the Works Department's estimate? From a workman's point of view, it was a matter of vital importance that the Council should do the work itself, for the loss of life per £500,000 worth of work done by the Council was smaller than the loss of life per £200,000 worth of work done by contractors. Lord Hardwicke supported the amendment. Sir J. B. Maple, M.P., was of opinion that the contractors had not been treated fairly in this matter. The Council was morally bound to give the work to the lowest contractor; but if it decided to intrust it to the Works Department it ought to compensate the lowest contractor for all the trouble he had taken. The Council divided, and the numbers were:—For the amendment, 42; against, 62; majority against, 20. Mr. Bond, M.P., moved the further amendment that the work should be given to Messrs. Kirk and Randall, the lowest tenderers, at the price of



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£296,575. Mr. Fletcher seconded the amendment, and another long discussion took place. Ultimately, on a division, the amendment was rejected by 66 votes to 37. The recommendation was then agreed to by 54 votes to 19.

#### ACADEMY ARCHITECTURE.

“ACADEMY ARCHITECTURE,” edited by Mr. Alex. Koch, has now become a permanent addition to the year's records of drawings shown at Burlington House and other galleries where architecture is not entirely excluded. The publication, judging by the current volume for the summer of 1893, quite maintains its representative character, and Mr. Koch keeps up the standard of his reproductions. Necessarily some of the most conspicuous drawings at the Royal Academy are not included in the book before us. It is not easy to obtain drawings in time before they go in, and some exhibitors prefer to withhold their drawings for other publications, or they elect not to publish their works at all. In consequence, it has been found desirable to issue two volume each year, and the one before us is the first instalment for 1893. The plans added increase the interest of the little book, which is not needlessly overweighted by photographs and sketches of foreign buildings in the second part,

entitled “The Architectural Review.” The Brussels International Exhibition buildings were very well managed, and we are glad to have these records of them. The *Förslag Till Hufvudbyggnad å Tjölökholm*, of which Mr. Wahlman, of Stockholm, is the architect, obtains its chief distinction, apart from the scale of the building, on account of its being conceived after the manner of an old English mansion, with bays and mullioned windows, big chimneys, and shaped gables. We give an illustration of the entrance front. From Berlin, Dresden, and Munich, Mr. Koch has garnered some capital examples of contemporary architecture. They are diverse enough in idea to meet most tastes, and eclectic enough to be in the fashion. A few, however, of the designs are based more closely on historical lines, and even if a degree of newness is lost in consequence, there is generally a compensating gain, provided, of course, that the designers are competent artists. Messrs. Heilmann and Littmann, of Munich, in their capital Hofbrauhaus, have furnished us with an example in point, and by the courtesy of the editor of this very pleasing little folio, we are permitted to reprint two views of the courtyard to which we refer. The pages devoted to sculpture from the Academy we like very much, and wish there were more of them. The Glasgow Institute of Fine Arts and the Royal Scottish Academy Exhibitions at





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Edinburgh are well represented. Among the contributors are Messrs. Hippolyte J. Blanc, R.S.A., John Honeyman and Keppie, Alex. N. Paterson, M.A., T. Duncan Rhind, Geo. Walton, Alex. Cullen, John A. Campbell, and Messrs. Thomson and Sandilands. The last named show the Govan Town Hall and Municipal Buildings, already published in our pages. We need not go over the drawings from the Royal Academy; but we may say that the drawings which appear in this book are thoroughly well reproduced, and it is remarkable that some of the larger ones should have stood such great reduction so well, while not a few gain refinement and are improved by the process.

#### ST. MARY'S CHURCH, WARWICK.

IN yet another of the famous Warwickshire churches—the church of St. Mary, Warwick—thanksgiving is about to be made for a great work of restoration. The work has been going on for fifteen years. Standing now almost exactly as it did 200 years ago, the fabric tells a story which has all the interest of fidelity, though some of its chapters may not altogether please the lover of purity in architecture. The first chapter is to be read in the crypt—all that remains of the old Norman collegiate church founded on the site of an ancient Saxon edifice, and possibly of an

earlier British church, by Roger de Newburgh, son of the first Earl of Warwick, about 1123. Here the well-preserved vaulting, the massive piers, and the characteristic toothed mouldings tell their tale tersely, but eloquently, as far as it goes. The eastern portion of the church, viewed externally or internally, presents a more richly illustrated, though not quite complete, portion of the story. Piled in picturesque irregularity, the chancel or choir, the Beauchamp Chapel on the south side, the Chapel of St. Anne, the staircase turret and the little semi-hexagonal chapter-house on the north, and the clerestory with its flying buttresses, form a poem the harmony of which all but quenches the one note of discord thrown in by later builders. The rich panellings and tracery of the Early Perpendicular period tell of the taste and piety of yet another family who held the earldom of Warwick. Thomas de Beauchamp, one of the heroes of Crecy, who died in 1394, and whose effigy, with that of his wife, reposes on a high tomb in the middle of this part of the church, was the founder of the choir. The architecture, however, shows that the work was completed, if not begun, by his son and successor, Richard de Beauchamp. At each side the choir is lighted by four four-centre arched windows of four lights, continued downwards in blank panel work. The roof is groined in four bays, the octagonal panel

in each bearing a shield with the arms of the Beauchamps. Flying ribs springing from the spaces between the windows help to support the roof, and make a graceful finish to the design. The sedilia, piscina, and the richly-carved groined recess on the north side, supposed to have served as a holy sepulchre in Passion Week, with other ancient and interesting features, remain. The reredos, a fine piece of work, though scarcely in harmony with the rest of the choir, represents the Adoration of the Magi. It was given in 1886 in memory of Mr. Margetts, a well-known citizen of Warwick, and forms one of the few features of the recent restoration which affect the chancel. The Beauchamp Chapel, commenced in 1443 and finished in 1464, with the elaborate tombs of its founder, of Ambrose, the good Earl of Warwick, of the famous Robert Dudley, Earl of Leicester, and his third wife, of “the noble impe” his son, and of various connections of the Beauchamps; its delicately groined roof, its sculpture of various kinds, its niches despoiled centuries since of their golden images, its deeply interesting chantry chapel, and its wealth of architectural and historical associations, must be passed over. Coming back to portions of the church more closely touching the building as a place of worship, of those among the older portions should not be left unnoticed the ancient chapel on the north side of the choir now used as a vestry. The ministers' portion, divided from the rest by a stone screen believed to date from the 15th century, has in its windows some very interesting fragments of the early stained glass from the east window of the choir, and of some later glass, apparently of Flemish origin, from the outer part of the vestry. The little chapter-house, disfigured since 1868 by the incongruous monument of Fulke Greville, the first Lord Brooke, but otherwise requiring little else than cleaning to make it seemly. There is not much else to complete the enumeration of the ancient parts of the church still remaining. The same Richard de Beauchamp who built the choir and the chapel rebuilt the nave and aisles. A drawing, made towards the end of the 17th century, and attributed by some to Sir Christopher Wren, shows a harmonious Gothic church, except that a lead roof, steeper than is customary with lead, though, as now, dropping in a curve from the more lofty eastern gable, had taken the place of the high-pitched roof of tiles which no doubt formed part of the original structure of De Beauchamp. At the west end was a Norman tower standing within the boundary line of the nave, while over a porch on the south was a chamber known as the library of Rous, who was chantry priest of Guy's Cliff in the 15th century, and one of Warwickshire's famous antiquaries.

Such was the church which might have remained to the present day, to afford to the restorers a more grateful task, in some respects, than that which they have had to perform. But on September 5, 1694, a great fire broke out in Warwick, and many of the inhabitants removed their goods to the church for safety, as they thought, only, however, to furnish fuel for the destruction of a large part of the church itself. The tower, nave, and transepts were completely gutted, and had to be pulled down. The fire-marks on the northern walls of the transepts still remain to call forth gratitude that a loss even still greater was escaped. Many would say, no doubt, that the rebuilding was a greater loss than the fire. It was the era of Wren. It is to one of his disciples, Sir William Wilson, that we owe the present incongruous effect. A new nave was built, having four windows on each side, each window containing six principal semicircular-headed lights, three above and three below, divided by reeded shafts or mullions, an attempt at tracery being made in the head of each window by filling it with a large light and two smaller lights of the much derided “hors-collar” form. The transepts—which were slightly extended—were similarly treated. In the spaces between the windows were placed buttresses in stages, but of meagre design and slight projection. No clerestory was provided; but a “railing” being considered an indispensable architectural feature, the builder placed a horizontal cornice along the wall, a little above the windows, and over this an open balustrade parapet, with stone urns at intervals. The new tower, it is said, was carried up 90ft. on the old site when it collapsed. The piers supporting the inner western arch of the nave are very massive, and appear to have been intended originally to support a tower. The site, however,



was changed, the two western piers of the tower being used to support the east side, and two more being built outside the church, so that the supports of the tower now form four arcades open to the street. The tower, spite of its architecture, is imposing on account of its height—to the top of the battlements 130ft., and to the top of the pinnacles 174ft. Internally the nave was divided from the aisles and transepts by four arches on each side, pointed in form, and supported by piers of design suggesting the 15th century, the moulding of capitals being composed of the echinus and acanthus. The roof was arched and coiled, and each bay was divided into eight compartments by small plaster ribs, so as to resemble groining. During the Queen Anne and Georgian periods, galleries were placed over the north and south aisles and at the west end. To the latter the organ, which formerly stood over the chancel arch, was subsequently removed. The galleries, as such, left little to complain of, and the west gallery and organ front were finely carved, the principal feature being a trophy of musical instruments. The present period of restoration commenced in 1884 with the tower, which was taken in hand by Mr. Butterfield about fifteen years ago. In this case, as in others, the repairs were rendered necessary by the crumbling of the soft Warwickshire stone. The tower was taken down to below the battlements, and rebuilt exactly to Wilson's design, while the fencing was renewed where necessary. The artistic scaffolding of the tower at the time was the subject of much admiration, and a lady living in the neighbourhood was led by noticing it to give £2,000 to complete the work of repair. While the building of the tower in Queen Anne's reign cost £4,782, the recent repair of the tower cost £6,000. In 1891 Mr. J. A. Chatwin, of Birmingham, succeeded Mr. Butterfield as the architect. It was then proposed to take down the galleries and rearrange the seating in the church. It was also found that the vaults under the flooring of the church were in an insanitary condition, and, therefore, a foot of concrete was put over the whole area. On taking down the galleries it was found that most of the timbers let into the walls were rotten, so that if the galleries had been retained they would have had to be rebuilt. The floors have been relaid with wood blocks, and the passages with York stone and Portland stone slabs placed diamond fashion, giving a chequered effect of grey and white. The organ, built in 1717 by T. Swarbrick, used to rank among the finest and largest in the kingdom; but its mechanism was past repair. The church is now provided with a Hope Jones electric organ similar to that in Worcester Cathedral. The church is lighted with gas by means of pendants. The recent building work, which has been done by Messrs. Smith and Son, of Milverton, includes the almost complete renewal of the tracery, such as it is, of the windows on the south side, which has suffered most severely from the weather, and such other repairs as examination has shown to be necessary. During the fifteen years about £15,000 has been spent, and the estimated cost of the additional work is £5,000.

#### SICCATIVES, OR DRYING COMPOUNDS FOR OILS AND PAINTS.

**T**HE action and nature of the compounds that are employed for rendering oil and paint vehicles drying were for some considerable time but little understood. The physical action in causing drying-oils to become more siccativ was well known; but the *raison d'être* of their chemical action was comparatively unknown. The advance in chemical knowledge, however, has put the paint-mixer and oil-boiler in possession of chemical facts concerning the behaviour of the siccativ substance which enable a far better product to be made now than the "boiled oil" of fifty years ago. Then sugar of lead was the chief ingredient used in rendering linseed oil of a quickly-drying nature. Now, however, we have zinc salts, sulphate, oxide, and borate; manganese salts, also the sulphate and borate and the sesquioxide, as well as various other bodies.

It is the writer's intention to describe the chemical nature and action of the various substances used by the oil-boiler in converting raw linseed-oil into linseed-oil varnish, as "boiled oil" is now most generally termed; also the physical behaviour of these various compounds, and methods of incorporating same with the oil,

vehicle will be considered, together with the nature of the atmospheric changes and other influences that engender change in oil and paints.

To perfectly understand what is herein given, it is as well to describe the operations carried out in boiling raw linseed-oil. This oil is solely considered, as it is the type of all other drying oils used in grinding up paints. There are two methods of boiling oil—one by a fire heat applied directly to the bottom of the boiling-vessel, which is like an ordinary kitchen or laundry copper. The other process is by steam heat. The former process is the earlier form of boiling oil. An outline of the process is this. The oil to be boiled is put into the boiling vessel, which should be capable of holding one-third to one-half as much more oil than is put into it, so as to allow of the expansion of the oil during its boiling. In the inside of the boiler there is a mechanical stirring apparatus, which keeps the oil constantly in motion, and thereby, by bringing the top cool portion of the oil to the hot bottom of the vessel, tends to prevent the oil at the bottom of the vessel from burning. This stirring also helps to disengage the aqueous vapour that is eliminated from the oil, and otherwise aids the conversion of the raw oil into a perfectly boiled one. The boiling-vessel should have a close-fitting cover, which, however, can be removed in a moment should it be required to cool down any oil that attempts to boil over. If this cover be furnished with an opening that can convey the fumes of the boiling oil into the chimney flue, so much the better for the health of the operatives, as then the acid and nauseous fumes that are emitted from the boiling oil do not escape into the shed or workshop where the boiling process is being carried out. These fumes are not actually poisonous; but they are not beneficial to either lungs, nostrils, or eyes. The fireplace should be so constructed as to heat the bottom of the boiling vessel only—not a side heat, and the fire-bars should be so placed as to be readily removable, so that if the oil begins to boil over the temperature of the oil can be at once lowered by quenching the fire. This quenching process is effected by removing the fire-bars, whereby the burning fuel falls into a receptacle containing water, and thus the heat of the furnace is rapidly lowered. These precautions are necessary, because if the oil begins to boil over it will continue to do so until the last drop of oil has crept up the side of the boiler and flowed over. The only means of arresting this overflowing of the oil is to at once lower its temperature, when the frothing rising oil will at once sink down to its former level. In some boiling-houses it is the practice to have a second vessel at hand into which the boiling oil is ladled, and, as a temporary expedient to lowering the temperature of the oil, a few ladlefuls of raw oil (or, better still, cold boiled oil), are added to the oil that is boiling over: this will momentarily check the overflowing. By this means the fire need not be disturbed. In some forms of boiling-vessels there is a rim round the outside of the boiler, which is useful in catching any overflowing oil, and so prevent it falling into the fire below. Usually the bottom of the boiling-vessel is inserted into a bricked-in furnace. In some factories the boiling vessel is hung on chains over the furnace, so that should the oil begin to boil over, the vessel is at once lifted out of the furnace setting and swung round by means of a crane out of the way of the furnace. By this means the overflowing oil does not reach the fire, and, moreover, it can be caught in another vessel, and so no waste is incurred.

The temperature at which linseed-oil boils should not be above 300° C. (572° Fahr.) If a higher temperature be reached, the oil will be decomposed into its components linolic, palmic, and margaric acids (the fatty-oil acids which impart the quality of "oil" to the fluid), and the base glycerine to which these three bodies are attached. It is the object of the oil-boiler, therefore, to be able to control the temperature of the oil so as to produce a good (undecomposed) product. The usual time for which oil boils is about two hours. Thus, at a temperature just slightly under, but certainly not exceeding, the above heat, two hours' boiling produces a dark-coloured oil; but a pale oil may be obtained by boiling it for three hours instead of two, but at a lower temperature—about 400° Fahr.

The change linseed-oil undergoes during the boiling is a physical one, if the temperature does not exceed 300° C. The changes are these: as the heat of the oil increases, the mucilaginous

particles inherently present in the oil eliminate the water that is present, and this water by being vaporised by the hot oil, rises up through the oil, and causes it to froth up, and flow up the sides of the vessel. This rising of the oil has to be watched for and checked, as already mentioned. After a time all the aqueous vapour is expelled, and then the oil settles down, and begins to flow about in a quiet way. If the surface of the hot oil be looked down on, it will be seen to be flowing about in a series of concentric circles, like the surface of water presents when a handful of pebbles are thrown in the water. When the oil has reached this stage, it has to be carefully watched, to prevent overheating.

The empirical or "rule-of-thumb" method adopted by the workmen of ascertaining the correct temperature, is to dip a feather into the hot oil, if it curls up and turns brown, and a slight cracking noise observed, then the right temperature has been reached. Some operators use a raw onion instead of a feather. If they used, a thermometer they would be adopting a more correct method. When the right temperature has been reached it is the object of the operative to maintain this temperature for the prescribed length of time the oil has to be boiled.

By the elimination of the aqueous particles, and the separation of the mucilaginous matter from the "oil acid," the oil becomes in a fit state to become oxidised or converted into linseed-oil varnish. This addition of the "drier" or "siccativ" compound is made with the object of completing the conversion of the fluid into a varnish-like oil.

The addition of the drier is made after the oil has been boiled the prescribed time, and then the boiling continued for a hour longer. The drier is added a small quantity at a time so as to prevent a too great disturbance of the oil. The chemical and physical action of the drier is not perfectly understood, but it seems to be a catalytic one—that is, the "drier" seems to act the part of a carrier of oxygen from the air to the oil. In this way the "drier" is an oxide of a metal which is capable of being oxidised to a higher oxide, and when it has reached this stage of parting with its oxygen, to become reduced to the lower oxide. This action is the catalytic one referred to. The oxygen that has been given off from the higher oxide is absorbed by the linolic acid in the oil, and thereby it is converted into linoxide (or oxidised linseed-oil). This body becomes a solid, tough, elastic one when exposed to the air, and it is the object of boiling the oil to obtain this linoxide. The palmic and margaric acids apparently become combined with the solid particles of the "drier," and thus their separate presence is not observable, while the glycerine part of the oil is either eliminated and carried into the residuum, or "foots," from which it should be recoverable, or else it is also absorbed by the "drier." In the case of litharge, that body absorbs about seven-eighths of the glycerine that is eliminated from the oil. The presence of free glycerine in the oil would prevent it rapidly drying, and, moreover, cause the oil to "pit" or show "pock-marks" when such oil was made into a resinous varnish (the explanation of such "pitting" is too long to be given here, and is, moreover, outside the scope of this paper). After the oil has been boiled with the "drier" for the requisite length of time, it is allowed to cool down, and the clear fluid drawn off without disturbing the lower portion of the oil. The clear fluid is the linseed-oil varnish. Chemically, it is either linoleate of lead, linoleate of zinc, or manganese linoleate, according to the nature of the metallic base of the "drier" that has been used. When a manganese salt has been used as a drier, the boiled fluid is often termed manganese varnish; the residuum left in the boiler is the "foots," which are either used for making putty, either by grinding up whitening therewith, or else it is used in making cheap ready-mixed paints. The ingredients used as driers are red lead, which is an oxide; litharge, which is also an oxide; sugar of lead, which is an acetate and borate of lead. Of manganese salts, the sulphate, the dioxide, the borate, and the oxalate are used, and also the sesquioxide. Of zinc salts, the oxide and sulphate are used. There are a few other materials used as driers, either alone or in combination, such as sulphate of iron (the ferrous sulphate or green vitriol or "coppers"), a compound of cobalt and manganese, and also a compound of zinc and manganese borate, while patent driers consist of zinc sulphate, sugar of lead, and litharge, together with white lead, Paris white, and oil.

*Driers with a Lead Basis.*—These salts were



at one time the only compounds used and known as being substances capable of rendering oils siccative, and, notwithstanding the many disadvantages that oils possess which have been boiled with salts of lead, their use is still as great as that of any other drier. The disadvantage above referred to is this: Linseed-oil when boiled with a salt of lead becomes changed into a new body—linoleate of lead—a kind of metallic soap, which can be dissolved in water. Now, this linoleate of lead is easily chemically acted on by sulphur compounds, whereby the lead is converted into the blackish sulphide of lead. Consequently all oils that have been boiled with a lead salt become darker in tone, and any pigment that is ground up or mixed with such oil also has its tint changed or modified according to the amount of lead sulphide that the lead-salt is changed into. In the case of varnishes the same defect is noticeable, for if such varnish be ground up with a pigment, such as cadmium yellow, vermilion, or any other pigment which contains sulphur as a component (cadmium yellow and vermilion are sulphides of the metal), the colour of such pigment is changed and darkened almost to blackness, such change being brought about by the chemical union of the sulphur in the pigment with the lead in the oil. Owing to the miscibility of linoleate of lead, the paint that is made by grinding up pigment in an oil that has been boiled with a lead salt will not be durable under atmospheric conditions, but will be more or less decomposed, as the binding vehicle (the oil used in grinding the pigment) is washed away.

To compound litharge with oil, first heat the oil in the boiler until scum begins to form on the surface, and as fast as it forms skim it off with a perforated ladle, or, better still, a flat pan having holes in it, so as to permit the oil, but not the scum, to drop back. When no more scum rises, the oil becomes smooth, and of a dark colour; then add the litharge in the proportion of 32oz. to 50oz. of litharge to 100lb. of oil. The litharge should be ground—not flake litharge, and should be as finely ground as possible. The oil should be constantly stirred the whole time of adding the litharge, which should not be damp or moist, but be thoroughly dry. To dry the litharge, it should be heated for about an hour and a half at a temperature of about 110° to 120° C. (230° to 248° F.), and it should at once be added to the oil without being allowed to cool. When the requisite quantity of litharge has been added, the heat of the fire should be increased so as to maintain a constant ebullition of the oil vapour or fumes being emitted. This boiling should be maintained for two and a half to three hours. Every eight or ten minutes the mixture should be thoroughly stirred, so as to prevent the litharge sinking to the bottom of the vessel. At the end of two hours and a half, take out a sample of the oil on a spatula, and pinch it between the thumb and finger. If it “strings”—i.e., can be drawn out into threads—when the finger and thumb are pulled apart, then you will know that the oil has been boiled sufficiently; but it is usual to continue the boiling until the oil begins to “string”—i.e., draw threads—on the stirring paddle. The fire is then increased until the oil begins to evolve heavy vapours when a stick is dipped in the oil. If it threads up quickly, let the fire die out; but stir the oil so as to maintain the whole mass of it at a uniform temperature. When vapours cease to be emitted, cease the stirring, and then cover up the boiler and let the varnish (which the oil has now become) remain undisturbed until it has entirely cooled. When the varnish is completely cooled draw off the clear fluid, but do not disturb the thick mass that has settled at the bottom of the vessel. This residuum of litharge and thickened oil can be allowed to remain in the boiler and boiled up with the next batch of oil that is boiled. The usual way of removing the clear varnish is to ladle it out into store barrels, wherein it remains for some time to undergo a still further clearance by standing undisturbed. The thickness of the fluid renders it incapable of filtering, but it may be strained through linen, only then, however, there still remain particles of litharge suspended in the fluid, which render it cloudy and turbid. The varnish thus put into the store-barrels improves the longer it is kept undisturbed, as all solid matter will then have settled at the bottom, and thus leave the varnish bright and clear, when it will become quickly drying—will, in fact, dry in a few hours, particularly so if there is a gallon or two of air-space left in the barrel. That is,

the varnish should not completely fill the barrel; the bung-hole should also simply be covered with a piece of coarse canvas or linen to keep out dust.

Red-lead as a drier acts more energetically as a drier than litharge. The generally accepted reason for this is that red-lead when heated parts with some of its oxygen, which, when set free, oxidises the oil, and the oxidised product thus formed combines with the oxide of lead. This, however, is only partially the truth. What actually makes red-lead render linseed oil more siccative than litharge is that the glycerine that is expelled from the oil combines with the lead oxide, and therefore the product obtained is in a better condition to form a solid mass than when there is free glycerine present in the product obtained by boiling oil with litharge. The finer the particles of lead oxide the better is its catalytic action on the oil. The lead soap that is found by the combination of the oil and lead oxides is dissolved in the remainder of the oil. For boiled oil for ordinary use, about 8oz. of litharge per hundredweight (112lb.) of oil is the proportion generally observed, whereas with red-lead the quantity used is less (6oz. to 8oz. of the oxide per 112lb. of oil). The product obtained by boiling oil with these lead oxides dries quickly, but firm and elastic to the touch, and dries with a lustrous coat when ground up with pigments to form a paint.

Sugar of lead, as a drier, is one of the oldest-used salts of lead. It is not used to such an extent as the oxides of lead, but it does not cause a darkening of the oil like other salts do, and, moreover, it causes paint to dry on greasy surfaces better than oil that has been boiled with the lead oxides. In “patent driers” sugar of lead forms one of the components.

Borate of lead is also a lead salt that does not cause discoloration of the oil; while it is quite equal to litharge in its siccative properties. It is used in the same proportion as red-lead.

Lead varnish may be prepared without the necessity of boiling the lead salt with the oil. Such oils are known in the trade as “bung” oils—that is, the so-called boiled oil is prepared by putting a certain quantity of the compound named below to the best part of a barrelful of oil, and allowing the compound to digest therein.

The process of preparing this compound is this: Dissolve 5 to 7½ parts of sugar of lead (lead acetate) in water, and then add 5 parts of litharge to the solution. The product thus formed is called lead vinegar. Before adding the litharge rub it up with a little oil (100 parts of oil is the quantity that is required for the above proportion of the lead salts). Then stir the litharge paste into the remainder of the oil, and finally add the lead vinegar. Mix the components together by stirring them for quite an hour and a half to two hours. The mixing can be done in a barrel, which is caused to turn on its axis. After the thorough incorporation of the oil and lead compound the fluid is left to settle and separate into two distinct layers, the lower one of which is the sugar of lead solution, and the upper one the oil varnish. The product thus obtained is a thin, pale fluid, which can be filtered through felt filtering bags.

To distinguish “bung” oil from boiled oil, put a little of the fluid into a test-tube, and then add a mixture made up of one part of sulphuric acid to five parts of water, add this to the varnish in the test-tube, and shake it or stir it for half an hour. If the oil is “bung” oil prepared as above, it will assume a milky appearance, due to the sulphuric acid converting the lead salts that are present in the varnish into white insoluble lead sulphate, which will be precipitated, and leave the oil clear. If the varnish is one that has been boiled, such reaction will not occur.

Another process of preparing bung oil is this: Mix together 1 part of litharge, 1 part of red lead, and 1½ part of acetate of lead. Put 35oz. of this mixture into a linen bag and suspend it in a boiler or pot that can be heated, into which has been put 8gal. of water and 8gal. of linseed-oil. Then heat the mixture until all the water has been evaporated, and then filter the hot varnish through a felt filter bag. For readily preparing quick-drying oil varnishes without the need of elaborate appliances, the above processes are to be recommended.

**Manganese Driers.**—Of all the manganese salts the borate furnishes the best product for rendering oil siccative, much better than the varnishes that are produced with manganese oxides. Borate of manganese is prepared by mixing a solution of borax with one of sulphate of manganese, collect-

ing the portion of precipitate that falls down and drying it for use. The varnishes obtained with this salt (manganese borate) are better than those prepared from lead salts, as they are paler in colour, and free from the defect of darkening. Four to eight of manganese borate per 112lb. of oil is the proportion used; but the writer found that by increasing the quantity three or four fold a product is obtained which dries to a tough, elastic pale skin, perfectly adherent to any material or surface, and also resistant to chemical or atmospheric influences. To prepare the varnish, heat 22lb. of linseed-oil, and then add about 72oz. of borate of manganese to the oil. The borate must be white—that is, perfectly free from iron—and also perfectly dry. Stir this into the oil gradually, and constantly stir the mixture until it is heated to 200° C. (392° Fahr.). Meanwhile, heat up 2,200lb. of linseed-oil in the boiler until bubbles begin to rise; then pour in the mixture of oil and borate in a thin stream. Increase the heat of the furnace, and then cause the mixture to boil energetically, and let it continue to do so for about 20 minutes; then ladle it out and put each ladleful into a filter-bag, so as to filter the varnish while hot; a plug of cotton-wool in the neck of a funnel forms an effective filter. The conversion of oil into varnish by the aid of borate of manganese may be made at low temperatures: 40° C. (104° F.) is sufficiently hot. The other salts of manganese do not produce a product in any way superior to that obtained by the borate, while the mode of using them is more complicated.

Sesquioxide of manganese is prepared thus: Heat 2,200lb. of linseed-oil to 70° to 80° C. (158° to 176° F.) separately, dissolve 99oz. of sulphate of manganese, in crystals, in as little water as possible, by heating it in an iron vessel of special shape. When dissolved, the vessel is removed from the fire, and a solution of 22lb. of caustic potash in a little water is quickly stirred through it, and the mixture thus prepared is then poured into the oil. At first the mass will be turbid, and in about half an hour assumes a dark colour; but, at the same time, the turbidity disappears, and the oil becomes clear. When the oil assumes this condition, the end of a rubber pipe, having a metal rose attached to it, is put into the boiler, and a current of air is forced through the oil by means of a pump for several hours, the colour of the oil becoming lighter.

Manganese dioxide or pyrolusite (black oxide) produces a good oil varnish, but of a dark colour. Four ounces per 112lb. of oil is the proportion in which it is used. This oxide of manganese contains more oxygen than is exactly equivalent to the metal present, and as it is loosely combined, the extra oxygen has a free catalytic action in conveying oxygen to the oil to convert the linoleic acid into linoline or linoxide (i.e., oxidised linseed oil). Manganese dioxide, or binoxide as it is sometimes called, is a bluish powder found native (whence termed mineral manganese or pyrolusite), and it is also produced artificially as a by-product in several operations. It acts very energetically in causing the oil to dry, and should not be used in larger quantity than that named. To use the oxide, proceed as follows:—

Heat 220lb. of oil to a temperature of about 180° to 200° C. (356° to 392° F.). Separately mix 70oz. of finely-powdered pyrolusite with 5½ per cent. of sulphuric acid, and add this to the oil, and continue the heating, whereby oxygen will be evolved. This oxidises the oil, and at the same time dissolves the sesquioxide of manganese in the oil. At the end of about one hour and a half add thick milk of lime (obtained by slaking 7oz. of burnt lime), let the fluid remain undisturbed for 12 hours, and then filter through a felt filtering bag.

Sulphate of manganese is not so powerful as the dioxide, but it is more powerful than any of the lead salts used, as it imbibes moisture from the air. The salt should always be dried by hot-air before use. It does not colour the oil like lead oxides. Oxalate of manganese is also a siccative for oils; but it is not largely used, although it is a powerful drier.

**Zinc Salts.**—As driers are used more in combination with other bodies than alone, the oxide has no drying qualities itself, and its use is chiefly as a diluent to decrease the drying qualities of very energetic driers.

Sulphate of zinc is also used as a drier, but it is very feeble, although, according to Eastlake, it was much in request by the old Italian and Flemish painters of a few centuries ago, who calcined white vitriol and used it as a drier of



the oils and varnishes. The crystallised salt is not used, but it is calcined before use to drive off the water of crystallisation. When zinc oxide is used in connection with borate of manganese, a very good drier is produced. The French product "siccatif zumatique" is claimed to possess the power of drying 40 times its weight of zinc paint in the course of 12 hours; but this is not extraordinary, as all good varnishes will dry in double that time sufficiently to allow being touched with the hand without being sticky. This compound consists of 19 parts of borate of manganese to 1 or 2 parts of zinc oxide.

*Green Vitriol*, when deprived of its water of crystallisation, is often used as a drier for varnishes; 1lb. to 2lb. per 112lb. of oil is the proportion in which it is used. This salt, however, is not so good as any of those mentioned, excepting the zinc salts, and if used in too large a quantity it is apt to cause the varnish to harden and crack.

#### COMPOUND DRIERS.

*Cobalt and Manganese Benzoates*.—Dissolve benzoic acid in boiling water, continually stirring the liquid; then neutralise with carbonate of cobalt until effervescence ceases. Remove the excess of carbonate by filtering the liquid, and then evaporate the fluid to dryness. The salt thus prepared is an amorphous, hard, brownish substance, which may be powdered like rosin. If this body be mixed with paint in the proportion of 3 parts of this drier with 1,000 parts of oil and 1,200 oxide of zinc, the paint will dry in 18 to 20 hours. Benzoate of manganese is a little more active, and is prepared in the same way, carbonate of manganese being used instead of the cobalt carbonate.

*Patent Driers*.—No. 1. Mix together 15lb. of calcined sulphate of zinc, 4lb. sugar of lead, 7lb. litharge, 4lb. linseed oil, and then grind them separately.

No. 1.—100lb. of Paris white, 50lb. of white lead, 30lb. of boiled oil. Grind up this substance and then mix the two compounds together, adding sufficient boiled oil to give the mass the consistency of dough.

No. 2.—Ingredients: 16lb. of whiting, 16lb. of barytes, 3lb. of white lead, 6 pints of boiled linseed-oil. This is a very poor drier.

No. 3.—25 parts of barytes, 4 parts of whiting, 2 parts of litharge, 2 parts of sulphate of zinc, 2 parts of sugar of lead, 5 parts of boiled linseed-oil,  $\frac{1}{2}$  part of plaster of Paris.

No. 4.—25 parts of linseed-oil, 25 parts of carbonate of zinc, 2 parts of borate of manganese. Grind up the ingredients together in each case.

No. 5.—8lb. of barytes, 8lb. of whiting, 8lb. of white sugar of lead, 2lb. white copperas, 2lb. of powdered litharge, 2lb. of dry white lead, 4lb. of boiled linseed-oil.

No. 6.—224 parts of barytes, 168 parts of whiting, 70 parts of white sugar of lead, 21 parts of white copperas, 56 parts of powdered litharge, 56 parts of dry white-lead, 84 parts of boiled linseed-oil.

Zinc drier, or Guynemer's drier, consists of 6 $\frac{1}{2}$ lb. of anhydrous sulphate of manganese, 6 $\frac{1}{2}$ lb. of anhydrous acetate of manganese, 6 $\frac{1}{2}$ lb. of anhydrous zinc sulphate, 980lb. of zinc white. The mixture is sifted and ground up together, and two to three per cent. added to the paint.

*Zumotic Driers*.—Grind up together 1lb. of borate of manganese, 25lb. of zinc white. For use add about 1lb. of the compound to 25lb. of paint.

*Transparent Zumatic Driers*.—Grind up together 9 parts of carbonate of zinc, 1 part of borate of manganese, 9 parts of linseed-oil.

Resinates are solutions of resin in alkaline lyes, which dissolves the resin to form a resinate. This may be precipitated in a solid form by adding a proportionate quantity of sulphate or chloride of manganese, or of cobalt; the amorphous resinate thus formed is collected in cloth filters, washed and dried.

Mention has been made of oil being boiled by steam. In this case there is no advantage over the oil boiled over an open fire, except the lesser risk of a conflagration. The vessel used is a steam-jacketed one, and the process is very similar to that already described.

The New York Iron League is said to be organising a national association of manufacturers and builders, with a view to dictating a uniform rate of wages and the cost of construction. The plan is likely to be vigorously opposed by the Building Trades Council.

#### BUILDING TRADES EXCHANGE IN NEWCASTLE.

ON Tuesday the Newcastle, Gateshead, and District Building Trades Exchange was formally opened by the mayor of the city. Good premises have been secured in connection with the Arts Club, and advantageous terms of membership have been arranged. There is a large room for use as an exchange, in which are placed trade papers, maps, &c., other rooms for the exhibition of samples, and also a room for the holding of business meetings. Mr. John George Walker, the president of the exchange, presided at the opening ceremony, and was supported by the mayor and many others.

The chairman, in opening the proceedings, said the idea of the Exchange was imported from America by Colonel Bennett, of Glasgow, who, on his visit to America, found successful exchanges in most of the large cities of the United States. Through Colonel Bennett's efforts an exchange was founded in Glasgow three years ago, and that had been followed by others in Edinburgh, Halifax, and elsewhere. Both in Glasgow and Edinburgh the exchanges had been officially recognised. The objects of the exchange were to advance the interests of the trades associated with the building industry. At that place architects, builders, and merchants would meet together and would have opportunities for the ready trans-action of business. The settlement of controversies and misunderstandings would also be undertaken, the technical study of the building trade would be promoted, and Parliamentary and municipal legislation would be supported. The Exchange did not propose to participate in trade disputes and contests. They desired to raise the standard of work and to strengthen public opinion in the aims and objects of their members. They would discourage shoddy work of all kinds, and encourage those who, for fair remuneration, were willing to do honest work.

The mayor said that if the Exchanges had been successful in the towns Mr. Walker had referred to, there was no reason why that one should not be successful in Newcastle.

#### BOOKS RECEIVED.

*The Decoration of Houses*, by EDITH WHARTON and OGDEN CODMAN (London: B. T. Batsford).—This volume, the work of an American lady artist and an architect, is an interesting treatise on house decoration. The authors describe and illustrate various features of house decoration, walls, doors, windows, fireplaces, ceilings, and floors, entrance-halls and staircases, drawing-rooms, boudoirs, gala-rooms, ball-rooms, bedrooms, &c. The illustrations are reproductions from photographs, and give some noted examples of interiors of houses and palaces. It is impossible in a brief notice to refer to the opinions of the authoress and her collaborator; but the work seems just one that would suit a gentleman or a lady who wished for some advice and information to guide them in the decoration of their residence. The rules given are, as far as we have noticed, sensible and reliable. For example, in speaking of rooms in general they say: "In deciding upon a scheme of decoration, it is necessary to keep in mind the relation of furniture to ornament, and of the room as a whole to other rooms in the house . . . Every house should be decorated according to a carefully-graduated scale of ornamentation culminating in the most important room of the house, &c." Again we read: "The simplest and most cheaply-furnished room (provided the furniture be good of its kind and the walls and carpet unobjectionable in colour) will be more pleasing to the fastidious eye than one in which gilded consoles and cabinets of buhl stand side by side with cheap machine-made furniture and delicate old marquetry tables are covered with trashy china ornaments." These remarks are to the point, especially the last quoted, and might be acted upon with advantage by hundreds of our West End and suburban householders who affect to have good taste. The styles chiefly treated are those of the Italian and French Renaissance, and the illustrations and books consulted are largely French, though valuable English, Italian, and German authorities are included. —*Electricity in Town and Country Houses*, by PERCY E. SCRUTTON (Westminster: Archibald Constable and Co.), deals in a popular and intelligent manner with the advantages of electricity compared with other forms of energy.

Water cannot give us either heat or light, unless we utilise its power by a turbine for driving a dynamo. Electricity can give us power for working a lift or blowing an organ more economically than water. Again, the author compares it with coal, which cannot give us heat or light without other apparatus and much labour. As a matter of fact, however, we can use steam in the form of electricity more conveniently than in other forms. The author deals with the Production of Electricity in Town Stations, and also by an independent plant. For the country house a long way from a central supply station electricity can be manufactured by simple means, which are described. The choice of apparatus is large. For a good-sized country house a gas-engine of 13H.P. may be used; for very large houses steam-engines are preferable. The author shows what plant can be used, and to what uses electricity can be put, as, for instance, in cooking, churning butter, knife-cleaning, boot cleaning, grinding corn, &c. The chapters on fitting the interior of a house, the apparatus and fittings, are illustrated, and will repay reading.

#### CHIPS.

Princess Henry of Battenberg visited Winchester on Wednesday for the purpose of unveiling the window which has been placed in the Lady Chapel of the cathedral in commemoration of the Diamond Jubilee.

Mr. W. O. E. Meade-King, an inspector of the Local Government Board, held an inquiry at the council offices, Eddington, with reference to an application by the council for sanction to borrow £3,000 for works of surface-water drainage, £1,321 for purposes of sewerage, and £424 for the purchase of land and a cottage at Tyburn for purposes of a refuse tip.

Work in connection with the fortification of the Scilly Islands, which was recently decided on by the War Office, will commence very shortly. The Secretary for War has accepted the tender of Mr. Carkeek, of Redruth, to erect two batteries and the accessory buildings at St. Mary's. The work is to be completed within two years.

New municipal buildings are in course of erection at Conway, from plans by Mr. R. Davies, of Bangor. The contractors are Messrs. Thorp and Son, of Llandudno. The town council have just completed the repair of the town walls. Gangways have been provided between Upper Gate and the Conway river in seven places, and the promenade along the existing portion of the walls is complete.

The preamble of a Bill promoted by the London United Tramways, Ltd., has been passed by a Select Committee of the House of Lords, presided over by Lord Ribblesdale. Power is sought for the extension of the company's existing lines from Kew Bridge to Hounslow, through Brentford, along the Chiswick High-road, and from Brentford along the Boston-road to Hanwell, and for the application of electricity throughout the whole system. The Bill has already been passed as amended by a House of Commons Committee. The engineer is Mr. J. Clifton Robinson.

Foundation-stones of the William Dawson Memorial Wesleyan Chapel were laid at Barwick, near Leeds, last week. The building will be Gothic in character, and will be seated for 210 worshippers, while at the rear, separated by a sliding partition, will be a schoolroom for 80 worshippers. Mr. G. F. Danby, of Leeds, is the architect, and the outlay will exceed £2,000.

The Duchess of Portland laid on Thursday last week the foundation-stone of an institute and club in connection with Marylebone Church. The building, which will cost about £9,000, will be erected from designs by Mr. Thomas Harris, F.R.I.B.A.

The subscribers to the Dean Vaughan memorial, have decided at a meeting held at University College, Cardiff, to erect a bronze recumbent life-size effigy on a plain coloured marble pedestal at a cost of £500, although an adequate amount has not yet been raised.

At Douglas, Isle of Man, a new pupil teachers' centre and physical laboratory, erected for the school board of that town, was formally opened last week. Mr. T. W. Cubben, of Birkenhead, was the architect.

A Local Government Board inquiry was held in the Sunderland Town Hall on the 13th inst. into the application by the town council to borrow sums of £26,000 and £25,650, the first mentioned being for purposes of electric-lighting extension, and the latter for improvements in the Hat Case insanitary area. Mr. G. W. Willcocks, M.Inst.C.E., conducted the inquiry. The borough engineer, Mr. Rounthwaite, explained the proposals.



CURIOSITIES IN COTTAGE PLANNING.  
—I.

By GEORGE H. BIBBY, F.R.I.B.A.

IN the erection of all kinds of cottages, an endeavour must be made to combine economy with a due regard to the wants and conveniences of the occupiers; to extend the accommodation beyond the habits and means of the inmates would add little to their real benefit, and the extra cost would diminish the inducement for the land-owners and others to build; the more cheaply that such buildings can be erected, consistently with the uses for which they are intended, the greater will the labourers of the country be benefited.

In Fig. 1 is shown the plan of a cottage such as was adopted some fifty years ago for the occupation of labourers in country districts, the accommodation in this case being entirely upon the ground floor. The only entrance shown is at A, the kitchen and living-room is at B, pantry and scullery at C. E and D are bedrooms, while bed-spaces are shown by dotted lines at *b, b, b*. The beds placed in the kitchen alcoves were usually screened off by curtains suspended from the ceilings. In cottages of this description, the



FIG. 1.

ceilings were frequently constructed of lath-and-plaster, but in some cases, boards and joists were added of sufficient strength to form a floor for storage purposes, or even for containing beds for young persons, access being obtained by a trap-door and ladder. Such lofts are yet to be found both in England and Scotland. In those times (about 1840) the better forms of cottages provided for sleeping apartments (generally on the upper floor), the spare bed only being placed in the kitchen or living-room. In Scotland, the older cottages were a set of mere hovels, and it is only since the beginning of this century that a more suitable class of buildings has begun to be constructed; but as the labourers and others, accustomed to their former hovels, displayed no great desire to obtain the superior kinds of cottages to be found in many parts of England, the proprietors in erecting new cottages upon their estates did little beyond extending and improving to a small extent the old practice of confining the apartments to a single floor, and it is remarkable that in the very few cases where really commodious cottages were erected in Scotland, the inmates exhibited reluctance to occupy upper rooms of any kind, preferring to crowd into the one warm apartment below.

In Fig. 2 is given another example of the kind of cottage erected more than half a century ago. In this case also, one entrance only is shown, and the privies and open ashpits were placed undesirably near to the cottages. B shows a kitchen with recesses for two beds at *bb*, a separated bed-room being planned at E.

As warmth in the labourer's cottage is so greatly desired, it is a matter for surprise that the open fireplace should be still so greatly favoured, especially as it is not suitable for the economical consumption of fuel and the transmission of heat to rooms. In many of the best constructed grates by far the greater part of all the heat given out by the fuel is carried up the chimney flue, and lost; and a better medium for heating, therefore, is the stove when placed apart from the wall, in

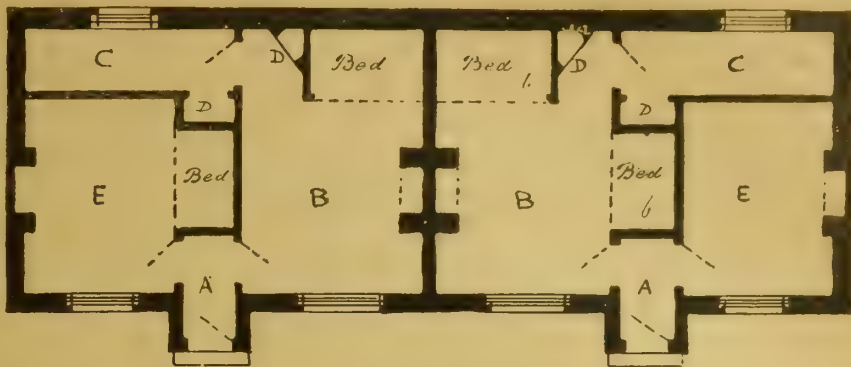


FIG. 2.

the manner so very long practised in all the colder parts of Europe. By means of such stoves, the inhabitants of Germany, Sweden, Russia, and other countries are able to give a far greater degree of warmth to their apartments than is usual in this country, and to perform all their culinary operations with great facility. The stove does not serve the purpose of ventilation so well as the grate; but there has been, perhaps, in many English cottages too much ventilation for comfort and health.

Occasionally a very humble description of

present century the grandson of the original labourer erected the addition, shown on Fig. 3c, the whole of the previously erected portions being left for kitchen and dairy purposes, and for the use of the farmers' now numerous farm-servants, &c.

At the present time the house, having been further added to, is one of the largest in the district, and has billiard and music-rooms, and most of those adjuncts to be found in country houses of the best class; but the oldest portions (once occupied by the labourer ancestor of the



FIG. 3A.

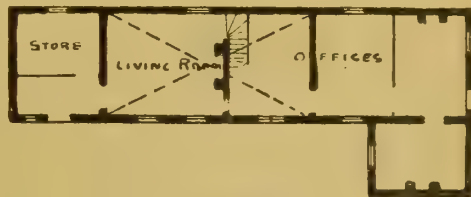


FIG. 3B.—(Extended.)

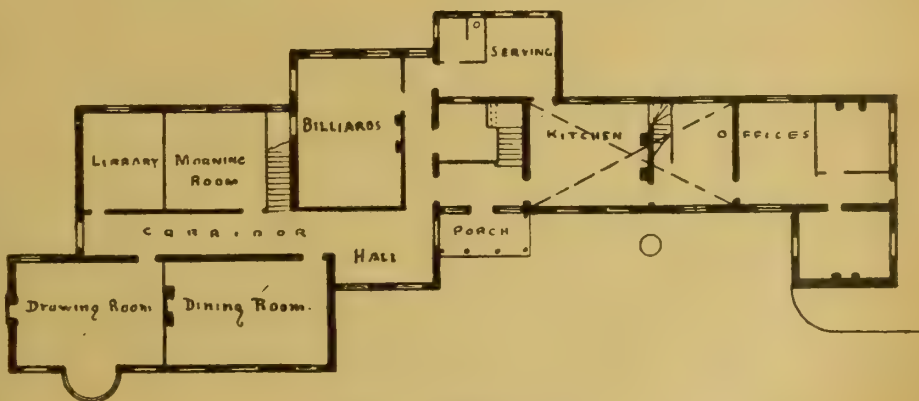


FIG. 3C.—(Further extended.)

cottage has been so well planned and so substantially built as to have been considered worthy of preservation during its occupation by many generations of a family who have added to the original building from time to time, as they increased in prosperity, and rose from a very poor position to a high degree of prosperity. Early in the 18th century there lived, in a small cottage in Warwickshire, a labouring man who had the good fortune to rescue his landlord from an attack by three highwaymen, and who, as a result, was rewarded by the promise that he and his male heirs should occupy the cottage and some acres of land rent-free so long as any of his descendants remained to claim the right. The plan of the original cottage, which still remains, is given in Fig. 3A. Probably there were some outbuildings for poultry and tools, &c., in addition, and there was one room, or possibly two, above. As time passed onwards, the cottager, freed from rent, and a careful man, was able to extend the building until it assumed the form on plan shown on Fig. 3n, when four bedrooms, &c., were obtained on the upper floor, and a parlour and other farmhouse accommodation added below. The defect in the plan upstairs was that the bedrooms were for the most part passage rooms; but in the middle of the last century such an arrangement was not uncommon and not greatly objected to, apparently. At the commencement of the

family) are yet preserved, together with the old flagged floor of his kitchen home, and it is to be regretted that the present occupier is the last male representative of the original tenant.

(To be continued.)

The Leeds Highways Committee have decided upon further extensions of their tramway service. Lines are to be laid down from Wellington-road along Armley-road to the bottom of Branch-road, Armley; also from Meanwood-road along Cambridge-road and Woodhouse-street, across Hyde Park Corner, down Victoria-road, and on Cardigan-lane. Parliamentary powers have already been obtained for carrying out these extensions.

The Duchess of Albany attended a meeting, held on the 14th inst. at the house of Mr. W. F. D. Smith, in support of the movement to raise £2,000, to enable the committee to furnish the Passmore Edwards Public Library, now in the course of erection in the parish of St. George's-in-the-East. The library is being built at a cost of £5,000, given by Mr. J. Passmore Edwards, who has promised to equip it with a thousand volumes of books, and to defray the cost of two life-sized statues, representing Literature and Art, now being executed by Mr. Nathaniel Hitch, and to be placed on either side of the entrance. The architect is Mr. Maurice B. Adams, F.R.I.B.A., and the builders are Messrs. W. Johnson and Co., of Wandsworth Common.



## OBITUARY.

PRESTON has lost one of its most faithful servants through the death of Mr. HUDSON REAH, who for twenty years had occupied the posts of borough surveyor and water engineer. Mr. Reah returned from the Isle of Man on Friday, and proceeded immediately to the reservoir works at Alston. After tea, at his residence, Garstang-road, he complained of feeling unwell, and at eight o'clock he had a paralytic seizure, from which death resulted about 10.30 on Saturday night. Mr. Reah, previous to being appointed borough surveyor of Preston in 1878, held a similar office at Darlington. Here he succeeded Mr. R. N. Hunter, who resigned on commencing business in the town. Mr. Reah was appointed at the same time that Mr. Hamer was chosen town clerk, when Mr. Jno. Satterthwaite occupied the mayoral chair. The deceased gentleman carried out with great ability some very important works, the chief being the construction of the sewage farm at Freckleton, which cost about £130,000, and at the time of his death he was supervising the works at Alston in connection with the extension of the Preston water supply by the building of a large reservoir. This latter undertaking, it is expected, will also cost over £100,000. The responsibilities of directing the expenditure of such large amounts Mr. Reah discharged with abilities which quite justified the choice of the council in selecting him, and his sudden death has brought forth expressions of regret on all hands. Mr. Reah, who was 58 years of age, leaves a wife, a son, and several daughters.

The death has occurred at his residence, Hartlepool, of Mr. WILLIAM BELK, who was for many years engineer to the Hartlepool Port and Harbour Commissioners. The deceased had been in ill-health for some time past, and resigned his appointment about two months ago. During the past week he was confined to bed, but his death came somewhat suddenly. The deceased was 49 years of age, and leaves a widow, one son, and a daughter. He was educated at the Grammar School, Lancaster, where he had an excellent career. He carried out many improvements at the Hartlepool.

## CHIPS.

The Berlin Municipality have resolved to build a system of underground electric railways, twenty-five to thirty kilometres long, and costing from forty to eighty million mark.

The Hydropathic at Peebles was reopened under new management on Friday. Built a dozen years ago at a cost of nearly £90,000, from designs by the late Mr. Starforth, Edinburgh, the building is placed on an elevated situation to the east of the town, and commands an extensive view of the Tweed valley. Its own grounds extend to 35 acres, and the rooms have been rearranged and redecorated at a cost of several thousand pounds.

On Friday, Mr. W. O. E. Meade-King, M.I.C.E., held an inquiry at the town-hall, Bromsgrove, touching the application of the urban district council for sanction to borrow £1,200, for purposes of street improvement, and £600 for the purchase of land for purposes of public walks and pleasure grounds. Mr. G. H. Gidd, the architect, and Mr. R. H. Nowell, surveyor to the urban district council, gave evidence in support of the application.

In aid of the restoration of Tregoney Church, near St. Austell, Cornwall, a bazaar was held last week in the grounds adjoining Penlee, Tregoney. The building has long been in a very dilapidated condition and the work contemplated includes a new roof, floor, and interior. This will cost about £1,200, and about £750 is in hand.

The Duchess of Devonshire on Saturday laid the foundation-stone of a new lifeboat-house in the Wish Tower Grounds at Eastbourne, which is to be erected as a memorial to the late Mr. William Terriss.

A meeting was held on Tuesday, at Marlborough House, of a committee of Royal Academicians and others, formed for the purpose of promoting a scheme to establish some permanent memorial to the late Sir John E. Mills. A sub-committee, consisting of the Dean of St. Paul's, Baron Ferdinand de Rothschild, Mr. C. Stuart-Wortley, M.P., Sir Charles Tennant, Sir W. B. Richmond, Sir Edward J. Poynter, P.R.A., Mr. James Knowles, Mr. Peter Reid, Mr. Alfred Waterhouse, and Mr. Walter W. Oules, was formed to consider and to report to the general committee the form which the memorial should take. Baron Ferdinand de Rothschild consented to act as the treasurer, and Sir Edward J. Poynter and Mr. Peter Reid undertook the offices of honorary secretaries. It was agreed to postpone an appeal for subscriptions until the form of the memorial should be decided.

## PROFESSIONAL AND TRADE SOCIETIES.

BRISTOL MASTER BUILDERS' ASSOCIATION.—The members of this Association and some friends had their annual outing on Monday, among those in the party being employers of other associations belonging to the West of England and South Wales Federation. Saloon carriages from Stapleton-road Station conveyed the excursionists to Cardiff, where luncheon was partaken of at the Royal Hotel, and then a visit paid to the castle. They afterwards proceeded in brakes through Roath Park to Llanisien and Llandaff Cathedral. Colonel Sir E. S. Hill, M.P., and the dean (the Very Rev. W. H. Davey) joined the party, and gave information respecting the restoration. The visitors afterwards went by invitation to Rookwood, the residence of Sir E. S. Hill, where they inspected objects of interest, one of local interest being a handsome set of ivory chessmen made by some of the French prisoners who were confined at Fishponds in a building which now forms part of the workhouse premises. Mr. A. Krauss, president of the Association, presented an address of thanks to Sir Edward and Lady Hill. Mr. F. N. Cowlin, vice-president of the Master Builders' Association, seconded the address. Sir Edward Hill responded. In the evening there was a dinner at the Royal Hotel, under the presidency of Mr. August Krauss. Among those present were Messrs. F. N. Cowlin (vice-president), J. Eastabrook, T. Scammell, J. Perkins, E. J. Neale, F. E. Neale, A. W. Lethbridge (Plymouth), G. L. Veysey, F. Wren, H. J. Kepple, T. Bazzard, J. Carwardine, G. L. Poole, W. P. Lewis (Hereford), W. Podger, W. Holborow, G. Downes, S. Lewis, F. J. Downes, E. G. Bradshaw, J. D. Ratcliffe, G. Wilkins, W. Church, C. J. Hill, G. Machin, A. Barratt, E. Love, A. Krauss, jun., J. Davey, W. K. Thomas, W. E. Lambert, J. F. Erwin, C. Cowlin, W. H. Jelly, J. Cox, E. J. B. Mercer (Bath), B. Price, W. Bryant, C. E. Barrell, J. James, W. G. Harvey, R. R. Wilkins, G. M. Gosling, F. E. Fawn, F. W. Wills, F. H. Jullion, W. Richards, G. E. Margrate, S. C. Hains, W. C. Wilkins, J. Wilkins, J. Harris, J. Walters, G. Humphreys, W. P. Saunders, J. Davis, G. H. Perrin, R. Thomas, T. H. Wills (Bridgwater), A. George (Mayor of Neath), T. M. Jenkins (Neath), M. Whittington (Neath), J. Turner, W. Morgan, J. Allen, W. Symons (Cardiff), and H. J. Spear (secretary). Mr. G. H. Perrin proposed "The West of England and South Wales Federation of Building Trade Employers." He remarked that the trade in Bristol had passed through an ordeal, and the difficulty was not yet quite settled. Mr. Symons (president of the Federation) responded, remarking that the organisation had been established a little more than twelve months, but there was a great work for it to do. Mr. Krauss, of Bristol, and Mr. Lethbridge, of Plymouth, likewise responded. The toast of "The Visitors" was submitted by Mr. F. N. Cowlin, and responded to by Messrs. Frank Wills, T. M. Jenkins (Neath), and J. Turner (Cardiff).

ROYAL ARCHEOLOGICAL INSTITUTE.—The Royal Archaeological Institute commenced its annual congress at Lancaster on Tuesday. Sir Henry Howorth, M.P., F.R.S., president, said the progress of Lancashire was due to its skill in seizing upon physical advantages. Its genius had been practical. He touched on the Celtic predominance noticed in its typography, and claimed its mental dexterity and humour as so originating. He hoped its Roman station at Ribchester would be scientifically burrowed.

THE SOCIETY OF ARCHITECTS.—An excursion will be made to visit Ely Cathedral to-morrow (Saturday), July 23rd. The party of members and friends will leave Liverpool-street at 11 a.m., returning at 6.35 p.m., at a special fare of 7s. 6d., and the company have promised to provide a special carriage. Arrangements have also been made for luncheon and tea.

THE SOCIETY OF ARCHITECTS' EXAMINATIONS.—The first examination of the Society of Architects in architecture and construction will be held on the fifth, sixth, and seventh days of October next. The following will be the subjects of examination:—Section I., Architecture: Subject (a) Architectural History, Subject (b) Planning and Design. Section II., Building, Construction, and Materials: Subject (a) Construction, Subject (b) Materials. Section III., Practice: Subject (a) Specifications, Subject (b) Contracts, Subject (c) Sanitary Science. Candidates are requested to

give notice as early as possible, and not later than August 6th, to the secretary, St. James's Hall, Piccadilly, W., who will supply full particulars as to time, place, fees, &c.

At a meeting of the newly-constituted urban district council for Itchen, near Southampton, held last week, Mr. T. A. Collingwood, of Street, Somerset, was elected as surveyor from among 33 candidates.

A building strike has broken out in Geneva, and the strikers have committed a series of excesses at spots where buildings were in progress, and also against the police. Some arrests have been made, and the military have been employed for the restoration of order.

The death is announced from Hobart, Tasmania, of Mr. Charles Fagg, who had been a member of the Society of Architects since 1885.

The erection of a monument to Mozart, Haydn, and Beethoven, in Berlin, has been entrusted to the well-known sculptor, Rudolf Siemering, who built the Washington Monument at Philadelphia.

A special committee has been appointed by the Tottenham District Council to consider the advisability of erecting a set of municipal buildings.

Mr. J. Shires Will, Q.C., made his awards on Friday, in the cases submitted to him in London, in which Mr. George Thompson, late secretary of the Harrogate Waterworks Company, which has now been purchased by the Harrogate Corporation, sought compensation, claiming £3,648, and has been awarded £2,700. Mr. Henry Bungay, who has been retained as clerk and collector, a position which he occupied for many years in the company, has been awarded £820, payable as an annuity, when he declines his office.

The hydropathic baths at Shandon, N.B., were gutted by fire on Friday. The building destroyed included Turkish, swimming, and general suite of ladies' and gentlemen's baths. The damage will amount to between £3,000 and £4,000.

At its sitting on Friday, under the presidency of Lord Dean of Guild Graham, C.I.E., Glasgow Dean of Guild Court had to deal with a roll of 63 cases, representing property to the value of £67,500.

Arrangements have been made for the handing over to the Library Committee of the City of London Corporation of the late Mr. Alfred Cock's unique collection of Sir Thomas More's works. It was the expressed wish of the deceased that his collection should pass into the hands of the City.

Mr. Justice North held on Friday that a house in Tottenham Court-road, through which the owners of the Oxford Music Hall had made an entrance to their place of amusement, was held with the property behind it as one establishment, and that, therefore, the owners were liable to be assessed on the whole building on the betterment principle, in accordance with the notice served on them by the London County Council.

The marble bust of Burns presented by local admirers of the poet to Tullie House, Carlisle, was unveiled on Wednesday afternoon by Mr. Wheatley in the art gallery of the institution. The bust is the work of Mr. D. W. Stevenson, R.S.A.

A new mission church on the Marsh, Lancaster, was opened on Thursday in last week. It seats 350 persons, and has cost £2,000.

The gross value of the estate of Sir Edward Coley Burne-Jones, of The Grange, Northend-road, Hammersmith, who died on June 17 last, aged 64 years, has been entered at £53,493 9s. 7d.

At the last meeting of the Harpenden Urban District Council a letter was read from the Local Government Board, regarding the appointment of Mr. William Walton as surveyor and inspector of nuisances, stating that they observed from the answers to queries put by them, that Mr. Walton was to be allowed to continue in business as an architect. If this was the case, he should enter into an undertaking with the council to provide that he would wholly abstain, in private business, from engaging in any works arising out of, or connected in any way with, the duties of his office of inspector. The council agreed to reply confirming to these requirements.

A lecture-hall which has been presented to Cemaes, Isle of Anglesey, by Mr. David Hughes, J.P., was opened on Tuesday. The edifice, which has cost £2,500, has, on the ground floor, the principal hall, to be used for public meetings, &c., with seating accommodation for 250 people. Besides, there are retiring-rooms, a refreshment-room, news and smoke room, reading-room and library, and lavatories. At the rear of the building is the keeper's house. Above the main entrance is a clock tower. The building has been erected by Mr. Hughes's own workmen, the architects being Messrs. Richard Owens and Son, Liverpool. Messrs. Thomas Russell and Sons, Liverpool, supplied the clock for the tower.



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## ILLUSTRATIONS.

NEW COUNCIL OFFICES, ALTRINCHAM.—SELECTED DESIGNS  
FOR EMMANUEL CHURCH, EXETER.—STUDIES OF ANIMAL  
LIFE TREATED FOR DESIGN.—"THE CROFT," EALING.—  
HOUSE AT SUTTON COLDFIELD.

## Our Illustrations.

NEW COUNCIL OFFICES, ALTRINCHAM, CHESHIRE :  
SELECTED DESIGN.

THIS design is the one chosen in the open competition, in which 26 architects took part this spring. It was submitted under motto "Vox Populi," and was awarded first place by the assessors, Mr. John Ely, F.R.I.B.A., of Manchester, and the Council have unanimously decided to instruct the authors to prepare drawings and quantities on the usual terms. Altrincham is one of the oldest of the quaint Cheshire market towns, and is the only town having a mayor, but not being a borough, being under an urban district council only. The design is in a plain, but picturesque, Jacobean style, the limit of cost forbidding any ambitious features. It is free from external timber or stucco features, and is solid and fireproof throughout, the upper floors being of concrete and steel joists, with pine block flooring. The main building contains all public departments on the ground floor, the finance offices, rates, and overseer's being on each side of the main entrance. The first floor is exclusively for council and committee business, and as a separate entrance and steps is provided to the Press and public gallery of the council chamber, it follows that the main staircase is absolutely private to the members and officials only. In the rear is a fire-engine house, mortuary and post-mortem room, and a caretaker's cottage. The site is a fine one at the juncture of Market-street and Dunham-road, and is elevated above the general roadway. The materials will be externally Accrington red facing and Buncorn freestone dressings; internally the woodwork will be of Australian Kauri pine; passages, hall, &c., floored with marble terrazzo; and dados of decorative tiles to staircases, corridors, &c. The council chamber is a fine room with arch panelled plaster ceiling, well lighted on three sides, panelled all round. A courageous step has been taken by the Council in deciding to omit all fireplaces, and rely entirely on a perfect system of hot-water heating and special ventilation; duplicate interchangeable furnaces will be used for the heating. The cost is estimated at £4,500, exclusive of furniture, &c. The joint-architects are Mr. Chas. A. Hindle, A.R.I.B.A., and Mr. Herbert Davenport, of Eccles.

EMMANUEL CHURCH, EXETER.

THE walls of this church are of Babbacombe stone outside, dressed Pocombe stone inside, with Bath stone dressings. The roofs are in pitch-pine covered with red plain tiles. The floors are laid with wood blocks and encaustic tiles in the chancel with marble steps. The chancel fittings are in oak, and the nave seating in pitch-pine. The heating is by Messrs. J. King and Co.,

Liverpool, on low-pressure system. The contractor for the whole work is Mr. N. Pratt, Great St. Mary's, and the clerk of the works Mr. T. Granfield, of Exeter. The architect is Mr. Harold Brakspear, A.R.I.B.A., of Corsham. The work is expected to be completed for opening next Easter.

## STUDIES OF ANIMAL LIFE TREATED FOR DESIGN.

DURING the past six months we have been publishing a series of drawings for which medals were awarded by the Science and Art Department, illustrating the application of animal forms with a view to their incorporation in decorative design. To-day we finish this present series by giving another sheet from the pencil of Mr. John J. Brownword, of the Royal College of Art. There is nothing to add by way of description, as the drawings speak for themselves. The silhouette sketches strikingly demonstrate how well the characteristics of the birds chosen for the artist can be expressed by outline and flat washes. There is no hesitancy about these drawings, though a special attention is ungrudgingly given to strict accuracy of form.

## "THE CROFT," EALING.

THIS house has been erected on a triangular piece of land in the Blakesley-avenue, Ealing. The ground plan shows the accommodation on that floor. The first and attic floors provide six bedrooms in all, with usual bath, linen, and box-rooms. The walls are faced with red tile hanging and Bath stone is used for dressings. The roof is covered with a dark brindled tile, and the timber to gables is solid and Stockholm tarred. The dining-room and hall have beam ceilings with plaster between joists. The contract has been satisfactorily carried out by Messrs. Edwards and Medway, from the designs of Mr. Ernest R. Barrow, A.R.I.B.A.

RESIDENCE, BLACKROD ROAD, SUTTON COLDFIELD, BIRMINGHAM.

THE accompanying illustration represents the front view of a residence which has just been erected at Sutton Coldfield. The materials used were local bricks, with best pressed red bank bricks for sills and string-courses and chimney caps. The roofs are covered with Broseley tiles. The architect was Mr. R. S. Oldacre, Birmingham.

## CHIPS.

FOURTEEN sets of plans of new buildings, including eighteen dwelling-houses, were sanctioned by the Aberdeen Dean of Guild Court on Friday. The estimated cost of the new property is £23,000. Sanction was also given to an extensive addition to the headquarters of the 1st Aberdeen Volunteer Artillery.

THE shareholders of the London, Tilbury, and Southend Railway Company have approved the Bill for empowering the Metropolitan District Railway Company and their company to subscribe towards the capital of the Whitechapel and Bow Railway Company.

THE Bishop of Oxford reopened on Saturday the parish church of St. Mary, Aldermaston, Reading, which has been restored at the cost of Mr. Keyser. The church presents examples of several periods of architecture, and contains some fine specimens of 13th-century painted glass. In the course of the restoration work interesting wall frescoes depicting St. Christopher and other subjects, and also the Decalogue, were disclosed, and they have undergone special treatment for preservation. The Bishop also opened in the same village the parish hall, which has been built at the sole cost of Mr. Keyser.

LADY Herschell laid the foundation-stone, on Saturday, of a new mission hall in Essex-road, Islington, for the St. John's district. The freehold of the site is a gift, and the cost of erection and equipment of the hall, about £3,700, has been subscribed, with the exception of about £500.

A fire broke out at half-past six on Sunday evening on the premises of Messrs. Battley, Son, and Holness, builders, of Ackworth-street, New Kent-road. A great quantity of timber and some valuable machinery were destroyed. The loss, however, is covered by insurance.

PUBLIC baths and washhouses, which have been presented to the town of Dumfries by Miss M'Kie, Moat House, were formally handed over by her to the town council on Thursday in last week. The building, which has been erected in the Greensands Park, contains ten separate washing apartments, with laundry room, eight plunge baths, and two spray, shower, and wave baths. It has been erected from the plans of Mr. Barbour, Dumfries, and the cost will approximate to £4,000.

## COMPETITIONS.

CHIPPENHAM.—A meeting of the Technical School Committee was held at the Jubilee Institute on Saturday afternoon to receive the report of the assessors upon the plans submitted for this school, and to open the envelopes, counting the names of the competitors. The plans selected by the assessors were those marked "Lux," which proved to be by Mr. Robert E. Brinkworth, F.S.I., of Chippenham; the next best set, marked "X. Y. Z.," were by Mr. Harold Brakspear, of Corsham. Through the kindness of the headmaster of the Merchant Venturers' College of Bristol, the plans submitted for competition were hung at that institution on Thursday in last week, and the assessors were the Mayor of Chippenham (Councillor Marshall), the chairman of the Technical Education Committee (Alderman Coles), Professor Wertheimer, Mr. Barnard, F.R.I.B.A., Bristol, and Mr. Stanier, chairman of the Swindon School Board.

MAIDENHEAD.—The Maidenhead Diamond Jubilee Memorial Committee held a meeting on Wednesday, July 13, to consider designs sent in for proposed Jubilee clock-tower. The first premium was awarded to Mr. E. J. Shrewsbury, A.R.I.B.A., Queen-street Chambers, Maidenhead; the second premium to Mr. John L. Kirk, M.S.A., 3, Queen's-terrace, Queen-street, Maidenhead.

MILLBANK WORKMEN'S DWELLINGS.—The Housing Committee have reported to the London County Council that the latter body on Feb. 2 authorised them to issue an advertisement inviting architects to send in their names as being willing to submit designs for the erection of dwellings on a portion of the Millbank estate. Some 70 architects have intimated their willingness to submit competitive designs, and from these the committee have made a careful selection. The following 18 are included in the committee's choice:—Mr. F. Arnett, Mr. T. J. Bushell, Mr. H. H. Collins, Mr. H. F. T. Cooper, Mr. C. E. Cronk, Mr. H. W. Dobb, Messrs. Ellison and Son, Messrs. Gibson and Russell, Mr. G. S. Hill, Mr. F. Hooper, Messrs. Howgate, Leeds, and Keith, Messrs. Joseph, Son, and Smithem, Messrs. Newman and Jacques, Mr. Rowland Plumble, Mr. W. H. Seth-Smith, Messrs. Spalding and Cross, Messrs. Waring and Nicholson, Mr. R. Williams.

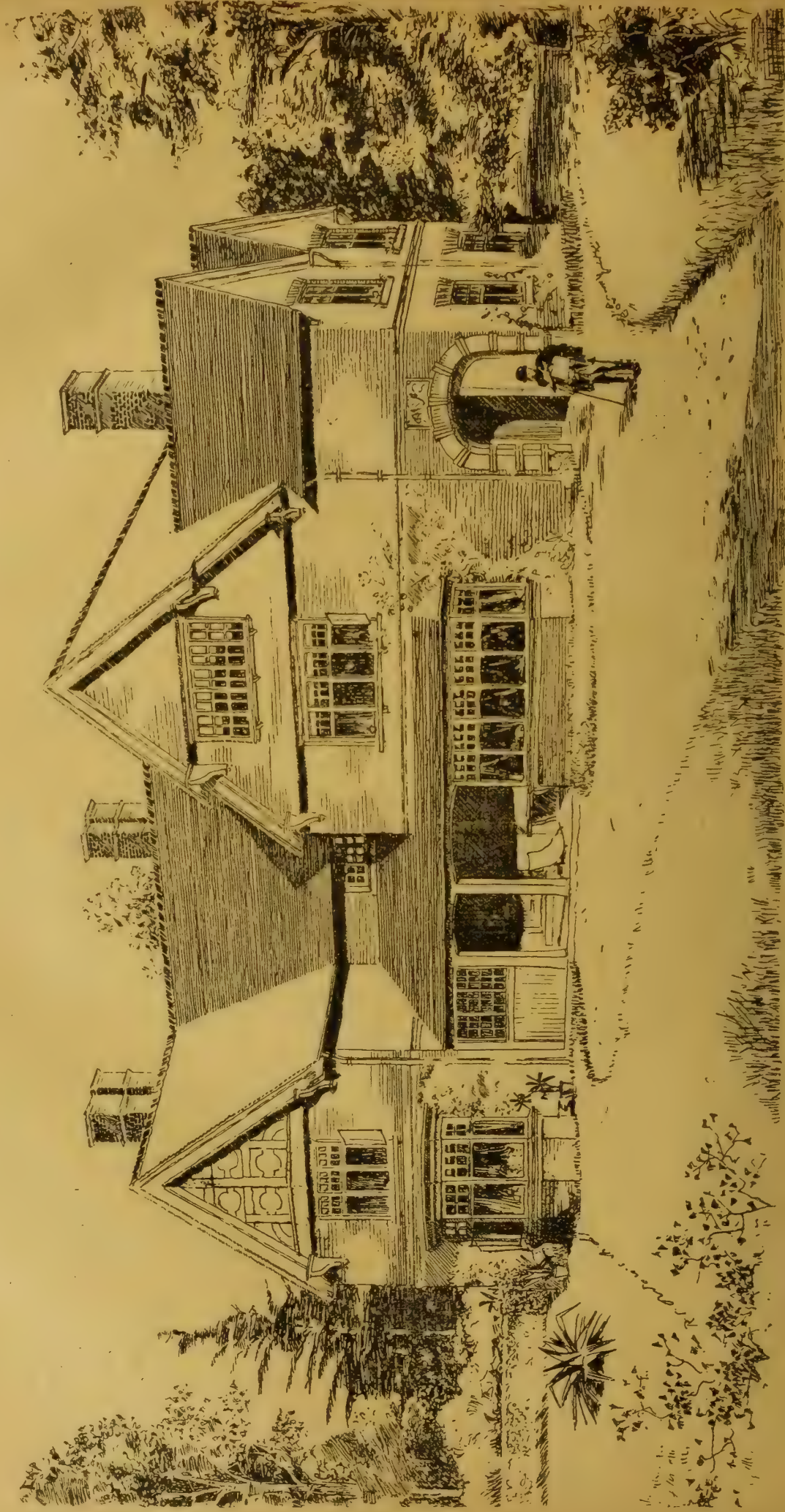
OUNDLÉ.—In the competition for a new town hall to be built in commemoration of the Diamond Jubilee, the design submitted under motto by Mr. J. B. Corby, of Stamford, has been unanimously selected. The building, which is to seat 450 persons, is to be erected within a limit of cost of £1,800.

THE inhabitants of Battersea are being well provided with baths and libraries. The Baths Committee have recommended the purchase of an additional 10,000ft. of land in Battersea Park-road, adjoining the site of the new public baths and washhouses, which would enable them to enlarge the laundry increase the number of men's slipper baths, and provide an additional swimming bath. The land belongs to the Southwark and Vauxhall Water Company, who are willing to dispose of the site for £1,878.

THE new pier at Walton-on-the-Naze, constructed for the Coast Development Co., Limited, was opened on Saturday. The company acquired the property of the old Pier and Hotel Co., which comprised the old pier, 600ft. long, and the hotel at its base, and has added to both. The old pier merely extended to about low water mark, but the extension has carried it a further distance of 1,905ft., making the total length 2,505ft., or only 135ft. short of half a mile. It is divided into a promenade for pedestrians 14ft. wide, and a similar width for the electric railway. The lighting will be by electricity. The pier-head is curved and widens out to 40ft., and steamers will be able to lie on either side.

THE Dean of Guild Court for Glasgow have twice adjourned and are still considering an application on behalf of Kirkland's trustees for permission to erect in Waterloo-street, adjoining the Corn Exchange, a tenement of offices 119ft. high, and comprising nine stories and basement. At a former meeting of the court, ex-Deacon-Convener Copland stated from the bench certain objections based upon what might be the result of a fire occurring in such a building as that proposed. The court had, he considered, no legal position to object, as the building was to be used as offices; had it been for warehouses, it would have been a different matter. Objections were lodged at the adjourned hearing by the adjoining proprietors, including the Corn Exchange, and the case was referred back.





House Recently Erected Blackrook Rd Sutton Coldfield: R. S. Oldacre Archt.







NATIONAL SILVER-MEDAL DRAWINGS

BY JOHN J. BROWNSWORD







STUDIES OF ANIMAL LIFE TREATED FOR DESIGN











EMMANUEL NE

SELECT

HAROLD BRAY





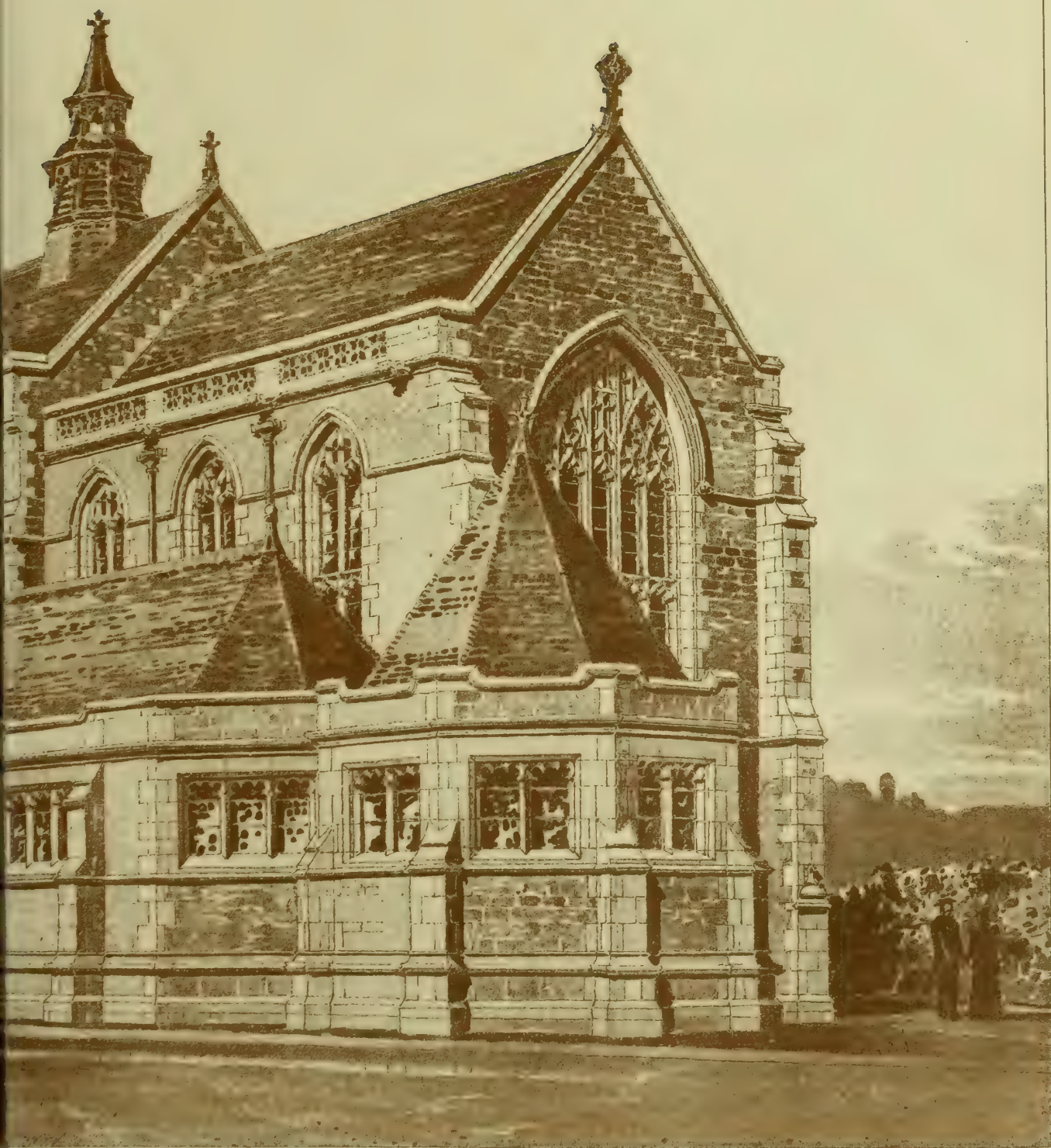
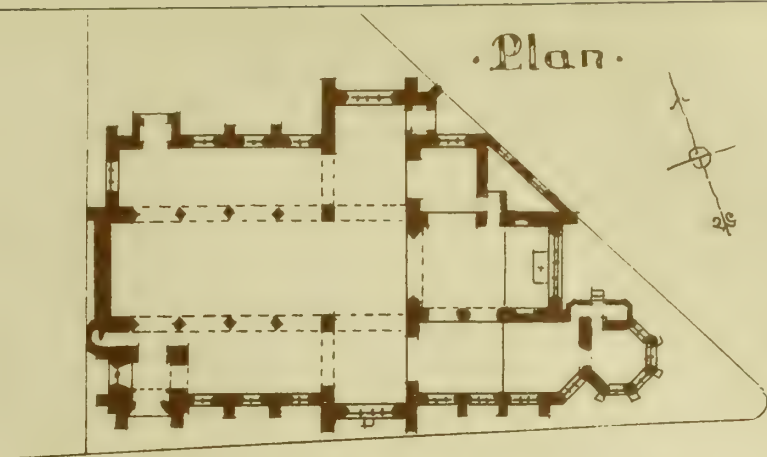
ES. JULY 22, 1897.

HURCH. EXETER.

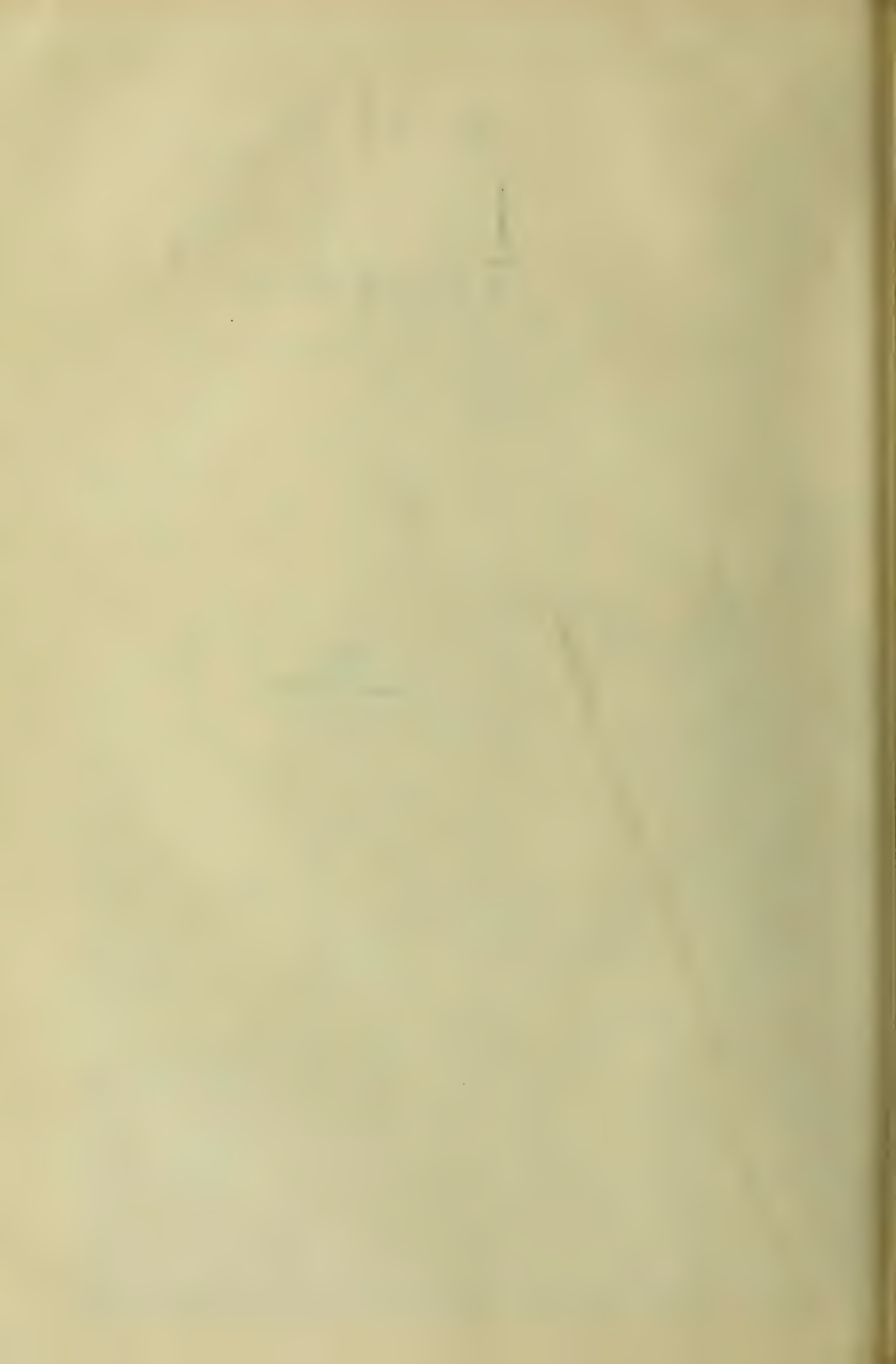
DESIGN

R. ARCHITECT

Plan.





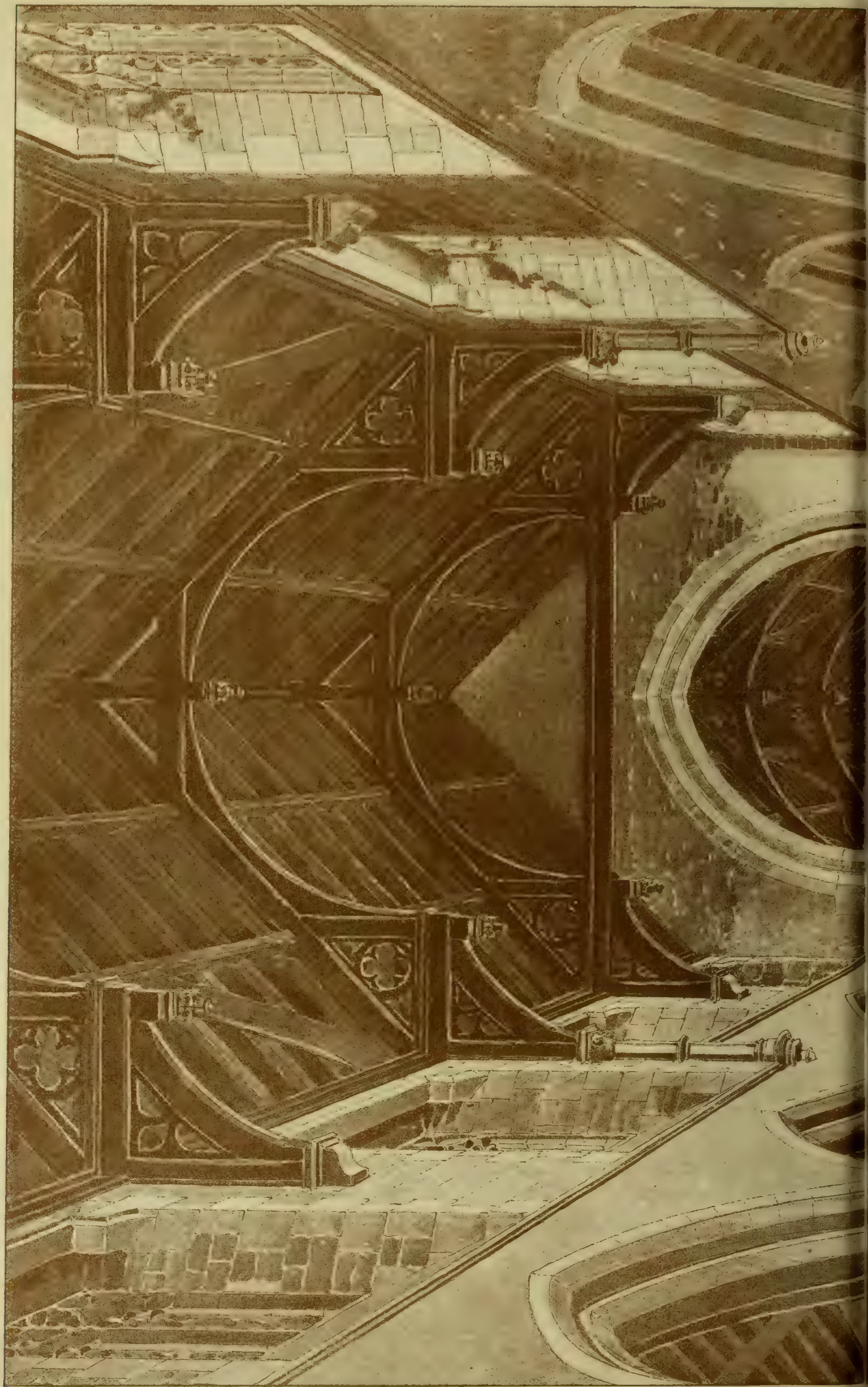




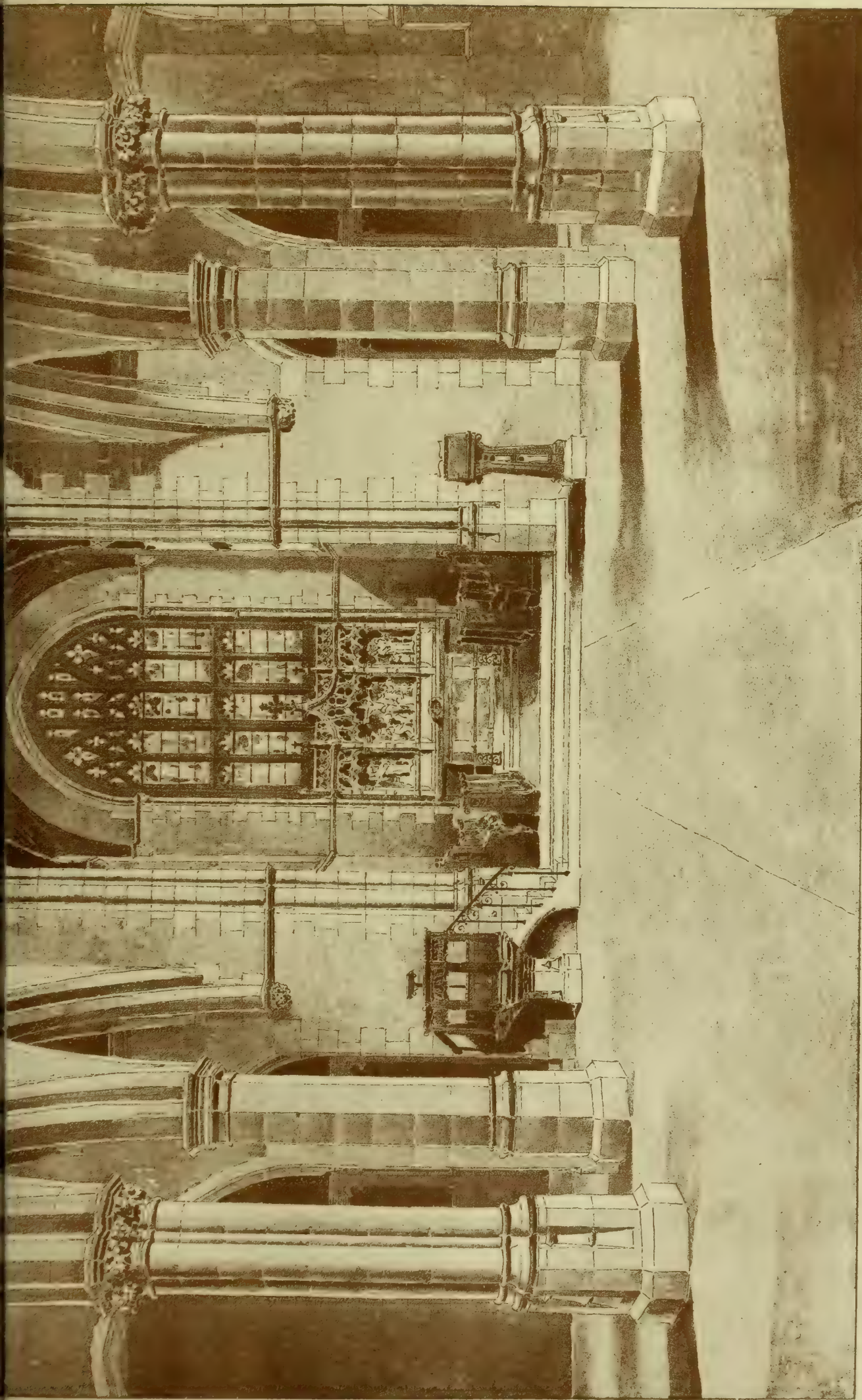




THE BUILDING DEWS, JULY 22, 1898.







"PHOTO-TINT" BY JAMES AKERMAN, 15, QUEEN'S SQUARE, LONDON, W.1.

EMMANUEL NEW CHURCH, EXETER.      SELECTED DESIGN.

HAROLD BRAKSPEAR, ARCHITECT





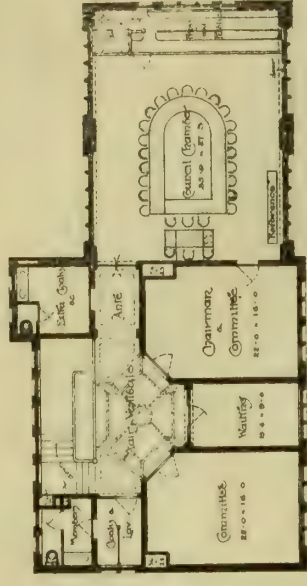
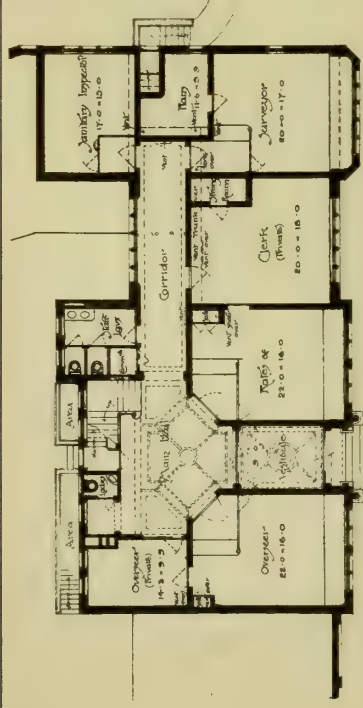




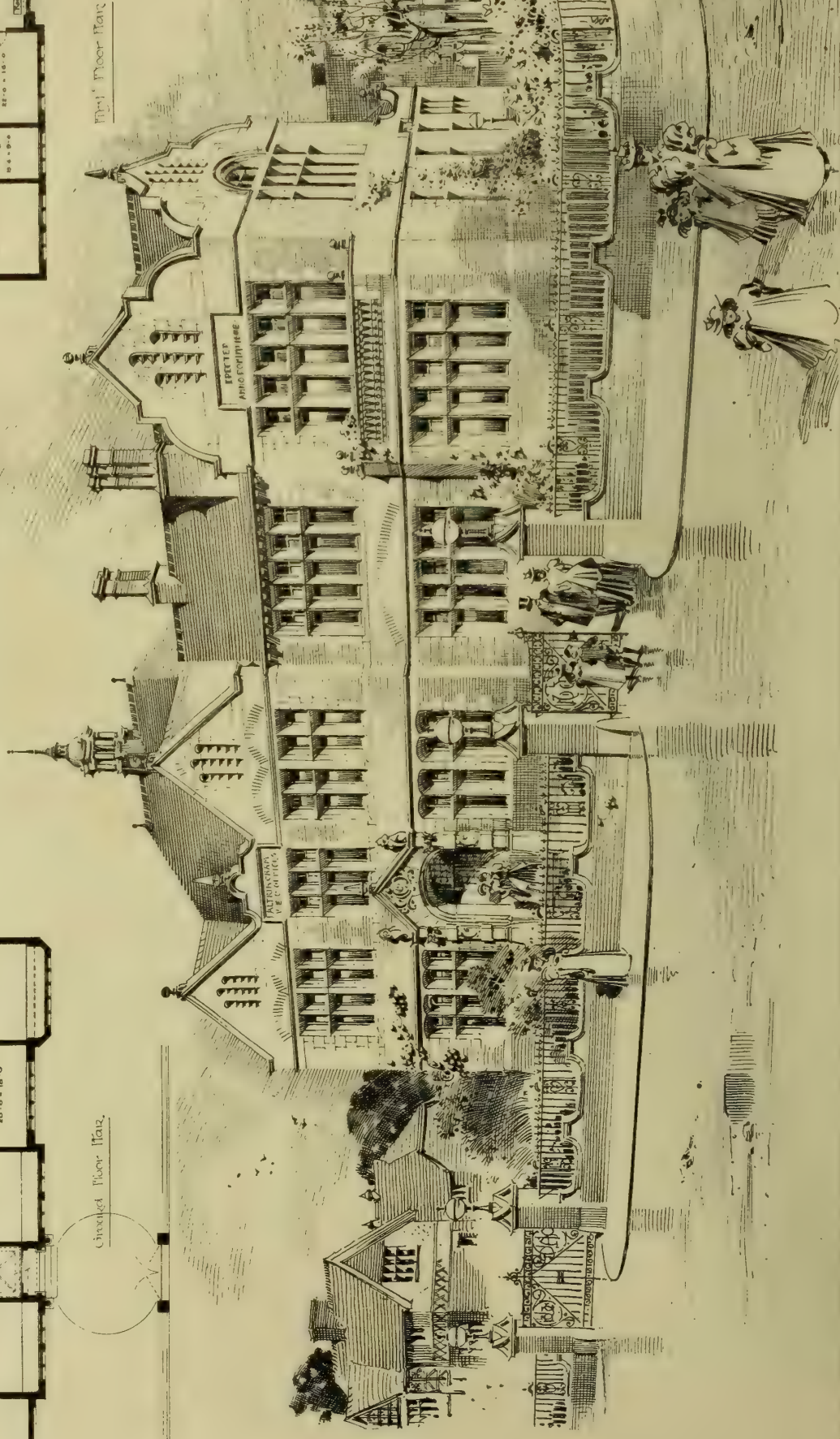


ALTRINCHAM URBAN DISTRICT COUNCIL OFFICES.

SELECTED DESIGN, HINDLE & DAVENPORT, ARCHITECTS.

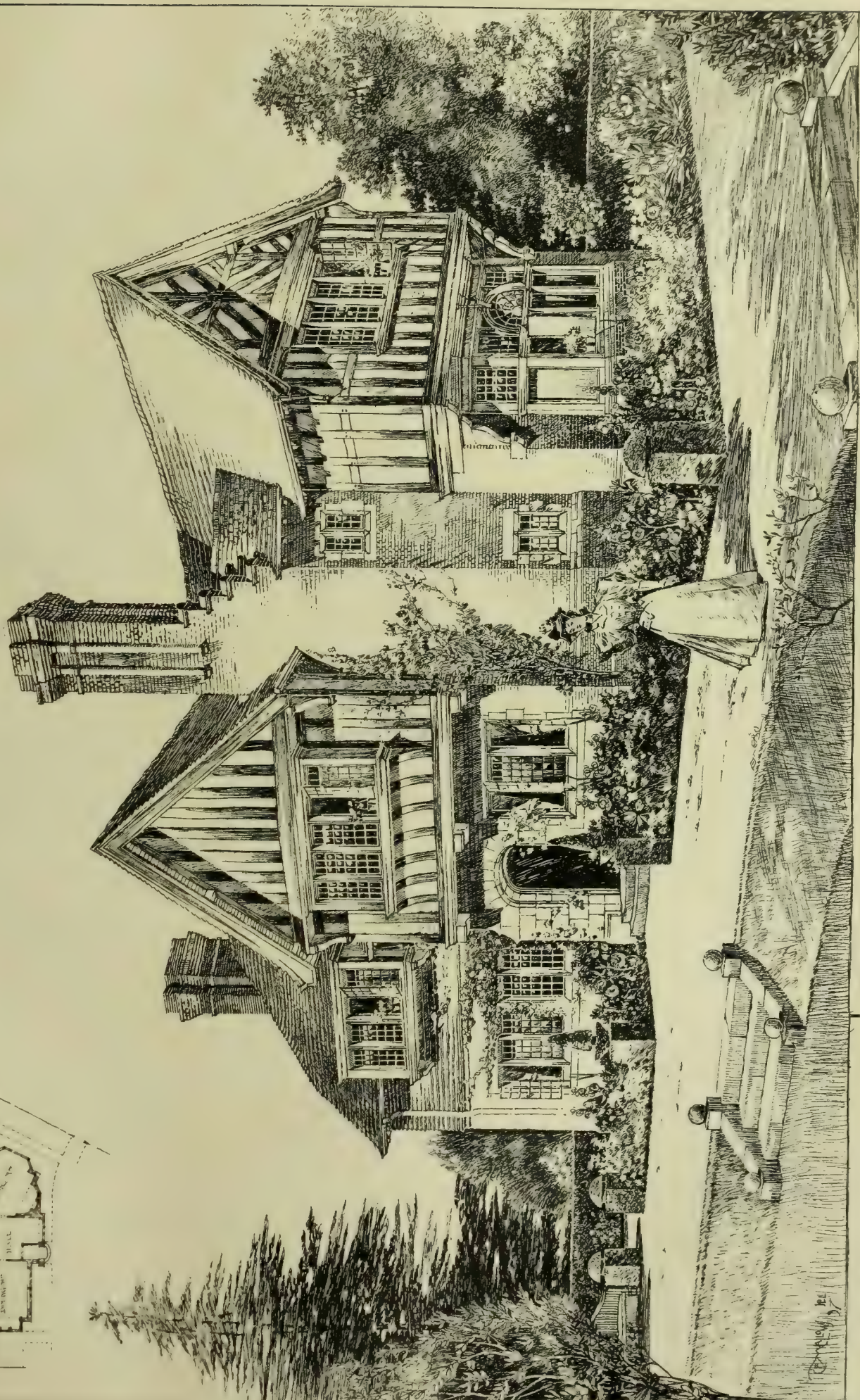


Circled River Hair.



III. Moor Flare



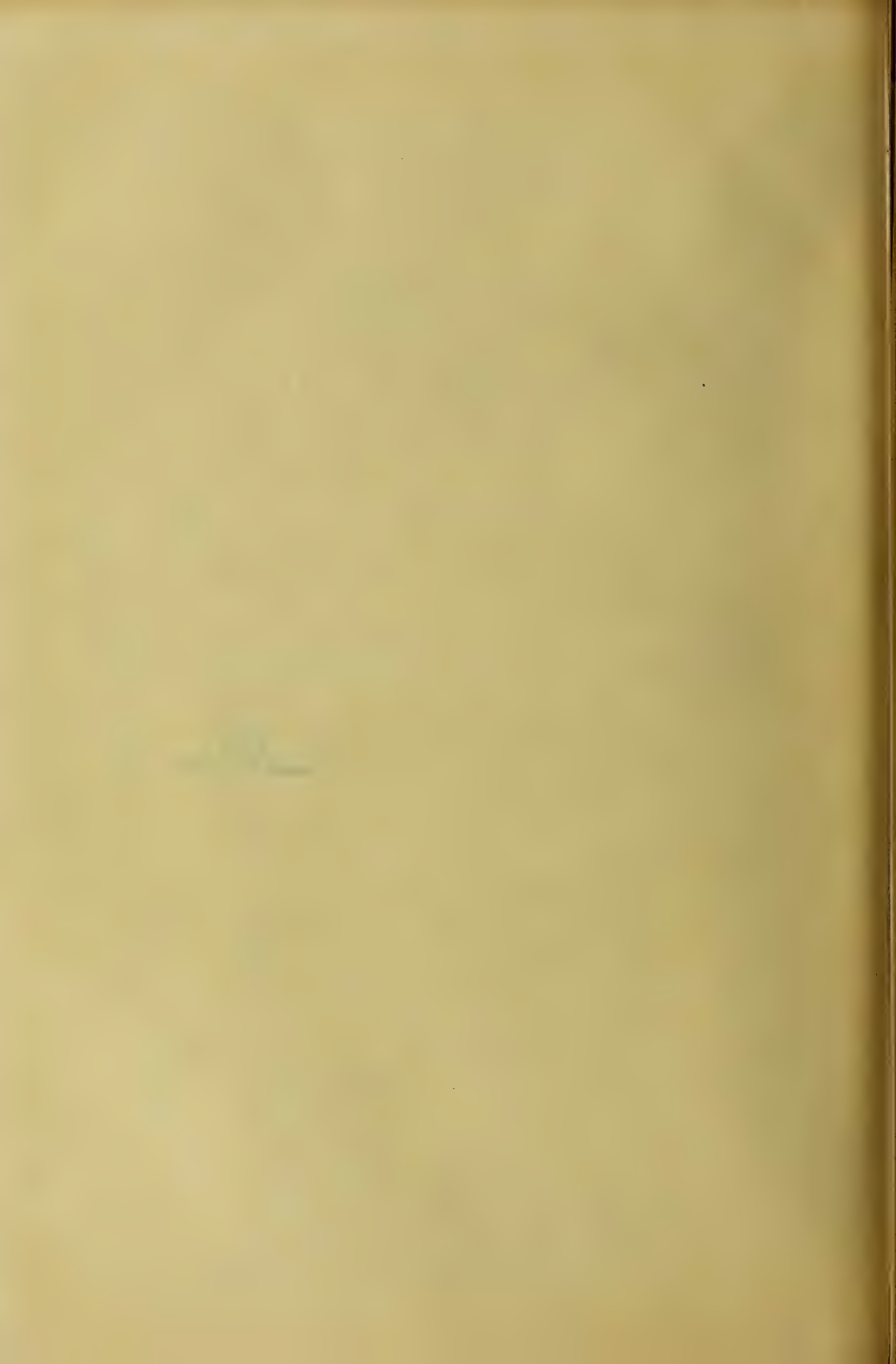


VIEW OF ENTRANCE FRONT

THE CROFT BLAKESLEY AVENUE EALING.

ERNEST R. BARROW ARCHT. LONDON







## Building Intelligence.

**CREWE.**—The old premises at the junction of Victoria-street and Market-street, Crewe, have been removed under an important street-widening scheme by the town council, and new premises built on the site will be opened to-day (Friday). The new premises are four stories in height, with a circular frontage of 70ft., and cover an area of 1,444sq.ft. The basement floor, which extends throughout the whole premises, is lit by the prismatic lights of Messrs. Hayward Brothers and Eckstein, of Union-street, S.E., on the most modern principles. The ground floor consists of one shop 38ft. by 37ft. 9in., and the large plate-glass front extends the whole length of the premises. There are two entrances from Market-street and Victoria street. The floors are laid with Roman mosaics, and the whole of the wood-work of the shop-fronts is carried out in polished African teak. The structure has been erected by Mr. Councillor Thomas Smith, Crewe, and the whole of the work has been carried out from the plans, and under the personal superintendence, of Messrs. Richard Owens and Son, architects, Crosshall-street, Liverpool.

**LLANFYLLIN.**—At the meeting, on Friday, of the School Governors of Llanfyllin, Mont., the clerk reported that, in accordance with instructions at the last meeting, he had written to Mr. A. Teather, Cardiff, from whose designs the Newtown and Llanidloes Intermediate Schools had been erected, and to Messrs. Hipkiss and Bassett, Aberystwyth and Aberdovey, who had erected the Machynlleth Schools, asking their terms for erecting permanent buildings at Llanfyllin. Messrs. Hipkiss and Bassett wrote that their terms were 4 per cent. on the outlay if they carried the buildings to completion. In the event of the work being abandoned, their charge would be ten guineas and incidental expenses. Mr. Teather wrote that his terms would be 5 per cent. on the outlay inclusive. The chairman thought that in Mr. Teather they had the right man. He had instructed the clerk to write to Mr. Teather, asking him to attend. After some discussion, it was decided to see Mr. Teather. In the course of the conference, Mr. Teather stated that it was impossible for him to undertake the work for less than 5 per cent. He could prepare preliminary plans for £5, and it was eventually agreed that he should prepare those.

**MORECAMBE.**—The new pavilion on the pier at Morecambe was formally opened on Monday in last week. It has been erected by Messrs. Peters and Sons, of Rochdale, from plans by, and under the supervision of, Messrs. Mangnall and Littlewood, of Manchester, and from the same architects' designs the pier itself has been widened from 20ft. to 42ft., a platform 250ft. by 159ft. being added alongside the pier-head to form the substitution for the pavilion. These works of widening have been executed by the Widnes Iron Co. The pavilion itself is Free Renaissance in style, the internal measurements being 96ft. by 70ft.: it is surmounted by a central dome, and has a balcony 115ft. by 90ft. The iron columns are set back so that the view of the stage is interfered with as little as possible. At the corners nearest the stage there will be boxes, the front of which, like the front of the balcony and the proscenium, will be covered with fibrous plaster work. The seating accommodation approaches 2,000. The four outside balconies are to be made into roof gardens. There will be six shops round the pavilion, with a shelter on either side, whilst the manager's office and the directors' room will be on the west side. There are seven dressing-rooms on the east side of the stage, and it is contemplated to increase this number to eleven by carrying that wing higher. On the other side are bandrooms, property rooms, and other offices. The stage front is 30ft. wide. At the back of the pavilion there is to be an ornamental verandah and shelter for use in inclement weather. The sub-contractors were:—Mr. Boekbinder, London, decorations; Mr. Higginbotham, Idle, plumbing work and tinted glass; Messrs. A. S. Taylor, Birmingham, zinc roofing; Messrs. A. R. Dean, Limited, Birmingham, seating, &c.; Messrs. Baxendale and Co., Manchester, lead lighting; Messrs. McCulloch, Bond, and Co., Sheffield, scenery; Messrs. Jenkins, Tollarton, and Co., Leigh, stage lighting.

**NEWINGTON BUTTS.**—Good progress is being made in restoring the basement schoolroom of the Metropolitan Tabernacle, and it is hoped to re-

open for service this portion of the buildings (which it will be remembered were destroyed by fire on April 20th) early in the autumn. The main structure will then be rebuilt on the old lines; but larger vestry accommodation will be taken out of the rear of the chapel, and the upper gallery will not be reconstructed. Messrs. Searle and Hayes, of Ludgate Hill, E.C., are the architects; and Messrs. Higgs and Hill, of Crown Works, South Lambeth (successors to Mr. William Hill, the original contractor for the Tabernacle), are the builders.

**SHERINGHAM.**—The Grand Hotel, built from designs by Mr. Herbert J. Green, of Norwich, was formally opened on Thursday in last week. The new hotel faces north, and is Modern Classical Victorian in style. The front is broken up by a lofty centre turret, cupolas at each angle, and bay windows. It is built of brick and white stone, interspersed with white Cossey bricks, and is fitted with iron balconies, which are approached from the first-floor windows. The front central entrance is reached by circular steps, and the doors open over a mosaic pavement, which extends through the two vestibules. In the first of these, on each side, are hat and cloakrooms, and a porter's room. The hall is fitted with two lounges, each containing a fireplace. The hall is carried on four circular columns, and at one corner is the manager's office. Out of the hall leading east and west are the reception-rooms, including a drawing-room; the dining-room, which accommodates 300 visitors, reading-room, billiard-room, all fitted and furnished in oak. In the lavatories the fittings are by Tylor, of London. Each of the corridors is 8ft. in width. In the east corridor is the passenger lift, which carries from basement to roof, and there is also a luggage lift. From the south corridor the still-room and other rooms connected with the service of the hotel are approached, and here is the manager's office. A staircase of great width leads to the upper stories, and the stained-glass windows contain pictures of ships from the earliest ages down to the latest patterns. The sitting-rooms are arranged on the first floor, and the visitors' bedrooms number about 120, each having a fireplace and an electric bell communicating with the servants' quarters. Ten tanks at the top of the building hold 6,000 gallons of water for the supply of the whole house. The furnishing has been done by Messrs. Trevor and Page, of Norwich. The building is lighted throughout with incandescent gas-burners. On the west side of the hotel is a winter garden. There is also a laundry outside communicating with the hotel, and stabling is provided for twelve horses. The clerk of the works has been Mr. C. Bullen. The builders are Messrs. J. Youngs and Son, of Norwich.

The sales at the Auction Mart last week, as registered at the Estate Exchange, amounted to £203,656. Although this is a large figure, most of the more important estates, landed and residential, and several West-end houses failed to find purchasers, although in some cases offers were made nearly approaching the prices required by the vendors. Last year the sum recorded for the corresponding week was £320,005; but the supply then was larger owing to the rush of auctions postponed on account of the Jubilee.

At a meeting on Friday of the Baths Committee of the city of Bath, Major Davis, F.S.A., reported the discovery of a consecration cross in the excavations at the Kingston baths. It was the first Christian antiquity discovery on the site, and belonged to the 7th century; it was extremely valuable. Tenders were ordered to be obtained for making a continuous promenade gallery round the large Roman bath. The works sub-committee were instructed to consult Mr. J. M. Brydon, F.R.I.B.A., of London, and bring up a scheme for decorating the new concert-room.

On Thursday in last week, Mr. W. O. E. Meade-King, Local Government Board Inspector, held an inquiry at the Old Public Offices, Halesowen, into the application of the Halesowen District Council for sanction to borrow £625, £420, and £99, for works of sewerage in the parishes of Halesowen, Hasbury, and Hawne respectively. Mr. W. Fiddian, engineer, produced and explained the plans.

At the last meeting of the Eckenham Urban District Council, the chairman reported that the deputation who inspected the new system of coal filtration of sewage at Malvern were perfectly satisfied with its operation, and recommended the same system to be adopted at Astwood Bank. The clerk was instructed to procure plans and estimates for two coal filters.

## Engineering Notes.

**MIDDLESBROUGH AND STOCKTON TRAMWAYS.**—The Middlesbrough, Thornaby, and Stockton electric tramways have been inspected by Major Sir Francis Marindin, of the Board of Trade Railway Department, and, being passed, were opened for traffic on Saturday. The stock extends from Norton to the railway crossing at North Ormesby, a length of 6½ miles, and also from the Royal Exchange, Middlesbrough, to Linthorpe, a distance of some two miles, and, the greater part of the track being double, there is over twenty miles of track. The rails are of the steel girder type, weighing 92lb. per yard, manufactured by the Leeds Steelworks, Ltd. The weight used per mile of single track is thus 145 tons. This is as yet the largest length of electric tramway ever opened at one time. Some particulars of the undertaking have been drawn up by Mr. J. Clifton Robinson, the managing director and engineer. In the construction of the road bed the following concreting quantities were used:—Grey Cleveland slag, 5,500 tons; best Portland cement, 3,500 tons; sand and gravel, 12,000 tons. For the tramways 2,700 tons of rails, points, crossings, fish-plates, bolts, and tie bars were used, while the copper bonding of the rail joints cost over £2,000. The paving required 1,300,000 scoria paving blocks, 7,500 tons of whinstone and granite blocks, and 75,000 tons of creosoted beech blocks. On these and other materials £20,000 was spent, in wages £15,000, in railway and carriage charges £5,000. The power-house and other buildings cost £10,000, while the contracts for the steam and electrical plant, poles, and overhead lines represent a sum of £70,000. The entire cost of the system has so far been £200,000. The whole of the electrical plant and equipment has been supplied by the British Thomson-Houston Company, Limited, under the supervision of Mr. Horace F. Marshall. The power-house is in Bridge-road, Stockton; the engine-room is 110ft. by 52ft., and has a clear space of 36ft. from the floor to the tie-bars of the roof principals. The boiler-room is 28ft. by 48½ft., and is of the same height as the engine-room. The company has a wharf with a frontage of 200ft. to the River Tees, and upon this is an electric crane for discharging coal from the vessels.

### CHIPS.

The foundation-stone of the new church of St. Barnabas at Regent Park, Morecambe, was laid yesterday (Thursday), when the Bishop of Manchester gave an address.

During the week there has been brought to light in the foundations of the eastern chapel of Peterborough Cathedral, now being underpinned, an elaborately tooled tomb-slab of Barnack stone.

The foundation-stones of a new Wesleyan chapel at Bishopthorpe, near York, were laid on Wednesday week. The chapel will seat 120 worshippers, but there is to be a vestry on one side, with folding doors, by means of which the accommodation may be increased by about 30 seats. The building will be heated by hot water, and lighted by gas. The architects are Messrs. Hornsey and Monkman, Railway-street, York, and the contractors engaged on the work are as follows:—Bricklayer, mason, joiner, and plasterer, Mr. Jonathan Simpson; slater, Mr. Joseph Hardgrave; plumber, Mr. J. H. Shoukamith; painter, Messrs. W. Bellerby and Sons. The cost will be £1,150.

The candidates for the vacancy created at South Kensington by Mr. Walter Armstrong's retirement from the directorship of the Art Department are Mr. Walter Crane, Mr. Alfred Gilbert, R.A., and Prof. Herkomer, R.A.

At the Aberdeen sea-bathing station on July 14, the opening took place by the corporation of extensive additions to the equipment of the establishment. The extensions comprise a swimming-bath and a new block containing Russian, sitz, and several additional private baths. The block adjoins the south end of the main building, and is of two stories, with turrets at the four corners. The first bathing station cost 3,000. The present contract was £7,200, and an additional sum of £300 has been sanctioned, making a total of £10,500.

The Secretary of State has received a despatch from her Majesty's Consul-General at Christiania, stating that tenders are invited for the delivery of 1,200 seats for the National Theatre at Christiania. Tenders should be addressed to "Architect, H. Bulls Kontor, Nationaltheatret, Christiania," where they should be received by August 12, and where conditions of tender, drawings, and further information may be obtained.



## TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the BUILDING NEWS, 332, Strand, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

Cheques and Post-office Orders to be made payable to THE STRAND NEWSPAPER COMPANY, LIMITED.

## TERMS OF SUBSCRIPTION.

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## ADVERTISEMENT CHARGES.

The charge for Competition and Contract Advertisements, Public Companies, and all official advertisements is 1s. per line of eight words, the first line counting as two, the minimum charge being 6s. for four lines.

The charge for Auctions, Land Sales, and Miscellaneous and Trade Advertisements (except Situation advertisements) is 6d. per line of eight words (the first line counting as two), the minimum charge being 4s. 6d. for 40 words. Special terms for series of more than six insertions can be ascertained on application to the Publisher.

Front-page Advertisements 2s. per line, and Paragraph Advertisements 1s. per line. No Front-page or Paragraph Advertisement inserted for less than 5s.

Advertisements for the current week must reach the office not later than 3 p.m. on Thursday. Front-page Advertisements and alterations in serial advertisements must reach the office by Tuesday morning to secure insertion.

## SITUATIONS.

The charge for advertisements for "Situations Vacant" or "Situations Wanted" is ONE SHILLING FOR TWENTY-FOUR WORDS, and Sixpence for every eight words after. All Situation Advertisements must be prepaid.

## NOTICE.

Bound copies of Vol. LXXIII. are now ready, and should be ordered early (price Twelve Shillings each), as only a limited number are done up. A few bound volumes of Vols. XXXIX., XL., XLI., XLVI., XLIX., LI., LIII., LVIII., LX., LXI., LXII., LXIII., LXIV., LXV., LXVI., LXVII., LXVIII., LXIX., LXX., LXXI., LXXII. may still be had, price Twelve Shillings; all the other bound volumes are out of print. Most of the back numbers of former volumes are, however, to be had singly. Subscribers requiring any back numbers to complete volume just ended should order at once, as many of them soon run out of print.

RECEIVED.—W. T. B.—L. W.—A. K. and Co.—G. D.—W. D.—S. G. A.—W. H. S.

## Intercommunication.

## QUESTIONS.

[11987.]—**Elizabethan Lantern Slides.**—Can you tell me where I could obtain lantern slides to illustrate the domestic architecture of the Elizabethan period?—GREGORY.

[11988.]—**Old Timber Construction.**—I have lately been examining a new oak porch (fixed during the restoration of a small church in the country). All the tenon joints are secured with round oak pins, projecting 3in. from the surfaces of the timbers. Is not this an exaggeration? Did the old builders so construct, or did they not rather finish the pins flush, leaving us later observers of their work to account for the slight projection of the pins by the shrinkage of the timbers?—STUDENT.

[11989.]—**Wooden Villas.**—I should be glad of some information respecting wooden detached villa residences. I want plans and detailed specifications. Our local architects have no experience in this work. Where can these houses be best obtained? Have they been proved to be weatherproof and comfortable in this climate? As regards heating such dwellings, do you know of any system of healthy heating by pipes, radiating the heat, and not merely warming the air, which is considered an undesirable mode of heating?—X. Y. Z.

[11990.]—**Church Roof.**—A roof truss of 24ft. span and of equilateral pitch, composed of principal rafters, with collar braces and curved ribs underneath, with wall posts and hammer beams is required. Will someone give me the scantlings required to make a substantial roof? The principal trusses are to be placed 10ft. apart.—A DRAUGHTSMAN.

[11991.]—**Fireproof Floors.**—Where can I get information about the various fireproof systems of flooring, and the cost per square foot?—TROMAS.

[11992.]—**Marble-work.**—How are polished slabs of marble, 3in. thick, secured to the cast-iron stanchions? Are cramps required, and what cement ought to be used? Should the space be filled up with anything, and what? Will some practical reader answer these queries and oblige!—IGNORANT.

[11993.]—**Holiday Tour.**—I am desirous of spending my holidays in Somersetshire in search of 17th century

Domestic Architecture. Can any of your readers give me a list of houses worth a visit, within easy distance of each other, or suggest another county? If so, they will oblige.—SKETCHER.

## REPLIES.

[11981.]—**Technical Education Board.**—Write to the School of Art and Crafts, and you will receive full particulars.—LOUIS ERWOLD.

[11984.]—**Technical Education Board.**—"A. G." had better apply to the Curator or Secretary of the Central Schools of Arts and Crafts, 316, Regent-street, W. Apprentices and learners are taken free, and for workmen the payment is only 1s. a month, I believe. The ordinary fee is 2s. 6d. a month. The prospectus will give "A. G." all the information he requires—the classes, names of teachers, and lecturers. The classes for architectural design are very useful for architect's pupils, and the time is convenient, Monday and Thursday evenings from 7 to 9.30. Lectures are given, and plain drawing is taught. Natural forms are made the motive for ornament. The classes on modelling, stone-working, lead-work, woodwork, stained glass, shaded drawing, &c., will be found of great value by the student who wishes to understand the relation of design to craftsmanship.—G. H. G.

[11982.]—**Electric Lighting Installation.**—Read the articles in the BUILDING NEWS that have been appearing; also "Electricity in Town and Country Houses," by Mr. Percy Scrutton, published by Archibald Constable and Co., Whitehall-gardens.—G.

[11983.]—**Ironwork.**—There are several large retailers of ironmongery who will show you everything quite up to date.—L. E.

[11983.]—**Ironwork.**—Let "A. L." take a journey to Stratford, and look over the great mart of the firm of Messrs. Young and Marten, where he will find every requirement for buildings, ironwork, sanitary goods, firebricks, R.W. goods, casements, decorating, gasfitting appliances, and numerous materials and fittings before specifying.—G. H. G.

[11984.]—**Jointing Stoneware Pipes.**—Doulton's "patent self-adjusting joint" is one of the best joints, as it allows for settlement, and the fillets of composition form a secure contact. Duckett's "safety" jointed pipes (Hassall's) are also secure. Stanford's joint is also well known. Cement jointing is apt to crack in clay soils.—A. B.

[11984.]—**Jointing of Stoneware Pipes.**—After a fairly large experience of all kinds of jointing, I have come to believe in the ordinary cement joint, when well executed, as being superior to others on account of its efficiency being combined with cheapness.—L. E.

[11986.]—**Scantlings.**—I am sorry to hear "A Draughtsman" say that it is too much trouble to work out the sizes of scantlings for the different weights, as I consider one must be very lazy and uninterested in his profession if he cannot make use of the following simple formula—

$$W = \frac{bd^2}{S}$$

W = safe weight in cwts. of distributed load  
b = breadth of beam  
d = depth of beam  
S = span of beam.

For load concentrated in centre, divide W by 2.—LOUIS ERWOLD.

[11986.]—**Scantlings.**—I know of no tables except those given by Tredgold and in Hurst's edition. For floor 18ft. by 12ft., single joists, 12in. by 2½in., may be used, strutted between; or the joists may be notched to 10in. by 6in. binders, 6ft. apart, and then the joists may be 7in. by 2in. Ceiling joists may be 6ft. by 2ft.—ARCHITECT.

The half-yearly report of the City and South London Railway Company states that the progress with the works of the extension to Moorgate-street has been continuous, and the tunnelling is rapidly approaching completion. At Moorgate-street both station tunnels are completed, while at Lombard-street and Denman-street the construction of these tunnels is proceeding rapidly. A contract has been entered into with Messrs. W. Rigby and Co. for the construction of the extension to Clapham Common. The sites for the stations having been acquired, the work has been commenced, and should be completed by the end of August, 1899.

Mr. R. S. Henshaw, who has for many years filled the office of secretary to the Institute of Builders and the Central Association of Master Builders of London, has found it necessary to resign those positions in order that he may devote himself entirely to the increasing business of the Builders' Accident Insurance, Ltd. Mr. Thomas Costigan has been appointed to the joint office of secretary to the Central Association of Master Builders and the Institute of Builders.

It has been decided to proceed shortly with the erection, in St. Bernardo's Mission, Kingsley-road, Liverpool, of a new Roman Catholic Church under the dedication of Our Lady of Lourdes and St. Bernard, from the designs of Messrs. Pugin and Pugin, of London. The estimated cost is about £8,000, of which some £2,500 are already in hand, a site adjoining the schools having also been provided several years since. The existing mission chapel, constructed in 1884, has become insufficient for the requirements of the district. The new church, Gothic in style, will consist of a nave and a parallel chapel equal in length, the latter with an altar and a grotto dedicated to Our Lady of Lourdes.

## PARLIAMENTARY NOTES.

THE NEW GOVERNMENT BUILDINGS.—Mr. W. Allan asked the First Commissioner of Works, on Monday, whether the Government had chosen the architects who were to prepare plans for the new public offices in Parliament-street and in Whitehall, provided for in the Act of this session. Mr. Akers Douglas: Her Majesty's Government have made a selection. They have requested Mr. J. M. Brydon to prepare plans and drawings for the new public offices on the Parliament-street site, and Mr. W. Young to prepare plans and drawings for the new War Office on the Whitehall site. These plans, when completed, will be considered by Her Majesty's Government, and before orders are given to proceed with the buildings the drawings will be exhibited for the inspection of members. In selecting these gentlemen the Government have received invaluable assistance from the Royal Institute of British Architects.—On Tuesday, Mr. Whitmore asked the First Commissioner of Works whether he could state what, if any, conditions had been prescribed with regard to the style and general character of the designs of the architects selected to construct the new Government offices. Mr. Akers-Douglas: The conditions are now being settled, but the architects who have been selected to prepare designs will be desired to follow in the internal arrangement of the new buildings general lines to be laid down by the Office of Works. The elevations will be of Classical character in design, to accord with those already erected in Whitehall; and it is stipulated that the new offices shall be externally constructed entirely of Portland stone.

SOUTH KENSINGTON MUSEUM.—Sir F. S. Powell asked the First Commissioner of Works, on Monday, what decision had been arrived at with reference to the disposition of the new buildings for science and art at South Kensington, and whether the art buildings were to be placed on the east side of Exhibition-road and the science buildings on the west side, in accordance with the recommendation of the Select Committee. Mr. Akers-Douglas: No decision has yet been arrived at. I have on several occasions given to the House my assurance that directly a decision has been come to, I will inform the House of its nature.

## CHIPS.

Mr. Justice Romer sanctioned on Friday the sale of a collection of Flemish and Dutch pictures, heirlooms of the Deep Dene estates, of which Lord Francis Hope is tenant for life. Two bids of £110,000 and £111,000 were made at once, but the judge said the Court must not be turned into an auction-room.

The National Monuments in Churches Bill passed through Committee of the House of Commons on Friday, and was reported without amendment.

The Norfolk County Council offer no opposition to a light railway it is proposed to construct from Trowse, Norwich, to Beccles, via Loddon. An inquiry was held at Norwich by the Earl of Jersey, chairman of the Light Railways Commission, on Tuesday, when a great many gentlemen gave evidence in favour of the proposal.

On Thursday evening in last week, a serious accident befell Mr. John Ratcliffe, architect and surveyor, of Oak Villa, Ivy-road, King's Heath. The unfortunate gentleman, who is sixty years of age, fell heavily down a stairway, a distance of 11ft., at the stores of Mr. J. Hillman, Paradise-street, Birmingham. He was removed with all speed to the General Hospital in that city, where he was found to be suffering from a compound depressed fracture of the skull.

At St. Anne's Roman Catholic Church, Edgehill, Liverpool, a baldacchino has been erected, designed by Mr. Peter Paul Pugin, of Westminster.

The bust of Oliver Cromwell, by Bernini, acquired at the sale of Lord Revelstoke's collection by Mr. Charles Wertheimer, and presented by that gentleman to the House of Commons, was placed in position on Monday in the lower waiting-hall near the foot of the committee-room staircase. Pending the provision of a marble pedestal in harmony with the general design, the work rests upon a wooden stand covered with crimson cloth.

On Saturday afternoon the foundation-stone of the new Mission-hall for St. John's, Cleveland-road, Islington, was laid. Mr. Burmeister, of Lincoln's Inn-fields, is the architect, and Messrs. Grover, of New North-road, the builders. The building contract is £2,900.

At a meeting on Wednesday week of the town improvement committee of the Newcastle Corporation, plans were submitted on behalf of Mr. Watson-Armstrong for laying into streets 45 acres of land at North Heaton, in the neighbourhood of Chillingham-road. It is proposed to build from 600 to 800 houses. Mr. F. W. Rich, of Newcastle-on-Tyne, is the architect. The committee passed the plans.



## LEGAL INTELLIGENCE.

**ALLEGED BREACH OF CONTRACT.**—In *St. Austell County-court*, last week, *S. Roberts*, farmer, of *Tregidgo*, *Creed*, sought to recover damages for breach of contract from *R. Tregunna* and *F. Mitchell*, builders, of *Grampound*. Plaintiff advertised for rebuilding premises in *Duke-street*, *St. Austell*, and defendant's tender at £680 was accepted. Prior to this, however, plaintiff decided to alter the width of a store at the back from 9ft. to 14ft. The parties met on the site, and defendants agreed to adhere to the original tender on condition that plaintiff contributed six days' cartage of materials. Defendants afterwards refused to carry out the contract on the ground that they had omitted £63 for slates for the roof. *Mr. W. J. Samble*, architect, and *E. J. Samble*, surveyor to *St. Austell Urban District Council*, bore out these statements, and asserted that it was clearly understood that the work was to be completed at the price tendered, £680. Defendants' solicitor contended that there should have been a written tender, and a written and unqualified acceptance of it. Defendants stated they understood that the altered plans and specifications would be submitted to them before the contract was concluded, to enable them to estimate the extra cost involved by the alterations proposed. *Mr. Coode*, for plaintiff, argued that, as it was not a contract under the *Sale of Goods Act*, writing was not absolutely necessary, and that a verbal agreement was quite sufficient. His Honour, *Justice Granger*, reserved judgment.

**IN RE J. WOODWARD, OF SHEFFIELD.**—The creditors met at the *Official Receiver's* (*Mr. J. C. Clegg*), in *Sheffield* on the 15th inst., of *John Woodward*, 14, *Malinda-street*, and 90, *Slinn-street*, joiner and builder, against whom a receiving order was granted, on June 24, on debtor's own petition. The debtor, in his statement of affairs, says he owes £983 6s. 4d. to unsecured creditors, and £4,120 to creditors fully secured, making the gross liabilities £4,512 12s. 8d. He estimates his securities to be of the value of £4,120. The assets consist of stock, machinery, and trade plant, amounting to £685, and debtor estimates that there will be a surplus of £620 on property securities in the hands of creditors. The *Official Receiver* remarked that if those figures were realised there would be a surplus of £297 7s. 4d. But, of course, the whole thing depended upon whether the properties were worth the amount estimated by debtor. At present this was not known. Debtor commenced business about 20 years ago, and he attributes his insolvency to want of capital and loss on property. It was decided not to appoint a trustee, but to authorise the *Official Receiver* to realise and distribute the estate.

**THE IMPROVEMENT OF TOTTENHAM COURT ROAD.**—*Mr. James Green*, acting as arbitrator, sat at the *Surveyors' Institute*, *Savoy-street*, *W.C.*, on Thursday in last week to conclude his arbitration as to the value of the property within the area of the *Tottenham Court-road* improvement scheme. The first case was the freehold interest in Nos. 4 and 5, *Tottenham Court-road*. The property was said to be let on lease at £362 10s. per annum, and the estimated value was fixed by *Mr. Edmund Farmer* (of *Messrs. Debenham and Co.*) and *Mr. E. H. Bousfield* (of *Messrs. Fox and Bousfield*) at £10,000; while for the Council *Mr. Young* and *Mr. Wilkinson* valued the interest at £8,360. The freeholder's interest in No. 6, *Tottenham Court-road* was then considered, the Council valuing the premises at £3,240, while no evidence was given on behalf of the claimant. In the case of No. 5, *Hanway-street*, *Mr. Chadwick* estimated the value of the freehold property at £2,415, the valuers of the Council fixing the value at £1,400. In the case of No. 4, *Oxford-street*, counsel for the claimants stated that the premises were let on a 95 years' lease at a rental of £800 per annum. No evidence was called on behalf of the claimant; but *Mr. A. Young* and *Mr. Wilkinson*, for the *London County Council*, valued the freeholders' interest at £43,700.

**DEFECTIVE DRAINS.**—*DAVIES V. SALEUR*.—This case, heard in the *Queen's Bench Division* on Friday before *Mr. Justice Wright* and a common jury, was brought by *Mr. Owen Huab Davies*, partner in the firm of *Messrs. Tudor and Jenks*, drapers, *Harlesden*, against *Mrs. S. Saleur*, a widow, residing at *Lorraine Villa*, *Knatchbull-road*, *Stonebridge Park*, to recover damages for an alleged breach of warranty as to the drainage of a house. Defendant denied that there was any warranty. The defendant was the owner of certain house property at *Harlesden*, and in October, 1894, she let one of her houses—No. 13, *Stracey-road*—to the plaintiff on a yearly tenancy. Plaintiff said he was induced to take the house on defendant representing that it was in a good sanitary condition. Plaintiff entered into possession in November, 1894, and in the following January he and his family suffered from sore throats. In December, 1895, and January, 1896, plaintiff, his wife, children, and sister-in-law became ill with diphtheria, and it was said that plaintiff was still suffering from the after-effects of the disease. About May, 1897, the plaintiff's

wife was taken ill with typhoid fever, and plaintiff contended that the illness from which he, his wife, and family suffered was due to the escape of foul and noxious gases into the house from the defective drains, and that, therefore, he was entitled to recover from the plaintiff compensation for the damage he had sustained. Defendant denied that she represented or warranted that the house was in a good sanitary condition, though she honestly believed that such was the case. She also said that the members of the plaintiff's household were negligent and careless in the management and use of the house and drains, and that, in consequence, the drains became choked and stopped up. She, however, admitted that the fall of the drains was insufficient. In support of the defendant's case, *Dr. Skinner*, medical officer of health for the *Willesden* district, gave evidence to the effect that diphtheria was prevalent in the district in January, 1896, in which month he had no fewer than 24 notifications. From his observations, he had frequently come to the conclusion that there was not sufficient water-flushing for the drains of many houses. In May, 1897, he added, typhoid was prevalent in every part of the district. *Mr. Justice Wright*, in summing-up, said there was a contract by the defendant that the house was in good sanitary condition in October, 1894, and, therefore, the first question for the jury was whether at the time he had mentioned the house was in good sanitary condition according to the ordinary meaning of those words. The defendant did not undertake that the drains should continue in good condition, nor was she liable for any mischief arising from the negligence of the plaintiff's household. If they considered that the drains were defective in October, 1894, then they would have to determine how far the damage complained of was the result of that defective condition. The jury found that the drains were defective in October, 1894, but that plaintiff had not proved that the illness was caused by the condition of the drains. *Mr. Williams* applied for judgment for the plaintiff. *Mr. Justice Wright*: What do you say about damages? *Mr. Williams* said as there was a breach of contract, the plaintiff was entitled to nominal damages. The foreman said the jury assessed the damages at a farthing. *Mr. Justice Wright* said on such a verdict the plaintiff would not be entitled to costs. He would consider the question whether the plaintiff ought to pay the defendant's costs.

**ALLEGED BREACH OF CONTRACT AT LINCOLN.**—On Monday, at *Lincoln County-court*, *Geo. Palmer*, *Rasen-lane*, *Lincoln*, master builder, sued *E. Handley and Sons* for £6 11s. 6d. for breach of contract. The action was brought by the plaintiff to recover the sum, being, it was alleged, moneys paid by the plaintiff on behalf of the defendant, or in the alternative for damages for breach of contract made in 1894. Defendant was the owner of a brickworks, and also possessed some building land in *Rasen-lane*, part of which he offered to sell to *Mr. Palmer*. Terms were discussed at an interview, and eventually *Mr. Handley* offered to sell at 7s. per yard. The new road which was to be built on the land was to be made and completed without any expense to the purchaser. A contract was drawn up, although at that time *Mr. Palmer* pointed out that there was no clause in it which stated that the new road should be made and completed by the defendant without expense to the purchaser, and one was inserted. *Mr. Palmer* commenced to build upon the land he had purchased, and *Mr. Handley* also commenced to make the road. He made the carriage-road, channel, and part of the footpath, and even went so far as to supply some kiln ashes for the footpath. The road was then left in order that the water-mains and gas-mains might be put down. *Mr. Handley* did not complete the footpaths, and the *Lincoln Corporation*, acting as the urban sanitary authority, served a notice on *Mr. Palmer* under section 50 of the *Public Health Act*, 1875. On receiving this notice, *Mr. Palmer* called the attention of *Mr. Handley* to it. But the defendant repudiated the suggestion that he had agreed to complete the road. The corporation finished the work, and charged *Mr. Palmer* £6 11s. 6d. He eventually paid this amount, and now brought this action to recover it. His Honour said he was of opinion that plaintiff was entitled to the whole of the claim. He gave judgment for the amount claimed.

**THE DANGERS OF THE STREETS.**—In the *City of London Court*, on Monday, *Mr. G. Pitt-Lewis*, Q.C. (the deputy-judge), gave judgment in a case in which *Mr. Walter Holliday*, *Park-street*, *Clapham*, sought to recover £50 as damages for personal injuries sustained through the alleged negligence of a servant of the *National Telephone Co., Ltd.*, 99, *Cannon-street*, *E.C.* *Mr. Lincoln Reed*, plaintiff's counsel, said that in February last the defendant company were laying new wires under the ground at *Clapham*. A pot of molten lead was standing in a cauldron on the pavement. It should have been guarded by a canvas, but that had not been done. One of the defendant's men caused the lead to fly all about the place, owing to an explosion with a lamp. The plaintiff was

spattered with the lead and seriously hurt. When he asked for damages he was told that the work in question was being done under a sub-contract, and that the defendants were not liable. Counsel argued that the defendants acquired the right to open the streets by an Act of Parliament, and that they could not delegate that to anyone else. *Mr. Lawless*, the defendants' counsel, contended that it was a case of casual or collateral negligence, and that they could not, in law, be held liable for that. The work was done by a sub-contractor, to whom the plaintiff should look, if to anyone. There were several other actions being brought against the company, and the matter was of importance to them as well as to the public. *Mr. Reed*, in reply, said the sub-contractor was only a pieceworker, and the defendants were responsible for his acts. The public had a right to walk along the roads in safety, and the defendants had done that which took away their safety. The Deputy-Judge said the case was of great public importance, raising, as it did, the question under what circumstances a person or body corporate entrusted by Parliament with powers to execute works on a public highway was liable for an omission to take the precautions necessary for the protection of members of the public who used the highway during the construction of the works, against acts necessarily incidental to their construction. He must hold that the so-called sub-contractor was only a pieceworker, having regard to the way in which the defendants controlled him and the work which he did. There must be judgment for the plaintiff for the agreed sum of £25 and costs. As the case was an important one, he certified for costs on the higher scale.

**ACTION AGAINST A DERBYSHIRE GRANITE MERCHANT.**—On Monday the *Court of Appeal*, consisting of *Lords Justices A. L. Smith* and *Rigby*, had before them the appeal of the defendant in the case of "*Mason v. Hill*," from an order of *Mr. Justice Channell* in *Chambers*, dated June 8 last, reversing an order of the *District Registrar* at *Manchester* staying the action. *Mr. Tindall Atkinson* appeared for the defendant, who wishes the action not to proceed. *Mr. Scott Fox*, Q.C., appeared for the respondent. The plaintiff, *Mr. Robert Mason*, of *Worthia Green*, *Wigan*, brought the action to recover damages for breach of contract, or, in the alternative, specific performance of the same by the defendant, a granite merchant, of *Marple Bridge*, *Derbyshire*. It appeared that by an agreement dated May 6 last, the defendant agreed to sell certain land to the plaintiff at *Marple*, situate in *Cheshire*, for building purposes, but that he failed to carry out the agreement. The defence was that one, *J. W. Fitton*, the plaintiff's agent, had misrepresented the position of the plaintiff, who, he said, was a brickmaker with 300,000 bricks in stock at *Wigan*, that he had been the builder of rows and houses, and that at the time the agreement was signed he was in possession of £500. These facts were denied by the defendant, who claimed to have the agreement set aside on the ground of misrepresentation as alleged. *Mr. Tindall Atkinson* said that the question to be determined was whether the action was compromised by the parties who had agreed to settle it on these terms, that *Mason* and *Fitton* were to receive £11 in respect of their claim, and that the defendant should pay the costs of the action. He contended that this agreement ought to be carried out, and the action stayed. *Lord Justice Smith* said that there was nothing in the appeals, and the appeal would be dismissed with costs, the order of *Mr. Justice Channell* to stand. Judgment accordingly.

**UNION CONGREGATIONAL CHAPEL, HORSELEYDOWN, AND SOUTH-EASTERN RAILWAY COMPANY.**—This compensation case was tried on Saturday last, before a jury, at *Red Lion-square*. The premises comprise chapel and schools; the property is freehold, and the area of land 5,523ft. The trustees only desired the cost of reinstatement, so that they might continue their work. The counsel leading for the trustees, *Mr. Foreman*, Q.C., and for the railway, *Mr. Littler*, Q.C. The surveyors for the trustees were *Mr. Alderman Green*, *Mr. W. C. Cooke*, *Mr. Field*, and *Professor Banister Fletcher*, the surveyors accepting the professor's figures as to the cost of rebuilding. Two items in the claim had to be withdrawn: (1) the minister's salary during rebuilding, as it was ruled by the under-sheriff the minister must claim, and not the trustees; and (2) the cost of faculty and removal of bodies, which the railway undertook to carry out. The claim was £12,000. The surveyors for the *South-Eastern Railway* were *Mr. Wilkinson*, *Mr. Humphrey Davis*, *Mr. Bousfield* (of *Messrs. Fox and Bousfield*), and *Mr. Ryde*. *Mr. Humphrey Davis* placed the value at £4,620, and for the reinstatement £4,716; *Mr. Wilkinson* valued at £4,950. The jury returned a verdict of £10,500.

In the *House of Lords* on Monday, the *London Building Act* (1894) Amendment Bill, which has already successfully passed all stages in the lower House, was read a third time and passed.



## WATER SUPPLY AND SANITARY MATTERS.

**CONFERENCE ON OVERCROWDING.**—A conference convened by the Bermondsey Vestry was held at the Town Hall, Spa-road, Bermondsey, on Friday, for the consideration of the question of overcrowding and the housing of the working classes. Delegates were sent from twenty-eight of the London vestries and district boards. Mr. W. W. Tyler, chairman of the Bermondsey Vestry, was elected chairman of the conference. As the result of a very lengthy discussion in which it was contended that the mere enforcement of the by-laws with respect to houses let in lodgings or the provision of cheap railway fares would not effectually remedy overcrowding, the conference agreed to the following motion by Mrs. Phillimore (St. Pancras):—"That the London County Council be asked to exercise their power under part 3 of the Housing of the Working Classes Act to provide accommodation within the county of London where required." The conference also passed a resolution calling upon the London County Council "to insert a clause in their General Powers Bill of 1899 to enable Metropolitan Vestries and District Boards to erect municipal dwellings under part 3 of the Housing of the Working Classes Act, 1890." Other resolutions agreed to expressed the opinion that the London County Council ought to contribute to the cost of the dwellings erected by the local authorities, that the management and retention of such dwellings should be permanently vested in the local authority, and that in view of the heavy cost of land in London, the local authorities should not be compelled to repay the cost of such land out of the income from the dwellings, and that the period for borrowing for buildings should be extended to 100 years.

**LONDON WATER COMMISSION.**—The Royal Commission, which is inquiring into the question of the Metropolitan water supply, under the presidency of Viscount Llandaff, met again on Monday at the Guildhall, Westminster. Mr. Henry Weeden, vice-chairman of the Ilford Urban District Council, whose area is supplied partly by the East London Company and partly by the South Essex Company, said the supply of water by the former company was very good, and infinitely preferable as regards quantity, quality, and price, to that afforded by the latter company, against which there were frequent and bitter complaints. Witness expressed a wish to have power either to buy up the East London Company's works in his district and compete with the South Essex Company, or in the event of the London County Council's being authorised by Parliament to buy out the East London Company, he thought they would supply Ilford with water in bulk, and then the urban council would distribute in competition with the South Essex Company. The East London Company had been asked to supply water in that part of the area which is now supplied by the South Essex Company; but they declined to do so. Mr. Frederick George Banbury, M.P., a trustee and manager of the Stock Exchange, the next witness, stated that he had prepared a scheme for the purchase of the London water companies which would not increase the rates now paid by the consumers, and would give the consumer free of cost any increase of profits. His proposal was that Parliament should create a small statutory central body authorised to create a 3 per cent. perpetual stock, secured on the rates and transferable at the Bank of England, in which trustees should be entitled to invest. He would give to each water shareholder or debenture-holder sufficient of this new stock to yield him the same dividend as he was previously receiving. The purchasing authority would thus require to raise no more money than the companies were raising at present, provided they managed as well as the companies, and would receive all savings in expenses that would arise from the amalgamation of the eight companies. Should the profits of the amalgamated companies continue to increase, they would go to the consumer, who would have paid nothing for them. If they remained stationary the consumer would be in the same position as now. Nothing would be paid for compulsory purchase. He contended that this scheme would be fair to the shareholders, as they would gain by the increased value which would be given to their stock by consolidation and by allowing trustees to invest in the stock, while it would be advantageous to the consumer, because he would purchase the companies for the price he was paying now and would obtain all savings and any future increase in revenue for nothing. Powers would have to be given to the board to raise money for extending the supply as London increased, and this, to judge from past experience, would be profitable. The scheme would supply a long-felt and growing want—namely, fresh securities for trustees. Mr. Allen Stoneham, Local Government Board arbitrator, appointed under the Metropolitan Water Act, 1871, to audit the accounts of the London water companies, having explained his system, expressed the opinion that his powers were sufficiently wide to enable him to make a very satisfactory audit. He

could not suggest any further powers with which he could be usefully intrusted. Mr. Reginald E. Middleton, engineer of many of the New River Company's works and joint engineer with Mr. Hunter of the Staines reservoirs, expressed a decided opinion that purchase of the water companies by any body whatsoever would be financially inexpedient in the interests of the consumers, who would be placed in a much worse position than at present. He did not mean to deny that the revenue would ultimately meet the charges, but that time would be very far distant. Of the two schemes before the commission—namely, a further extension of the Staines reservoirs and the Welsh scheme—he expressed a decided preference for the former, on the ground that it would be much less costly—£8,000,000, as against £42,000,000. The Commission adjourned until next Monday.

**ROYAL COMMISSION ON SEWAGE DISPOSAL.**—The Royal Commission on Sewage Disposal held three sittings last week. The members present were:—Lord Idlesleigh (chairman), Sir Richard Thorne, F.R.S., Professor Foster, F.R.S., Professor Ramsay, F.R.S., General Carey, Dr. Russell, Colonel Harding, Mr. Killick, Mr. Cotton, and Mr. F. J. Willis (secretary). The following witnesses were examined:—Mr. Deane of the Local Government Board for Ireland, and Mr. Murray of the Local Government Board for Scotland; Mr. Tatton, Mr. Scudder, and Mr. Wilson, on behalf of the Mersey and Irwell Rivers Board; Mr. Naylor on behalf of the Ribble Rivers Board, and Mr. Trevor Edwards and Dr. Wilson on behalf of the West Riding Rivers Board. The commission intend to undertake a considerable amount of bacteriological and chemical work, and no further evidence will be taken until September next.

**SCUNTHORPE.**—The urban district council have appointed Messrs. Stevenson and Birstall, of London, engineers for their new gas and water works. The tender of Messrs. Vivian's Boring and Exploration Company, Whitehaven, for sinking the bore the required size and depth, has been accepted, the amount being £1,495. A Bill is to be promoted in the next session of Parliament by the council, authorising them to manufacture and supply gas, and conferring on them powers with respect to the supply of water, and for other purposes. Messrs. Timmins, whose scheme the board have adopted, was the next lowest tender to that of Messrs. Vivian's. The contract for kerbing, channelling, metalling, asphalt pavement, and other works necessary for the construction of six new streets to be taken over by the council, has been let to Mr. George Holiday for £1,088 8s. 6d.

**STOCKPORT.**—In presence of the Mayor and the other members of the Corporation Main Sewerage Committee, trial was made on Friday of the engines and pumps just completed at the sewage outfall works, now almost completed, on the Cheside side of the river at Heaton Mersey. For the past four years the work of constructing a main intercepting sewer has been in progress. It is 7ft. diameter through the town, and runs to a depth of 60ft. in the red sandstone rock, crossing under the river three times, twice by inverted siphons. A peculiar difficulty was met with in a number of tunnels 5ft. to 6ft. square formed many years ago for the purpose of conveying water from the upper reaches of the river to the mills in the valley, and which crossed the route of the sewer at almost the same level. For the purpose of treating the sewage to be conveyed by this sewer the Corporation purchased 95 acres of land, of which 60 acres are now under construction into filtration areas of five or six acres each for the purposes of intermittent filtration after the sewage has passed through the tanks and been treated with lime for purification and precipitation. There are eight tanks, each covering an area of 120ft. by 60ft. It is necessary to raise the sewage from the sewer to the tanks, and the machinery for this purpose, which was set in motion on Friday as a trial, comprises two boilers capable of a pressure of 200lb. to the square inch, and a pair of invincible horizontal compound double-crank jet-condensing engines and pumps, each capable of lifting 18,000 gallons per minute 19ft. high, having a 27in. suction. Mr. A. M. Fowler is the engineer, under whose direction the works have been carried out at a cost so far of some £140,000.

**WATER SUPPLY TO THE CITY OF LONDON.**—The County Purposes Committee of the City Corporation have been considering the question of the water supply as it affects the rights of the ratepayers of the City in respect of a pressure water service by meter or otherwise and a constant supply. They have elicited from the New River Company an assurance that while they do not regard pressure supplies as falling within the usual scope of their business, yet, in cases in which a consumer is particularly desirous of such a service, his wish is met as far as possible, providing the pressure under which the ordinary supply is maintained is not thereby prejudiced. Any person who might wish for a pressure service would, on communication with the company, receive every explanation and assistance; but, in the interests of

consumers generally, it is absolutely necessary that the company should, in all these cases, satisfy themselves in the first instance as to the extent to which their mains are likely to be drawn upon, and the possible effect of such draft upon the efficiency of the supply to the surrounding locality. As regarded a constant supply, the company were perfectly willing to give such a supply if called upon to do so, provided the regulations prescribed by the Metropolitan Water Act, 1871, were previously complied with. Up to the present the Corporation have not thought it expedient to take any steps in the direction indicated for a constant supply.

## CHIPS.

Alterations are being made to the board-room, London, Brighton, and South Coast Railway Company, embracing the ventilation, which will now be carried out on the Boyle system.

The new Beaumont Park Schools, Acton Green, are being warmed and ventilated by means of Shorland's patent Manchester grates, the same being supplied by Messrs. E. H. Shorland and Brother, of Manchester.

The monument which has been raised in Paris close to the Observatory on the crossway of the Boulevards Port Royal and Montparnasse, to the memory of the explorer, Francis Garnier, was inaugurated on Monday. The monument consists of a bust of Francis Garnier raised on a pedestal, at the foot of which are three female figures.

At Colne, a Local Government Board inquiry was held on the 13th inst. into the application of the borough for sanction to a loan of £24,400 for works of private street improvement. It is proposed to pave 45 streets, and on amended plans prepared only £22,778 17s. 8d. is required. The amount deducted on account of work done by private owners is £1,090 8s. 4d., leaving a balance of £21,688 9s. 4d. To the latter should be added £1,200 for surface-water drains, making a total of £22,889 9s. 4d.

The council of the British Medical Association resolved at their last meeting to found as a memorial of the late Mr. Ernest Hart a scholarship to be called the "Ernest Hart Memorial Scholarship for Preventive Medicine." The scholarship, which will be of the annual value of £200, will be tenable for two years.

The First Lord of the Treasury has given the commission for Mr. Gladstone's statue in Westminster Abbey to Mr. Thomas Brock, R.A.

The Town Hall at Pietermaritzburg, where the sittings of the Legislative Council are held, was totally destroyed by fire on Tuesday evening. The damage is estimated at £60,000.

The Lockwood memorials are to be a stained-glass window in York Minster, a brass in St. Margaret's, Westminster, and a child's cot in the London Hospital. It is also proposed to have two portraits painted of the late Sir Frank Lockwood, one (already executed by Mr. J. F. R. Wood) for Lady Lockwood and the other to be undertaken by Mr. A. S. Cope for the National Portrait Gallery. For the window in York Minster the design of Messrs. Atkinson Brothers, of Newcastle-on-Tyne, selected in competition, has been adopted.

A special service was held at St. Michael's Church, Exeter, on Friday evening, for the unveiling and dedication of a stained glass window inserted on the north side of the nave, in memory of the late Rev. G. R. B. Tudor. Archdeacon Sandford unveiled and dedicated the window, which is the work of Mr. E. Drake, of the Cathedral Yard, Exeter.

Mr. Robert Pryke, of Warrington-road, Ipswich, retired builder, died last week at the age of 81 years. He was widely known as an organiser and worker in the Manchester Unity of Oddfellows, of which friendly society he had been a member for over half a century. In January, 1868, he was elected Deputy Grand Master of the District, and in the following year he became Provisional Grand Master.

Mr. George A. Dean, civil engineer, residing at Pattishall, Northamptonshire, died on Friday, after a long illness, at the age of 84. Under the superintendence of the late Prince Consort, he laid out the Royal model farm at Osborne. Mr. Dean was the author of a number of works on agriculture, and was the founder of the Towcester Conservative Club.

Another large landslip of the Lighthouse Hills cliffs at Cromer occurred last week near the same spot as the one which took place about two months ago. This time a piece of the cliff thirty yards wide by 120 yards long has been hurled on to the beach, where a large portion of the first slip yet remains, despite the action of the sea. The last, and what was the most inland of Lloyd's posts, marking the signal site, is but 19 yards from the edge of the cliff, the two other posts having been carried away with this latest fall and the thousands of tons of earth that went with it.



## Our Office Table.

THE sale at Christie's on Saturday of the pictures and drawings by the late Sir E. C. Burne-Jones realised altogether nearly £24,000—that is to say, the first ninety lots of the remaining works of the late artist fetched an average of between £200 and £300 each. The most important work in the day's sale was the finished picture of "Love and the Pilgrim," 60in. by 120in., painted in 1896-97, with the inscription, "Dedicated to his friend A. C. Swinburne." In this work Love, represented in a blue-grey robe, with wreath of roses and holding an arrow, attended by a flight of birds, is leading a pilgrim, dressed in a dark robe and hood, out of a wilderness. The bidding started at 1,000 guineas, and in a few moments reached 5,500 guineas, at which price the picture was knocked down to Mr. Philpot, who purchased it for the Dowager Duchess of Sutherland. Messrs. Agnew were the underbidders. "Elijah in the Wilderness," in which the robed prophet is holding up his hands to seven ears of corn brought to him by ravens, was purchased for 950 guineas by Mr. Whitworth Wallis on behalf of the Birmingham Municipal Art Gallery. Mr. Wallis also bought at 600 guineas for the same institution a set of three designs for stained-glass windows representing "The Last Judgment," intended for East Hampstead church, and a water-colour drawing of "Mars" and "Helen at the Burning of Troy," the prices paid for the latter works being 58 and 75 guineas respectively. On Monday the remaining studies and drawings were sold, and fetched nearly £5,000, bringing up the total to £39,475. In connection with the fund now being raised for the purpose of presenting to the National Gallery a chosen example of the art of the late Sir Edward Burne-Jones, we are requested to state that, with the concurrence and approval of the painter's family, the directors of the New Gallery have decided to hold next winter an exhibition of his works, and they have pledged themselves to the committee of the fund that, after the payment of rent and other incidental expenses, the proceeds of the exhibition shall be added to the amount that has already been raised by public subscription.

SIR FRANCIS POWELL'S committee on the museums of the Science and Art Department have made further progress with the consideration of their report. The committee are now committed to an expression of opinion that the South Kensington Museum has suffered from a lack of experts, and that the system of moving officials from one department to another which obtains at South Kensington is detrimental to the public service. It is admitted that Mr. C. Purdon Clarke has recently done his utmost to bring about reform by subdividing the Museum into sections in which it is proposed to specialise as much as possible; but the committee agree with Lord Balcarras that this arrangement, instead of being subject to rescission, as at present, should receive official sanction and be made a permanent feature of museum administration.

WITH regard to the admission of new officials, their examination, and the probationary system, the committee adopted Lord Balcarras's recommendations practically as they stood. These recommendations are:—(1) That the scheme of special examination already in operation in connection with the Jermyn-street Museum should be extended to South Kensington; (2) that, following the practice of the British Museum, no examination should be held unless there be a minimum number of candidates; (3) that no member or paid official of the Science and Art Department should be employed as examiner; and (4) that the regulation (abolished in 1871) requiring reports upon the qualifications of all new officials to be sent to the Civil Service Commissioners should be re-enacted. Other suggestions formulated by Lord Balcarras, and now embodied in the chairman's report, are that the attendants employed in the museum galleries at South Kensington might, with advantage, wear a distinctive uniform, such as that worn by the attendants in the Dublin Museum, and that the sappers now largely employed by the department as artisans should give place to civilians.

A PROPOSAL will shortly be made to the London County Council by its Improvement Committee for the widening of the portion of High Holborn between Southampton-row and Southampton-

street. High Holborn at the spot in question is at present 55ft. wide, and it is proposed to increase this to 70ft. The buildings fronting the street to be widened are now in course of demolition, and the freeholder and lessee have expressed their willingness to treat with the Council for the acquisition of the necessary land. The officers of the Council estimate the net cost of the improvement, including the necessary paving and other works, at £56,000. The committee think the present opportunity for carrying out the work is a very favourable one, and that the improvement is desirable as a complement to the widening of Southampton-row now being undertaken by the Council. They point out that High Holborn, like the Strand, is and must continue to be one of the greatest east and west thoroughfares in London. The traffic in Southampton-row is frequently blocked, and they think the Council should readily avail itself of the opportunity of increasing the width of the road at such comparatively small cost. If this opportunity is not seized they state that new buildings will at once be erected, and the cost of carrying out the work in the future will be prohibitive.

THE third annual outing in connection with the Southampton and District Builders' and Decorators' Association was held on Thursday in last last week. The party, which numbered 50, was accompanied by the president, Major Brinton, and the vice-president, Mr. H. Stevens. Their destination was the Larmer Tree pleasure-grounds, placed at their disposal by General Pitt-Rivers. Starting from Southampton West shortly after nine o'clock, Salisbury was reached in due course, and here the party were transferred to brakes, which conveyed them to Larmer Tree Grounds, nineteen miles drive through some of the loveliest Wilts and Dorset scenery. After tea, Major Brinton proposed a vote of thanks to the hon. sec., Mr. A. T. Doggrell, on whose shoulders had fallen the bulk of the labours in connection with the carrying out of the arrangements. Thanks were also accorded the president, on the motion of Mr. T. Jukes, and Major Brinton, in reply, alluded to the trade difficulties the members had experienced during the spring of the year, and which they had successfully come through, having settled the wages question. Southampton was reached about half-past ten.

THE Statuary Joint Committee of the Aberdeen Master Masons' Association, the United Operative Masons' and Granitecutters' Union, and the Aberdeen Granite Association held its first annual distribution of certificates within Gray's Art School on Friday evening. The class was formed last year for the purpose of giving apprentices and workmen more time and opportunity than can possibly be got in the course of their daily occupation for the study of ornamental stone-cutting, as well as the benefit of efficient instruction in the art. When the class was formed, it was more in the way of an experiment, and it was considered advisable to restrict the number of pupils. The method taken for selecting the pupils was a competition in modelling, and the result has been that only twelve pupils have been under tuition during this, the first session of the class. The results, however, have been so satisfactory that before next session arrangements will be made for accommodating at least twice as many pupils. Mr. John Anderson presided at the distribution, and he was accompanied on the platform by Lord Provost Mearns, who distributed the prizes.

PROFESSOR FERNOW, Chief of the Forestry Division of the American Department of agriculture has published a formula worked out by Mr. T. S. Neely, showing how the strength of beams of timber can be determined by the compression strength. In testing timber to obtain its various coefficients of strength, the test which is at once the simplest, most expedient, most satisfactory and trustworthy is the "compression endwise test," which is made by crushing a specimen parallel to its fibres. All other tests are either mechanically much less easily performed or else—as in the case of cross-bending—the stresses are complex, and the unit coefficient can be expressed only by depending upon a doubtful theoretical formula. The importance of Mr. Neely's formula is that it gives the relation between the cross-bending strength—the most important coefficient for the engineer and the compression strength. The conclusion to which Mr. Neely is led by his investigation is expressed in the following terms. "The strength of beams

at elastic limit is equal to the strength of the material in compression, and the strength of beams at rupture can be directly calculated from the compression strength; the relation of compression strength to the breaking load of a beam is capable of mathematical expression." This is of great importance, and a comparison, if calculated with Mr. Neely's observed results, is convincing as to the efficiency of the formula.

A LOCAL GOVERNMENT inquiry was held at Halifax on Tuesday respecting an application on the part of the local authority for powers to borrow £88,987 for various purposes, including certain street improvements, works in connection with the Birks Hall estate, and £19,940 for the erection of new police-court and station. With regard to the sum applied for in connection with the new police-station and court-house, Mr. Walton said the £19,940 included £7,000 paid for the site, and the buildings were estimated to cost £12,933 2s. 6d., and there would be £326 5s. to deduct from that as the value of the old material on the site. He said the question of providing new premises had engaged the attention of the council since September, 1894, and in 1897 they received an intimation from the Home Office that unless something definite was done they would run the risk of losing the Government grant; however, they were satisfied with what was being done at present. The architect said the figures were based on the tenders received, and he had no hesitation in saying that the work would be carried out for that sum. The inspector was afterwards taken over the places mentioned.

It is said that the Duke of Devonshire, while at Windsor, on Tuesday, was able to inform the Queen that the question of the new buildings at South Kensington, which has been exciting the art and science worlds for some weeks, has been settled by the Government to the satisfaction of both parties. It is believed an agreement has been arrived at which will keep all the available ground on the east of Exhibition-road for the purpose of an extension of the art museum, while science is to be allocated on the west side of that road, on the vacant ground facing the Imperial Institute. This is in accordance with the plan which has been advocated by the Royal Society and the Royal Academy. It is as yet very doubtful whether the foundation-stone of the new buildings will be laid this year by the Queen as was expected.

ACCORDING to a report by the United States Consul at Berlin respecting the carriage pavements of that city, wood pavement does not find much favour there. The area of pavements is 6,550,405sq. yd., and of this area a little less than 74 per cent. has stone pavements, about 25 per cent. asphalt, and a fraction over 1 per cent. wood. The Consul states that the proportion of asphalt is steadily increasing. The soil consists of coarse gritty sand, forming apparently an excellent foundation for the heavy 8in. layer of gravel and cement over which the 2in. covering of asphalt is spread.

THE annual meeting of the National Fire Brigades' Union will be held in August next in Blenheim Park, the Duke of Marlborough being president for this year of the union, to which over four hundred brigades are now affiliated. It is expected that there will be in the camp at Blenheim from Saturday (August 20) to Thursday (August 25) contingents from 200 brigades from all parts of England and Wales, including 100 Welshmen. Representatives will attend, too, from Belgium, Germany, and France, and the delegation from the latter country will include the officer at the head of the fire service, M. Rabany, of Paris, who is a Government official. There will be competitions for challenge shields, and prizes with the steamer, the manual, the escape, and hose cart. Prizes will also be offered for the smartest ambulance drills. Firemen and fire appliances will be conveyed to Blenheim, Woodstock, at special rates on the railways, and excursions have also been arranged.

THE Department of Science and Art have just published the "Science and Art Directory," revised to June, 1898. The principal changes made since the last edition of the directory are, in science and art, a change in the period of school session, which is now to extend from Aug. 1 to July 31, and a conditional increase in the maximum number of attendances which may be counted in the session 1898-9. There are also modifications in the restrictions as to registration, and provision is afforded for making special



grant when a school is closed or scholars are excluded by reason of epidemic disease. In science schools and classes, the rate of payment in Stage 1 of mathematics and in the new subject—elementary practical mathematics—is to be from 1d. to 6d. per attendance, and it is wisely provided that a teacher recognised as qualified to teach a subject cannot be paid on for attendance at instruction in that subject. A certificate will be granted for attendance at a course of practical instruction, and for success in certain groups of science subjects. Modifications are made in the regulations for the competitions for royal exhibitions, national scholarships, and free student-ships, and the syllabus in some of the subjects has been revised, and an addition has been made of a syllabus in elementary practical mathematics. Various minor changes are made in the rules for conducting schools of science, while in a class for attendance grants in respect of Group I. only may be under the instruction of a teacher holding the elementary school teacher's drawing certificate, or the second grade drawing certificate, or the elementary drawing certificate. In schools established before 1897, the department is authorised in exceptional cases to increase the payments for each group by an amount not exceeding 2d. an attendance, provided that there be a fair amount of work beyond the first group done in the school, and that the teacher hold the art class teacher's or art master's certificate. The year of employment for pupil teachers will in future end on July 31. No student will be eligible to receive a gold medal unless he has previously obtained at the personal examinations held in May, or obtains in the current or next year a first class in the advanced stage of the same or analogous subject as that of his work entered for national competition. Corresponding success at the third grade examinations, which were held before the adoption of the advanced stage, will be counted in lieu of success in the advanced stage.

#### MEETINGS FOR THE ENSUING WEEK.

SATURDAY (TO-MORROW).—Society of Architects. Excursion to Ely Cathedral. Leave Liverpool-street Station 11 a.m. (Fare 7s. 6d.)

## Trade News.

### WAGES MOVEMENTS.

**THE SKILLED LABOUR MARKET.**—The monthly report for June of the Labour Department of the Board of Trade is based on 2,389 returns, viz.:—1,715 from employers, 556 from trade-unions, and 118 from other sources, and states that, on the whole, employment has slightly improved during June, except in the case of industries affected by the continued stoppage in the South Wales coal trade. In the 116 trade unions making returns, with an aggregate membership of 465,143, 12,068 (or 2.6 per cent.) were reported as unemployed at the end of June, compared with 2.7 per cent. at the end of May, and with 2.7 per cent. in the 113 unions, with a membership of 464,126, from which returns were received for June, 1897. Employment in the building trades remains brisk, the percentage of unemployed union members at the end of June being the same as in May—viz., 1.2. The percentage for June, 1897, was 1.5. The furnishing trades continue well employed, the percentage of unemployed union members at the end of June being 1.3, compared with 1 in May and 1.5 per cent. in June of last year. Changes in the rates of wages of about 42,000 workpeople were reported during June, of which number 36,000 received advances, and 6,000 sustained decreases. The increases were mainly in the building trades (10,103), and the engineering and shipbuilding trades (22,275). The net result was an increase estimated at about 1s. 2½d. per head in the weekly wages of those affected. Changes affecting 1,250 workpeople, or 3 per cent. of the total number, were preceded by strikes, arbitration being the mode of settlement in two of these cases affecting 725 workpeople. Forty-nine fresh disputes, of which 13 affected the building trades, occurred in June, 1898, involving 12,087 workpeople.

**BRISTOL.**—On Saturday morning the secretary to the Bristol Master Builders' Association received an official letter from the Stonemasons' Society, intimating that the members of that body had on Friday evening decided to accept the terms proposed by the employers, and that they were prepared to resume work and sign the working rules as soon as convenient. The demands of the bricklayers have not up to the present time been conceded by the Master Builders' Association—viz., ½d. per hour advance at once, and ½d. per hour advance to come into operation on March 1, 1899,

making 9d. per hour. The position is, therefore, still unchanged; 53 private firms and builders have conceded the demands, and about 200 of the members of the society are working under the new conditions. At a specially-summoned meeting of the Bristol branch of the Operative Bricklayers' Society, it was unanimously decided on Monday to reject the terms of the employers—viz., the arbitrator's award, but to still adhere to the amended rules adopted by the society. There are only two points of difference—the wages and the walking time.

**LANCASHIRE: SETTLEMENT OF THE MASONS' STRIKE.**—A meeting of the master stonemasons associated with the Lancashire and Cheshire Building Trade Employers' Federation was held at the Victoria Hotel, Manchester, on Friday night in last week. It was attended by deputations representing the operatives. Mr. Frank Nicholl (Messrs. J. Nicholl and Son, Henry-street) represented the local masters. It was agreed to settle the dispute by making the following addition to the operatives' code of working rules: "Worked stone not to come into this town from any district where the standard rate of wages is less than in this district. All contractors may buy from wherever they think fit rawn or machined stone of any size. All stonework to be fixed by masons except heads, sills, pad-stones, and steps where these are not set stone to stone. Any worked stone from a quarry not to come into the town except steps, landings, column stones, engine beds, and roughly-worked masonry for bridges, railways, and canals. Imported stone from a quarry not to be introduced into this district." The new rule will take effect in each district included in the Federation. It was further decided that the rate of wages in Manchester, Bury, and Preston should be increased by a halfpenny per hour from Monday in this week, and in Rochdale and other towns from the 1st March next. All shops, jobs, and yards in the trade were consequently opened on Monday. The masons associated with the society in Rochdale, and many other Lancashire towns have been out on strike since May 1, whilst in some other important centres lock-out notices had been posted which would have taken effect on Saturday if no settlement had been arrived at. The dispute was primarily caused by the masters giving notice that they intended to abolish the rule prohibiting the importation of worked stone into their respective districts. In Manchester and some other towns the men had asked for an advance of a penny an hour in wages, but in Rochdale there was no request for an advance.

**NEWCASTLE-ON-TYNE.**—The builders' labourers ask for an advance from 6d. to 7d. per hour, but the employers have refused to grant any increase. The builders on the north-east coast are now federated, and it is considered probable that a lock-out will be the outcome of the agitation.

**SUNDERLAND.**—The bricklayers' labourers have sent in a claim for an advance of ½d. per hour, making their wages 7d. per hour, and the employers have offered ½d. advance. They contend that the wages of labourers will then be the highest in the county.

**WEARDALE.**—A limestone quarrymen's strike at Messrs. Bolckow, Vaughan, and Co.'s quarry in Wardale was brought to a termination by the men, to the number of 150, returning to work on Saturday morning.

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Rolled-Steel Joists, English.....	6 10 0	7 0 0	
Wrought-Iron Girder Plates.....	5 15 0	6 10 0	
Bar Iron, good Stuffs.....	7 0 0	8 0 0	
Do., Lowmoor, Flat, Round, or Square.....	17 0 0	17 5 0	
Do., Welsh.....	5 15 0	5 17 0	
Boiler Plates, Iron—			
South Staffs.....	7 17 0	8 5 0	
Best Suedshill.....	10 0 0	10 10 0	
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No. 18 to 20. No.			
6ft. to 8ft. long, inclusive gauge.....	£10 15 0	£11 0 0	
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Cast-Iron Stanchions.....	6 0 0	8 10 0	
Rolled-Iron Fencing Wire.....	7 0 0	8 0 0	
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Cast-Iron Sash Weights.....	4 0 0	4 2 6	
Cut Clasp Nails, 8in. to 6in.....	8 15 0	9 15 0	
Cut Floor Brads.....	8 10 0	9 10 0	
Wire Nails (Points de Paris).....			
0 to 7 8 9 10 11 12 13 14 15 B.W.G.			
8/6 9/0 9/6 10/3 11/0 12/0 13/0 14/9 16/9 per cwt.			
Cast-Iron Socket Pipes—			
4in. diameter.....	£5 10 0	£5 15 0	
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7in. to 24in. (all sizes).....	4 15 0	5 0 0	
[Coated with composition, 2s. 6d. per ton extra; turned and bored joints, 5s. per ton extra.]			
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Cold Blast, Lillleshall.....	105s. to 110s.		
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10cwt. caasks. 5cwt. caasks.			
Sheet Zinc, for roofing and working up.....	£22 10 0	£23 10 0	
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Teak, Burmah.....per load	£13 0 0	£14 5 0	
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" Birch.....	3 0 0	4 13 6	
" Elm.....	4 3 0	5 3 0	
" Ash.....	3 18 0	5 3 0	
Danitic and Memel Oak.....	2 0 0	3 0 0	
Fir.....	2 13 0	4 3 0	
Wainscot, Riga p. log.....	4 18 0	5 18 0	
Lath, Danitic, p. log.....	4 10 0	5 10 0	
St. Petersburg.....	5 0 0	6 10 0	
Greenheart.....	8 0 0	8 10 0	
Box.....	4 0 0	15 0 0	
Sequoia, U.S.A. ....per cube foot	0 1 8	0 1 10	
Mahogany, Cuba, per super foot			
lin. thick.....	0 0 5	0 0 6½	
" Honduras.....	0 0 4½	0 0 6½	
" Mexican.....	0 0 4	0 0 5	
Cedar, Cuba.....	0 0 4	0 0 4½	
" Honduras.....	0 0 3½	0 0 4½	
Steinwood.....	0 0 5	0 1 0	
Walnut, Italian.....	0 0 3	0 0 7	
Deals, per St. Petersburg Standard, 120—12ft. by 1½in. by 1½in. :-			
Quebec, Pine, 1st.....	£18 15 0	£21 15 0	
" 2nd.....	13 5 0	15 10 0	
" 3rd.....	6 15 0	9 5 0	
Canada Spruce, 1st.....	10 15 0	12 5 0	
" 2nd and 3rd.....	8 5 0	9 5 0	
New Brunswick.....	7 5 0	7 15 0	
Riga.....	7 5 0	7 15 0	
St. Petersburg.....	9 5 0	13 5 0	
Swedish.....	9 15 0	16 5 0	
Finland.....	8 15 0	9 5 0	
White Sea.....	9 15 0	16 5 0	
Battens, all sorts.....	5 0 0	18 0 0	
Flooring Boards, per square of lin. :-			
1st prepared.....	£0 9 6	£0 17 9	
2nd ditto.....	0 8 0	0 13 6	
Other qualities.....	0 6 3	0 7 6	
Staves, per standard M. :-			
Quebec pipe.....			
U.S. ditto.....	£35 0 0	£42 10 0	
Memel, cr. pipe.....	220 0 0	230 0 0	
Memel, brack.....	190 0 0	200 0 0	
OILS.			
Linseed.....per ton	£16 12 6	£17 2 6	
Rapeseed, English pale.....	23 10 0	23 15 0	
Do., brown.....	22 0 0	22 5 0	
Cottonseed, refined.....	15 15 0	16 5 0	
Olive, Spanish.....	32 10 0	33 0 0	
Seal, pale.....	20 0 0	20 5 0	
Cocconut, Cochiti.....	29 0 0	29 10 0	
Do., Ceylon.....	23 10 0	24 0 0	
Palm, Lagos.....	23 10 0	24 0 0	
Oleine.....	18 15 0	19 15 0	
Lubricating U.S. ....per gal.	0 6 3	0 7 6	
Petroleum, refined.....	0 0 4½	0 0 4½	
Tar, Stockholm.....per barrel	1 0 0	1 5 0	
Do., Archangel.....	0 12 6	0 15 0	
Turpentine, American...per ton	23 15 0	24 0 0	



# THE BUILDING NEWS

## AND ENGINEERING JOURNAL.

VOL. LXXV.—No. 2273.

FRIDAY, JULY 29, 1898.

### OUR BUILDING SITES AND POSSIBILITIES.

**O**PPORTUNITIES for doing something to redeem our great cities from dullness and monotony occur only seldom during a century. The rebuilding of the City of London after the Great Fire, and the construction of the great boulevards which have made the French Capital what it is under Napoleon III. and since the War, are, of course, exceptional instances. We have, in these days of municipal enterprise and street reconstruction, once more a chance of proving that we have national architectural talent, and, when occasion arises and the opportunities are favourable, of showing that we have not lost the art of planning great schemes. Hitherto many of our public sites have fallen into the hands of men who have been speculative and commercial rather than enterprising, and we can point to many spoiled corner plots and widened thoroughfares. A great many of these failures have arisen through a want of foresight on the part of our civic authorities—the late Metropolitan Board of Works and the London County Council—in their not obtaining the co-operation of our architectural societies or of our leading architects. The choice just made by the First Commissioner of Works for the new Government Offices, of the Local Government Board, the Board of Trade, the Education Department, the War Office, and other ministerial departments is at least a satisfactory beginning of a better régime. Last week we mentioned the names of the two gentlemen whom the Government had selected for these important buildings—Mr. William Young and Mr. J. M. Brydon. The former has been intrusted to prepare plans and drawings for the new War Office on the Whitehall site, long lying a waste, facing the Horse Guards, and Mr. Brydon has been selected to prepare designs for the combined public offices on the Parliament-street site created by the widening of that thoroughfare. A great task is committed to the two gentlemen intrusted with the work, and their duties will be onerous. Mr. Brydon has won a deserved position among our Classic architects for his vernacular treatment of the style, and his Municipal Buildings at Bath, his Chelsea Town Hall and Public Libraries, have shown that he has a true appreciation of that dignity and breadth so valuable for buildings of a public character; while, of Mr. William Young's work, his great Glasgow Town Hall and Lord Wemyss's residence at Gosford are, in spite of defects, Classic designs of unimpeachable merit and refinement in plan and detail. But it is the ability in designing blocks of public and official character to suit the locality that we have to consider. Upon plan and appropriateness of design their work will be judged. What a man has done is not always a safe test. We cannot doubt the many advantages of the Whitehall and Parliament-street sites. They are convenient to the Houses of the Legislature, and within easy distance of the leading offices, public and private, that are brought daily into connection with Government business. In other respects few architects could wish for more favourable surroundings. They both have wide frontages: the Parliament-street improvement has opened a frontage of several hundred feet from the furthest corner of Great George-street to the block of Colonial offices facing White-

hall. Here the architect will have an opportunity of aligning the new frontage of the combined offices with that of Sir Gilbert Scott's heavy Classic pile. Its flat heavy roof is not perhaps the most favourable outline, nor will it be desirable to continue the lines or façade of that building. Let us hope that Mr. Brydon will rise to the occasion, and design a block at once dignified by breadth and simple and picturesque in its grouping and skyline, to redeem the insufferable flatness of the buildings in its proximity. The site also has a good depth, which will enable the architect to give a handsome return end towards Great George-street. From Westminster Hall to the Broad Sanctuary the open space of Parliament Square will give a good view of this end of the new offices, and we trust the opportunity will not be lost to combine the surroundings with the plan adopted. If only the area between the Colonial and India Office and Great George-street could be included in the design, there might have been a site nearly as worthy of the architectural ideal as that which Inigo Jones cherished, though did not carry out, in his plan for the Palace at Whitehall which he designed for Charles I. There have been opportunities since of completing a less ambitious scheme in this part which would have vied with the scheme of the Tuileries or Louvre; but it has been left to our own days of street reconstruction and widening to do something to redeem this area from commercial or official commonplace. The Carrington House site reserved for the new War Office will, we hope, be made to subserve the important end of uniting as far as possible Inigo Jones's fragment with the surroundings. At present these are squalid and dull enough. How came it possible that such a site as this should have been spoiled by shops and big hotels? From Whitehall-place to Charing-cross there is nothing but a most commonplace block of houses and shops. All that we can now do is to try and make amends for the apathy of a past generation. The *Times* hoped that Mr. Young would build a War Office as the Brothers Adam would have done, or like that gentleman's beautiful house for Lord Wemyss at Gosford. We hope he will not be restricted to a style, beautiful as it is, that may do for private residences, but would scarcely be suitable for a War Office. It hardly seems reasonable that a style characterised by extreme quietness and elegance would be most suitable for offices devoted to bellicose operations. We might, had we time, mention other sites which will shortly demand architectural treatment. Let it not be said again that our authorities have lost the opportunity to make the best of them. What a good opening for architectural improvement should there be when the long-talked-about boulevard from the Strand to Oxford-street is really begun—a scheme which might have excited the ambition of a Visconti or a Haussmann.

### NATIONAL COMPETITION DESIGNS AND DRAWINGS.

**T**HE exhibition of students' work, now on view at the South Kensington Museum annexe, is on the whole a fairly strong one in those sections of drawing and modelling from the Antique, drawing from models, modelled designs, design applied to various materials and feature, which have been regarded as the essential branches of art instruction. We cannot say the same of architecture, and the examiners admit that the quality of the work in this section does not reach the high level of the last few years. Our usual complaint has been that the work given to students is too ambitious. This year the choice of subjects has been more discreet. The designs for a market hall, for town houses, farmhouses, labourers' cottages

show a more reasonable application of design to buildings of ordinary requirements. Confining our attention first to this class of subjects, we notice Shirley Harrison's design (Leicester) for a Market Hall. The author is an expert draughtsman, as the perspective, drawn in sepia and shaded, shows. The plan of market, which is on the ground floor, is an oblong, 76ft. long, with columns dividing the area into a central avenue and aisles, with stair turrets at the corners in the rear, and a staircase forming a side tower on the side at the entrance end, which lead to a council hall, 90ft. by 35ft., with gallery stage. The double flight of outer steps at the vestibule end is a feature, and the corner tower is simple and dignified in outline, the basement and upper lantern stage being rusticated. The design is in a simple Classic Renaissance style. The section shows an elliptical-shaped ceiling to hall, and the details of the interior decoration are refined. A silver medal is awarded. Near it is a design for a mausoleum, by a Glasgow student, Alex. R. Gardner, a clever design showing knowledge of the Neo-Grec style—a sort of Greco-Egyptian treatment. In plan there is an oblong cell; at the ends are projecting circular stairs, square externally, and the principal entrance and front are tetrastyle in design; but the outline is rather heavy, the drawing of the ornament being the most creditable part.

One of the cleverest designs is for a town house, by William Haywood (Birmingham), in a free Renaissance style. The plans are well thought out, a centre hall giving light through a skylight. The author exhibits an artistic hand in the details of elevation, which are freely sketched and tinted. A silver medal is also given to B. Bower, Birmingham, for the same subject. The plans show a large centre court, which lights the main stairs, a picture gallery along one side, and a drawing-room in front and dining-room in the rear on the principal floor. Red brick and rough-cast are the materials used in the façade, which is plain and suitable. A bronze medal is awarded to Leonard R. Guthrie, of Glasgow, for this subject; but the planning is not good, and another student of the same city fails in the plan, which lacks concentration. A few designs for a country house receive bronze medals. That by Harry H. Goodall, Nottingham, in brown ink, is a picturesque brick design of Old English character with gables; but the corner entrance looks weak, and the plan is wasteful. Another, by George H. V. Cale (Birmingham), is spoilt by the patchwork of timbering in the gables. One of the best attempts at domestic work of an unpretentious kind is a farmhouse, simply treated in brick, with slate roof, by A. Herbert (Leicester). The sketches of leadwork are clever. A bronze medal is awarded. Equally clever is the bronze medal design by Alfred D. Thacker, Birmingham, for three labourers' cottages in a row, simply and picturesquely handled in brick, and having a well-devised plan.

Other designs are for a village hall and club, and art school (697) in poor Italian, county council offices (873), weak and faulty, and a design for a municipal building in a kind of Late Gothic of acrobatic character, (662).

The designs in subject 23c are very creditable. A design for wrought-iron gates (133) by Harold A. Smith, Wolverhampton, exhibits invention, the upright wave-shaped bars with foliations are clever, and the details show a nice iron treatment. We see in this class a nice painted panel design by W. L. Stamp, who receives a silver medal. The gold medal is awarded to E. Evans, of the People's Palace, Mile End, for a masterly design for ceiling decoration. The spandrels, with figure subjects in colour, exhibit invention and skilful arrangement, and the domical ceiling, with groups of figures, displays considerable feeling in composition and colour.



Dorothy Smyth's (Manchester) a design for frieze, which takes a silver medal, is also clever. A design for decoration of an entrance hall by Geo. Montague Ellwood, Holloway, receives a bronze medal, and also shows skilful drawing. No. 182, by Mary D. Masters, Bath, for a three-fold screen, and the silver medal design by Harry Morley, Leicester, for an oak door (86) with a figure surmounting it, are chaste in conception and refined. The same prize is also given for a fire screen by W. A. Bennett, Salford. We must draw attention more particularly to James A. Jones's design for an angle and fireplace which wins a silver medal. This Birmingham student gives us a quaint and artistic arrangement for recessed fireplace in plaster panels and stained wood. The wrought-iron firegrate and copper hood are simple and effective; the hood is relieved by repoussé ornament. The panel in iron and copper repoussé is also clever. Near it we see an artistic treatment for the decoration of railway carriages by a lady student, Isabel McBean, of New Cross. The design for tapestry blind and seat shows invention. For stained glass we see little—one of the best designs, evincing a composition marked by some power, is 316, by Charles W. Kelsey, of Holloway, in which the Virgin and Child, the Wise Men, and the Angel Gabriel are introduced. A bronze medal is given. Designs for tiles, showing considerable inventive arrangement and adaptation, are exhibited. We particularly notice one by Robert A. Dawson, a National scholar, who takes a silver medal; also a design for a frieze, in which a peacock's plumage has been artistically adapted (bronze medal).

Several examples of modelling design of considerable merit claim our notice. Amongst these we must briefly notice the following:—J. Begg (Westminster) for a door-knocker, silver medal; to a Glasgow student, Albert Hodge, the same prize for a modelled design for top of a newel; No. 55, F. G. Swaish, Bristol, a nicely-treated design for tiles, based on a geranium flatly treated; No. 312, three modelled figure panels, very gracefully composed in low relief by Bertha Goff, Holloway (bronze); some modelled designs for book-covers, &c., 1003, 1063, by Plymouth and South Kensington students. There is much movement and grace in the figures in No. 354, by A. White (Mile-End), which wins a bronze medal, and in No. 363, by F. Halmon, New Cross, for a design for a gallery-front. The designs for a metal alms-box, by G. C. Warren, Plymouth, and for a hand-mirror (242), which take the same prize, are creditable. Nos. 606, a casket, by Llewellyn Roberts, Birmingham, and 395, Ruth Pinwill, Plymouth, for book-case, and Eleanor Mercer (hon. award) for a panel, side of fireplace, are particularly clever examples. Another lady-artist, of New Cross (which school has won so many prizes), Katherine Coggin, wins a bronze medal for a design for a wall fountain, exceedingly clever in idea and adaptation, and her designs for silver work are also good.

We can only briefly refer here to the designs for wall-papers and stencil designs. The gold medal is given to James Grimstone, of Glasgow School of Art, for his original and inventive design, based on the gladiolus pink and white. The green and yellow arrangement of colour, and the interlacing harmonies of colour shown in his designs, in which lilies, nasturtiums, and daisies are introduced, deserve notice. R. H. Arthur Jackson, of Accrington (bronze medal), has a well-distributed design, though not pleasing. Ernest H. Simpson, Bradford, wins a gold medal for a wall-filling of much elegance; and the silver medal design for stencil decoration for filling by G. P. Parker, Chelsea, is a pleasing arrangement, well adapted for its purpose. H. Tattersall also sends a creditable arrangement. A silver medal also goes to a clever series of comical

Christmas cards, stencilled, and wall-paper and dado border, by Hugo W. Koch, South Kensington. We also mention as creditable work in this class a wall-paper based on the azalea, but too green and harsh.

The designs for book illustrations reflect much credit. Very beautiful and characteristic designs are those which take the gold medal—Margaret Thompson, New Cross, for "The Seasons," "The Tempest," and the nursery rhyme are very cleverly illustrated in ink. The silver medal designs (120), by S. Rollinson, Scarborough, for landscape and figure, are exceedingly clever. "The Shepherd's Cradle Song" is very devotional and tender (bronze medal), and we must also notice the same lady's (Alice Horton's) designs for decorative pages. Edith A. Cubitt, New Cross, wins a silver medal for illustrations for children's books, "The Hour"; also the book plates by H. Ospeval. No. 74, Jessie King's series of pencil sketches, illustrative of "The Light of Asia," is inventive and marked by poetic feeling and quaintness. A gold medal is awarded to Mary G. Hauston for designs for book-cover. Her "Chaucer" is very bold and appropriate. A silver medal is given to Leonard T. Howell for a cover to be executed in silver and ebony, and we also note 495, bronze medal design.

We have already noticed a few of the modelling designs. The gold medal (20) is awarded for a modelled design for a panel by J. H. Strutt (Westminster), in which the figure subjects are in low relief and pierced. The silver medal is given to Florence S. K. Joyce, a Birmingham student, for a finger-plate, in which the legend of St. George and the Dragon is introduced, admirable in line and arrangement. A modelled design for wall decoration (91) by J. Bancroft (Macclesfield (silver medal), and a design for a frieze for children's nursery, by Ernest Light (488), and repoussé plaque (bronze medal) may be noticed. A refined figure composition and ornament in gesso is shown by E. W. Horne, Wordsley. The designs for artistic posters are worth notice. A gold medal is given to Frederick Taylor, New Cross, for several designs; one for an exhibition of embroidery and needlework, in which a richly-embroidered costumed figure is introduced; another for an art students' soiré poster shows a graceful figure of a girl in long dress, her head set against a number of illuminations or Chinese lanterns, and the colour very effective. "The Quiver" poster is a slantwise flight of scarlet arrows through blue space, and a musical festival programme is headed by three cleverly drawn female figures holding scrolls over the lists of vocalists and instrumentalists. These all show artistic invention applied to the everyday advertisement, and if our hoardings were covered with these flat-coloured outline designs, they would not be so objectionable as they are.

Very few measured drawings are exhibited. Very accurate, carefully, and shaded drawings to a large scale of Peterborough Cathedral west front, by Ernest W. Turner (silver medal), showing every stone that has been replaced by new ones, is of value; but the style of drawing is a little out of date. The work shows immense labour, and the north-west tower is indicated to be 1ft. 2in. out of perpendicular. The drawings of one bay of Winchester, inside and outside, by a local student (Arthur Bunch), and the plans of piers, Bishop Langdon Chapel, and the entrance front of Wollaton Hall (108), by Frederick Gregory, Nottingham, and careful set of drawings of St. Michael's Church, Linlithgow, by Donald M. Stoddart, Glasgow, receive silver medals; also drawings of Peterborough Town Hall (391), by Samuel Taylor (bronze medal), are the chief contributions to this class.

Mr. Mark Simpson was elected building inspector to the borough of Burslem last week at a salary of £90 per annum, rising to £100 by £5 a year.

## MODEL SPECIFICATIONS.—XXIII.

### HALF-TIMBERING—ROOFS.

LAST week we illustrated and described different kinds of framed floors, and two or three systems of half-timber work. We now furnish details of walls constructed of brick-filling between timbers, and stucco or plaster-filling, showing modern and economical methods. Plan 1 represents a 9in. wall, framed with 9in. by 9in. angle-posts, and 7in. by 4in. intermediate studs, filled in with 9in. brickwork, which is built behind the studwork. The internal face of wall is rendered, and the exterior is finished with a coat of rough cast, consisting of lime, sand, and small gravel or pebbles. We show how the internal angle between two walls is treated, the pieces being rebated to each other. Plan 2 is a plaster-filled wall. The angle-posts are built up of two pieces of the same thickness as studs, by rebating them together. Clauses for these are given (p. 94), Nos. 13 and 14.

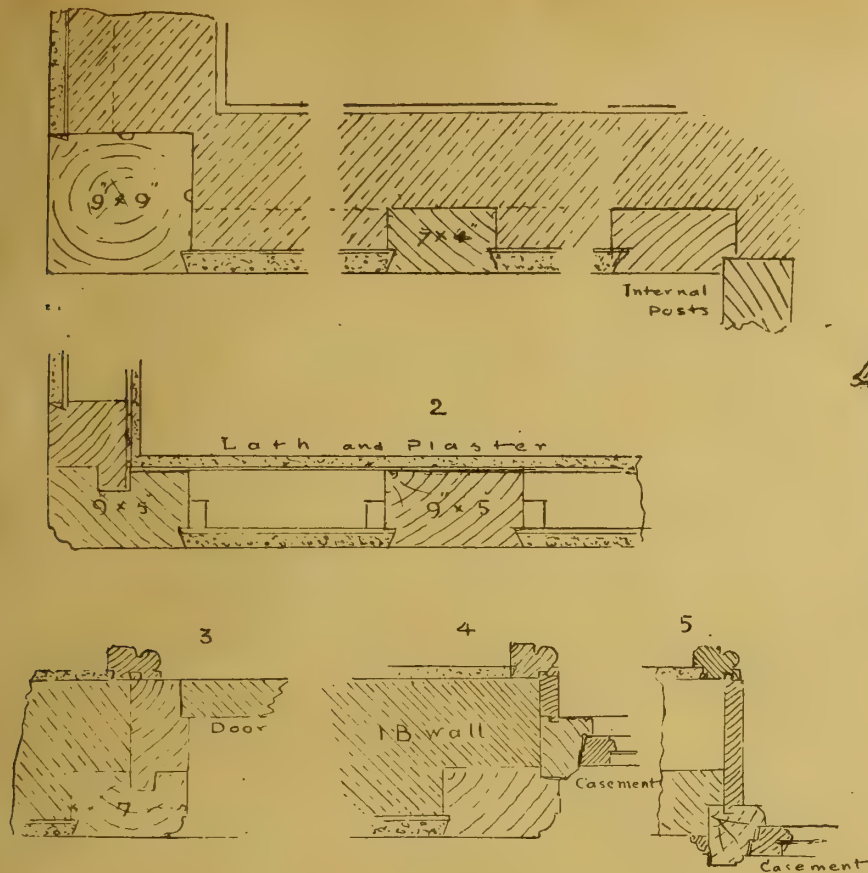
Methods for forming jambs for doors and windows are seen in Figs. 3, 4, and 5. The latter shows the casement frame made to project from face of wall. Many very ornamental shaped studs are to be seen in the old timbered-fronted buildings of the 15th and 16th centuries, especially in Herefordshire, Warwickshire, Lancashire. Our sketch (6) represents the gabled entrance of Park House, Oswestry (illustrated in Mr. Gotch's valuable work on "The Renaissance in England"). The plaster and timber panelwork is very unique. Carved Ionic pilasters project on the face of the studs, which are of baluster shape, between which are arched plaster panels below the six-light window. Above the window is also seen a series of flat baluster-shaped studs. Other gables have quatrefoil panels between the studs, and horizontal timbers showing the variety of decorative effect obtained by this mode of building.

In Fig. 6A we give a sketch of the connection of the beam and principal in a king-post truss for a roof of about 25ft. span; and in 7 and 8 the connections of king-post and ridge, and the framing of the struts into the post. Joints should be specified for roofs of a special kind; it should be stated whether the principal rafters are to be shoulder-tenoned or strapped to the king-post; if the principals at foot are to have an abutting joint or bolted, or to have a bridle joint with heel strap, and cast-iron shoe; whether the purlins are to have cleats, the rafters are spiked or "housed" into the ridge-board, for, unless these points are shown clearly, carpenters are apt to introduce simpler and often inferior connections. A general clause to the effect that "all joints to be stub-tenoned, and to fit square to shoulders," may be introduced. Purlins are best coggled on to principal rafters, and not framed between them. (See sketches next week.)

In our next article we shall show a few examples of the framing of open-timbered roofs, suitable for schoolrooms, libraries, halls, and churches.

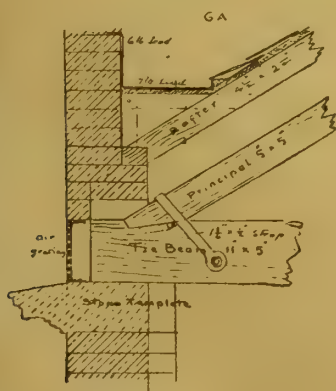
The student is recommended to read works like Hurst's edition of Tredgold, the "Notes on Building Construction," published by Longmans; Mitchell's "Building Construction," or other works for details of roof and timber structures. Scantlings in all cases ought to be regulated by the width or span and pitch of roof, and tables of these for every class of truss are published. Trusses should be placed not more than 10ft. or 12ft. apart, and purlins should not be placed more than 8ft. apart. In many of the old timbered roofs over French churches the principal rafters are halved at the apex, and carry the ridge pieces, which are of large scantlings (not mere ridge boards). In some cases the tie-beam is clasped or hung up by double king-posts, stirrup-like.





Double wall-plates are used, one on each side of the thick wall, and these are generally strutted to form horizontal trusses. We shall show instances of these details.

A king-post roof is adapted for spans of from 20ft. to 30ft. The following scantlings are given by Hurst for a roof of this kind, 30ft. span:—Tie-beam 12in. by 6in., principal rafter 6in. by 4in., king-post 6in. by 4 $\frac{1}{2}$ in., struts 4 $\frac{1}{2}$ in. by 2in., purlins 9in. by 5 $\frac{1}{2}$ in. Suppose we have a roof of this description divided into 10ft. bays and of about one-third pitch. In specifying scantlings of the



timber, it is better and makes a neater job to make the principal rafters, king-posts, and struts all of the same thickness as the tie-beam. The clauses may run as follows:—

19. *King-Post Truss*.—The roof to be composed of four (or more) trusses from sound dry Dantzic red fir, free from knots, sap, and shakes, placed 10ft. apart, and of the following scantlings of timbers:—

Tie beam 12in. by 6in., cambered in the centre to a curve of 1in.  
Principal rafters 6in. by 5in.  
King-posts out of 6in. by 5in.  
Struts 6in. by 3in.  
Purlins 9in. by 6in., scarfed over bearings.  
Common rafters 4 $\frac{1}{2}$ in. by 2in.  
Ridge-piece 11in. by 2in.

The trusses to be framed, as shown in drawings, with all necessary stub tenons, notched timbers, cleats, bolts, and straps. The straps to be 1 $\frac{1}{2}$ in. (or 2in.) wide, by  $\frac{3}{4}$ in. (or  $\frac{1}{2}$ in.) thick of wrought forged iron, with  $\frac{1}{2}$ in. bolts, nuts, heads, washers, jibs, and cotters. The tie-beams to be carried on tooled York stone templates 6in. deep, and of the whole thickness of wall, and openings with cast-iron air gratings 12in. by 12in. to be provided at the ends of the beams for ventilation (or the tie-beams to have cast-iron shoes of the pattern given, or 12in. long of  $\frac{3}{4}$ in. thickness, resting 9in. on walls at ends, with 4lb. lead (or tarred felt) seatings on stone templates 6in. thick of the whole thickness of wall, and 18in. wide). Or—

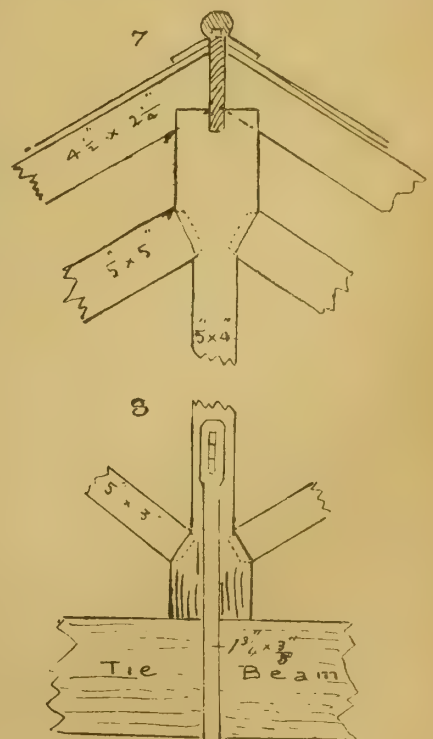
The truss to be framed in accordance with working drawings, and the scantlings figured thereon with all proper stub-tenoned connections, abutment joints to principals and tie, shouldered tenons to principals and king-post, straps or bolts of the sizes figured in detail, cleats, notches, and other fastenings, &c.

20. *Queen-post Truss*.—The roof over large hall to be supported by trusses as shown and figured in drawing. The trusses to be not more than 10ft. apart, with half-trusses at the ends, of corresponding form and scantlings; hip rafters, 10in. by 2 $\frac{1}{2}$ in., framed into dragon piece, which is to be dovetailed into an angle-tie of Memel fir, 7in. by 7in. The tie-beams to bear on walls 9in. (or 12in.), and to rest on 6in. York stone templates, tooled fair inside, 1ft. 6in. long, and 14in. wide. The queen-posts, 5in. by 4in. (or figured on drawing), to have wrought-iron bolts (or straps), with heads, nuts, washers, &c., to unite them to the tie-beam. The principal rafters of red pine (or Memel fir), 10 $\frac{1}{2}$ in. by 5in., to be united to tie-beam with wrought-iron bolts  $\frac{3}{4}$ in. in diameter, with heads, nuts, washers, &c.; the straining beam, 7in. by 5in., to be securely framed or tenoned into heads of queen-posts, and secured with three-way straps and bolts, 2in. by  $\frac{3}{4}$ in. The purlins to be 8 $\frac{1}{2}$ in. by 5in., and the ridge piece 10in. by 2in., common rafters, 4in. by 2in.; the whole to be framed in a workmanlike manner, with all proper joints, abutment-joints, cast-iron shoes, sockets, wrought-iron bolts, straps, and cleats.

21. *School Roof*.—The roof over school room to be carried on trusses formed according to drawings, and of the figured scantlings. The principals to be (6in. by 4in.) halved and bolted together with wrought fir angle brackets (or rib pieces) screwed (or strapped) to the timbers at the junction of collars and wallpost. The king-post (to be 4in. by 4in.) supporting collar and ridge to be framed into principals and tenoned into collar, and secured to

same with 1 $\frac{1}{2}$ in. by  $\frac{1}{2}$ in. wrought iron strap or stirrup piece. All the timbers below collar to be wrought fair, and the principals and ribs that show to be wrought, chamfered (or moulded). Or—

The principals (say, 6in. by 5in.) to be constructed with cross braces (5in. by 5in.) halved at



crossing and at junctions secured by straps and bolts. All the timbers exposed to view are to be wrought, and the angles stop-chamfered (or moulded). The roofs to be boarded above the rafters with  $\frac{3}{4}$ in. (or 1in.) wrought, matched, V-jointed hoarding laid diagonally and securely nailed to rafters, and covered with asphaltic felt (or McNeill's felt for roofing, Bunhill-row). Lay battens 3in. by 1in. over the boarding on the back



of each rafter, and on these lay 3in. by 1in. battens for slating (or laths for tiling), fixed to a proper gauge.

22. *Lantern Roof*.—The roof over library (or billiard-room) to be constructed as shown on drawings, and according to scantlings figured thereon. Or—

The roof trusses (state how many) have queen-posts 6in. by 4in., principals 6in. by 4in., straining beam 6in. by 4in. (or 7in. by 4in.), tie-beam 10in. by 6in., straining sill 5in. by 4in., purlins 9in. by 6in. The lantern curb to be carried by the purlins, and to be framed with 6in. by 6in. wrought, twice rebated and beaded (or chamfered) angle-posts, and 4½in. by 3in. rebated and beaded (or chamfered) intermediate posts, and head piece 4½in. by 4in., rebated, beaded (or chamfered), according to detail. The sill to be of oak, 7in. by 4in., twice sunk, weathered, and throated, screwed at angles with galvanised iron water bar, bedded in white lead, and the framing to be 1½in. (or 2in.), moulded sashes, rebated for glass, each sash to be hung at top on a pair of 3in. brass bulbs, and glazed with 21oz. fluted (or other) glass in putty, complete to architect's satisfaction.

23. *Roof of Mission Hall*.—The following is a clause suitable to describe a roof over a small hall of about 22ft. wide. The timbers are rather heavy, but form part of the wall supports which occur under each truss:—

The roof and wall-posts to be framed in accordance with the drawings. The timber to be of the best Baltic, free from sap, shakes, large and loose knots, &c., and of the following scantlings: Wall-posts to be 9in. by 6in.; double principal rafters of two 9in. by 1½in. pieces, clasp king-post at the apex, and diagonal ties; king-post 7in. by 3in.; diagonal ties 7in. by 3in.; purlins 9in. by 3in., placed flatwise; ridge-piece 9in. by 3in.; two collars 9in. by 3in., clasp principals, king-posts, and diagonal ties. These clasped timbers are to be bolted together where shown with ½in. wrought-iron bolts, heads, nuts, screws, and washers. The king-post is to be connected to diagonal ties by wrought-iron straps, 2in. by ½in., placed on both sides of timbers with ½in. bolts, nut-heads, &c. The double principals are also to clasp the wall-posts, and be united by ½in. bolts, nuts, &c. The purlins to be cogg to principals (or framed into them), and the whole to be put together in a substantial and workmanlike manner. The exposed timbers to be wrought fair and chamfered, and the roof to be lathed and plastered under common rafters. (We shall give a sketch of this roof in our next.)

## EGYPTIAN ANTIQUITIES AT UNIVERSITY COLLEGE.

THERE is an interesting collection of antiquities from the excavations of the Egypt Exploration Fund at Denderah, and from the Egyptian Research account at Hierakoupolis, on view at University College, London. The discoveries at Denderah were made by Professor Petrie, and those at Hierakoupolis by Mr. Quibell. The purpose of the excavations at Denderah was to examine the cemetery and to ascertain its age, in order to throw light on the history of this ancient and important capital. So far as the history of Denderah could be ascertained by its cemetery, no tombs earlier than the fourth dynasty were found; but the bulk of them began in the sixth dynasty, and went on till the eleventh. The whole area of the cemetery was searched, half a mile back from the temple inclosure, and lying along about a mile of the desert. The majority of the discoveries at Denderah are in stonework. One sculpture, like the sculpture of the third dynasty in the Louvre, was found on a group of great brick mastabas of the earlier style. Between two of these mastabas was part of a bowl of black incised pottery like that found by M. de Morgan in a tomb of Seneferu's age. Large quantities of worked flints were picked up on the surface of the desert, mostly of palæolithic types, but only one statue, such as are common in the cemetery at Memphis, was found, that of Prince Adu I., which lay broken up, in the filling of his tomb shaft. A series of mastabas of the Princes of the sixth dynasty were among the most important discoveries. Some lintel rolls from the false doors along the side of Prince Mena's tomb are of very high relief, and one has his state name the same as the pyramid of Pepy I. A slab of Prince Adu I., and his wife Ana, was also found. Many bowls of the old kingdom and much pottery of the Middle Kingdom, probably of the eleventh and twelfth dynasties, are shown, along with a number of embalmed and

bituminised sacred animals, found in catacombs consisting of tunnels of brickwork branching from main galleries. In one of the tunnels a quantity of blue glazed objects of temple furniture, buried doubtless as sacred property, was discovered, the names on them showing that they belonged to the eighteenth dynasty. Some of the sculptures of Prince Mena, which belong, it is supposed, to the end of the sixth, or the beginning of the seventh, dynasty, show a falling off from some of the old kingdom sculptures. There are two quaint figures made on the wheel as jars, one weeping and the other tearing the hair, representing grief at the loss of some ruler or relative. A diorite shell and dish, a porphyry vase, two alabaster, and one limestone vase were found in a woman's grave, all of the sixth dynasty, and under a heap of flints from an untouched grave, containing a burial of a woman, came a small mirror and a necklace of garnet and silver beads. A rude doll of pottery, found in a mass of bodies, with objects of the twelfth dynasty, buried in the gallery of the tomb of Adu I., serves, it is thought, to date this class of rude pottery figures. Two important finds were made of bronzes, but the best as well as the most of them were kept for the Ghizeh Museum, including a large and perfect incense-holder of the long arm form and a libation vase with dedication by Ramessu II. Among the bronzes allowed to be taken to this country, were a libation vase, a cooking pot, blackened outside, a splendid specimen of a fluted jug with handle all hammered out of one piece, the first of the fluted vases actually found, though often shown in scenes of the eighteenth dynasty among foreign tribute. There is a beautifully carved group of Mentuhoep and his wife, probably of the eleventh dynasty, which shows the fine work done at that time equal to the best work of the old Kingdom. Unfortunately, the head of the male figure has been lost, but the head of the female has been preserved. Various necklaces of amethyst, carnelian, and blue glaze of the middle kingdom are shown. On one of the tables in this room is a large quantity of glass work of Roman date, part of some temple furniture buried in the annual catacombs as sacred property, and on another table is a series of limestone labels from mummies with demotic inscriptions from the Ptolemaic cemetery—the miniature tombstones of those days. A crucible and moulds were found in a Roman bronze foundry in a house near by, and in the annular catacombs of Roman age two jars of coins were found hidden early in the 5th century. Such finds show the gradual extinction of the earlier coinage. A lot of coins of Diocletian, in perfect condition, were found buried in rouleaux in the floor, near the temple inclosure.

Mr. Quibell's excavations at Hierakoupolis, opposite to El Kab, produced some discoveries of the highest value on the temple site, for here were monuments of warfare and of history, the first such known to belong to the earliest dynasties. Most of the objects shown are precursors to the fourth dynasty, 4000 B.C. Pottery of the types well known in the later New Race graves of Negada was found in the cemetery upon the desert, belonging to a period contemporary with the earliest kings, and along with it a number of slate palettes of square type for grinding paint. There is a wonderful collection of ivory carvings, buried as offerings, which represent very early people of about the second dynasty, but unfortunately much of it was rotted. Most of the male figures have scanty pointed beards, like the heads of the New Race people of pre-dynastic times, probably, it is thought, the Libyan race, who occupied Egypt then. Nearly all the figures wear girdles, and most have a dagger sheath hanging in front. Nearly all the female figures are nude, and, although it is believed they show the type of the people at the time, they are not supposed to represent living persons, as figures of women shown in procession are all clothed down to below the knee. On the ivory work animals are usually selected for decorative purposes, some of the carving being very fine. On one table are a number of animals in green glazed ware, showing that the system of modelling in sand body and glazing over was developed in the earliest dynasties. Monkeys seem to be the most usual animals, although there are the pig, calf, dog, pelican, hawk, scorpion, and a fish. There is a beautifully-carved limestone mace of King Nar-mer, which was probably used for ceremonial purposes. The largest mace, which is broken, has the finest carving; but the

smaller and perfect one represents this unknown king seated in a canopy at the top of a long flight of steps with the vultures hovering over him. Two men bearing long fans are below. Behind are the high priest and the royal servant with three men-at-arms bearing long staves. Below is a man seated on a couch, and three men running forward, and at the base is an account of his worldly possessions, which evidently numbered 400,000 oxen, 1,422,000 goats, 120,000 captives in an inclosure. On a portion of the large mace there are dancing figures, of men bearing offerings, and the king is represented as holding a hoe, superintending irrigation works, an instrument not unlike that in use in Egypt at the present day. The great palette now in the Ghizeh Museum, of which only casts are shown at University College, is the most important historical monument of the early kings. It represents a king whose Ka name was Nar-mer, but whose personal name is unknown. One side depicts him going in procession, and the figures of the men accompanying him point to diversity of population at that time. Before the king are ten headless enemies, the bearded heads laid between their legs. At the base is a bull emblematic of the king trampling on an enemy and tearing up with his horns the wall of a fort. On the other side, Nar-mer is represented as holding an enemy by his hair, with the mace uplifted to strike, while below are shown two slain enemies. Two Hathor heads are on each side, and the same heads form the ornament on the royal kilt. Another notable exhibit is a door socket of quartzose rock, representing a bound enemy crushed by the door. This is the same symbolism as in the Book of the Dead, where the wicked are said to be crushed under the doors of Hades.

## THE FORTHCOMING SANITARY CONGRESS.

EXCELLENT arrangements have been made for the forthcoming visit of the Sanitary Institute to Birmingham. A meeting of the local general committee having the matter in hand was held last week at the Council House. The Lord Mayor, who presided, said that would probably be the last opportunity which the committee would have of meeting, and he thought the public should know that the arrangements for the forthcoming congress were well forward. They might with confidence, he thought, look forward to a complete meeting in September. Over one thousand delegates had been appointed to attend by the different organisations, and if they added that number to those who are locally interested, they might be sure there would be large audiences. He was glad to know that there would be a most interesting collection of papers.

The officers, in their report, which was submitted by Mr. W. Bayley Marshall, stated that the date fixed for the Sanitary Institute Congress is from Tuesday, Sept. 27, to Saturday, October 1 (inclusive). The inaugural address of the president will be delivered on Tuesday afternoon, Sept. 27, and the conferences will be held in Mason University College on Wednesday, the 28th. The mornings of Thursday, the 29th, and Friday, the 30th, will be devoted to the sectional meetings. The arrangements for the congress are in a forward state. The preliminary programme is now ready for issue, and it is expected that the full programme of local arrangements will be issued early in September. Tickets of membership of the congress will be ready for issue at an early date, and may be obtained at the local offices, which are situate in the Council House. Holders of congress tickets will be entitled to attend all the conferences and meetings of sections, to join the excursions, to admission to the exhibition, and will receive invitations to the reception given by the Lord Mayor, and to the garden party at the Edgbaston Botanical Gardens. The Lord Mayor and the president of the congress (Sir J. Fyner, Bart.) will, in accordance with practice, attend a public luncheon, which will be held on Sept. 27, at the Grand Hotel. The list of subjects to be discussed is an exhaustive one, principal among them being "Facts, Fancies, and Fallacies of Vital Statistics," by Dr. E. F. Willoughby; "Antiseptics in Food," by Dr. A. P. Luff; "Prevention of Tuberculosis in regard to Meat and Milk Supply," by Dr. T. M. Legge; "Birmingham Water Scheme," by Mr. J. Mansergh; "Sanitary Defects in Rural Districts: Remedies," by Mr. G. H. Smith;





AN AMERICAN STAIRCASE HALL.

"Deep-well Boring in Warwickshire," by Mr. J. E. Willcox; "Construction and Ventilation of House drainage," by Dr. A. Bostock Hill; "Natural Purification of Sewage," by Dr. Kenwood and Mr. W. Butler; "The Flora of Sewage," by Professor Boyce; "Dwellings of the Working Classes," by Dr. J. F. J. Sykes; "Cleansing of Persons Act," by Mr. A. Wynter Blyth; "Bacteriological Diagnosis and Infectious Disease," by Dr. Washbourn; "Relation of Medical Officers of Health to Schools," by Dr. Manley; "Precautions Observed in the Ventilation of Sewers and Drains," by Mr. T. J. Moss-Flower; "Teaching of Sanitation in Elementary Schools," by Mr. E. Day; "Sanitary Knowledge for Working Women," by Mrs. Wakeford; "Village Nursing and Infectious Disease," by Miss Wood; "Slaughterhouses, in which Continental and English Methods are Compared," by Councillor Parkes, M.P.; "The Removal of Insanitary Areas, and the Management of Improvement Schemes under the Housing of the Working Classes Act," by Mr. Peter Addie (formerly of Birmingham). Mr. Marshall also read a long list of vice-presidents, which includes local noblemen, sheriffs, members of Parliament for the divisions of Warwickshire, and the members for the city of Birmingham, the mayors of the surrounding towns, and representatives of the principal authorities in the city and district.

The president of the congress will be the guest of the Lord Mayor. For the reception of the congress the Lord Mayor has granted the free use of the town-hall for the purposes of a reception-room. The building will be fitted with writing and reading tables, easy-chairs, and lounges. The council of the Midland Institute have granted the use of the large lecture-theatre on the afternoon of Tuesday, Sept. 27, for the president's inaugural address, and on the evening of Friday, Sept. 30, for the lecture to the congress, which will be delivered by Dr. C. Chiles.

The council of the Mason University College have also granted the use of rooms in the college for the meetings of conferences and sections. The report was presented by Councillor Godlee, who moved its adoption.

The following excursions had been arranged:—Friday, Sept. 30, (1) to Dudley Castle and caverns; (2) to Whitacre reservoirs and pumping station; (3) to Saltley Sewage Farm. On Saturday, October 1, to Stratford-on-Avon, Warwick, and Malvern. The Lord Mayor has consented to entertain members of the congress at a reception at the Council House on the evening of Sept. 28, and the chairman and members of the health committee will invite the members to the garden party at Edgbaston on the afternoon of Thursday.

The exhibition sub-committee state that they have rented Bingley Hall for a month, that being the only suitable building available. It will be necessary to board over the whole of the floor of the hall, to provide efficient electric lighting, gas for the stall-holders, water and drainage, and to decorate the interior of the hall. It is estimated that the sum of £1,000 allocated for these purposes will be sufficient to cover the total cost.

The expenses attendant upon the congress are estimated at £1,500. This sum, Councillor Martineau explained, is made up as follows:—For rent and equipment of Bingley Hall for the purposes of the sanitary exhibition, £1,000; for the general local expenses of the congress, £500.

#### AN AMERICAN STAIRCASE HALL.

THERE is a considerable degree of refinement to be observed in much modern work now being designed in the United States, and in this respect the particular variety to which we refer follows in some way the character of the old Colonial work, based in general lines upon the style of the

Brothers Adam. The staircase hall, which we illustrate from a photographic print to-day, is an instance in point, although here a French influence is observable Americanised. The result is homelike, and it harmonises with domestic requirements, even if distinct originality cannot be claimed for the design. There is not much to say about the illustration, which speaks for itself.

#### THE OAK HOUSE MUSEUM AT WEST BROMWICH.

MONDAY last saw the inauguration of an important movement for the pleasure and improvement of the inhabitants of the borough of West Bromwich. It was a happy thought which induced Mr. Farley some four years ago to secure the half-timbered mansion known as Oak House, around which cluster memories of the events which marked the stirring times of the 16th and 17th centuries, with the view to setting it apart for an art gallery and museum. During the Civil War, it is supposed, the soldiers sought shelter within the Oak House grounds prior to attacking Dudley Castle. During the alterations necessary to convert the house into a museum, implements of war have been discovered which clearly point to the house having been the centre of important military operations. It is also believed that John Wesley preached on one occasion within its courtyard, about the year 1774.

The restoration, which has been carried out entirely at the cost of the generous donor by Messrs. Wood and Kendrick, architects, of West Bromwich, has been accomplished in a manner to interfere as little as possible with the quaint characteristics of the fabric, and Oak House will be handed down to future generations with pretty much the same appearance as it presented on its completion about the middle of the 15th century. The building has been elevated and a new founda-



tion supplied. All modern additions have been removed, and windows, &c., have been replaced in accordance with the original style of architecture; the same remark applies to the defective brickwork. The panelling and carving, of a most elaborate description, which had in various rooms been thickly coated with paint and plaster, has been restored to its original state, and, on the whole, is in a well-preserved condition. The museum will be located in the old dining-hall, and the remaining rooms will be utilised for various other purposes. The grounds have been prettily laid out; a large bowling-green has been provided, and also a recreation-ground. The estimated cost of restoration and the laying out of the ground is about £3,000, the whole of which has been borne by Mr. Farley; and the Oak House Museum will now stand as a monument of his liberality and thoughtfulness for the edification and enlightenment of the people of his native town.

#### SOME INSTANCES OF PILES AND PILE-DRIVING, NEW AND OLD.—IV.\*

(Continued from p. 96.)

##### PORTSMOUTH DOCK.

A SET of tests bearing on the result of rest is found in Mr. Charles Colson's paper on "Portsmouth Dock Extension" (Institute Civil Engineers, 1881). After tabulating the results of the driving of 12,088 piles, wherein is given nearly everything except the ultimate sustaining power, he applies formulas, getting safe loads of 50, 60, and 70 tons per pile. The strata are those immediately below the London clay, consisting of compact sandy beds, containing masses of hard concretionary stone or shell rock; some not containing the shell rock and some driven to a still lower stratum of hard clay. The last sets were about  $\frac{1}{2}$  in. from the fall of a 1,600lb. ram; height, 20ft. "During the progress of the work it was observed that on the resumption of driving, after an interval of some hours, the set of the pile was invariably much less than that observed on the cessation of driving, the fall of the ram being the same. The result is to be accounted for, in a great measure, by the fact that during the process of driving the ground is to a great extent disturbed; the vibration also of the pile causes the hole, from the surface downward, to be slightly enlarged, thus relieving the pile from the full frictional resistance. In order to obtain information as to the extent of such increased resistance accruing from quiescence, a number of special observations were made upon piles, the driving of which was completed, or nearly completed, immediately before leaving work for the night, as many as possible of the piles which gave an excessive first set being included. On the following morning one test blow of the ram, with a full fall, was given, and the resulting set compared with that recorded on the previous evening. It is shown by these observations that 39 beech piles, averaging 13'076ft. in length, 123,863sq.in. in sectional area, and showing 0'0540ft. set, gave, when tested the following morning, an average set of 0'0234ft., showing an increased resistance in the ratio of 2'30 to 1. Seventy-four fir piles, averaging 19'74ft. long, 162'70sq.in. sectional area, and showing 0'0366ft. set, gave, when tested the following morning, an average set of 0'0130ft., showing an increased resistance in the ratio of 2'81 to 1." Applying these new values in the formula, he gets what he calls "augmented stability," running from 118'77 tons to 232'21 tons. These ratios have been calculated on the assumption that the whole pressure is supported by the piles; an assumption which is untenable, inasmuch as the whole space between the piles and up to the under side of the longitudinal sleepers being filled in solidly with Portland cement concrete, the pressure is of necessity distributed over the whole area of the foundation; in fact, particular care was taken to insure this condition. During the progress of the pile foundations observations were made with a view of obtaining data on which to found some idea as to the extent to which the ground was compressed by the piles. The effect of driving was to raise a cone of earth round the pile, the base extending to a varying distance; this being repeated by the driving of each pile, produced a raised, undulating surface over the whole area. The ground consisted of the compact, sandy beds immediately

below the London clay; the mean rise of the surface, due to the driving, was found to be 0'75ft. Therefore, over an area of 52ft. by 24ft., containing 66 piles, the heads of which averaged 1'33sq.ft. in area, the quantity of ground lifted would be equal to 870'17cu.ft. Deduct one quarter due to disintegration by driving, leaves 652'63. The quantity of timber driven as piles within the above area is 66ft. by 12ft. by 0'854ft., or 676'36cu.ft. Therefore, the displacement of ground due to the pile-driving will be equal to 96 per cent. of the whole quantity of timber driven." Other ground "of a somewhat more argillaceous character" gave displacement 64 per cent. of the total quantity of timber driven. Other strata still "of a compact blue clay," the upper surface being "more plastic and compressible," gave 47 per cent. of the total quantity of timber driven. Results like these give a definite idea as to whether the piles act as simple columns to transfer the load to strata underneath, or whether they act as compressors of the interfluent soil.

##### AQUA CREEK, VA.

Further experiments on the value of quiescence are those at Aqua Creek, Va., Major E. T. D. Myers, 1885. Bents 12 $\frac{1}{2}$ ft. centres, six piles each, 15in. to 18in. butt, length 50ft. Grade line 15ft. above low water; in use fourteen years. Piles driven in a liquid mud. Two bents, of six piles each, were driven, upon which a platform was placed, and upon this a weight of 75,000lb., uniformly distributed. The experiment was made nineteen hours after driving. No settlement taking place, piles Nos. 2 and 5 in each bent were cut out, leaving four piles in each bent. Then No. 3 of the seventeenth and No. 4 of the eighteenth were cut out, leaving only three piles in each bent. About 5,000lb. was then added to the load, when No. 6 of the eighteenth bent yielded, followed by No. 3 of the same bent, and sank until Nos. 4 and 5 were again brought to bear. It required, therefore, about 13,000lb. each to start the piles. The record of the driving was as follows:—

	1	2	3	4	5	6
BENT 17.						
Fall from 3ft. to 10ft. 2,000lb. hammer.						
Pile No. 1.	11 blows, last blow	7ft. 11in.				
" 2.	13 " " "	9ft. 9in.				
" 3.	8 " " "	9ft. 18in.				
" 4.	8 " " "	8ft. 17in.				
" 5.	9 " " "	5ft. 6in.				
" 6.	7 " " "	7ft. 10 $\frac{1}{2}$ in.				
	1	2	3	4	5	6
BENT 18.						
Pile No. 1.	12 blows, last blow	5ft. 10 $\frac{1}{2}$ in.				
" 2.	8 " " "	4ft. 8in.				
" 3.	8 " " "	4ft. 8 $\frac{1}{2}$ in.				
" 4.	9 " " "	8ft. 5in.				
" 5.	14 " " "	10ft. 9in.				
" 6.	5 " " "	9'8ft. 22in.				

A pile 40ft. long, after sinking 30ft. with its own weight and that of the hammer weighing 2,000lb., was struck with a blow of 2ft. fall, and then settled 6 $\frac{1}{2}$ in. in one minute, by the weight of the hammer. Four weeks after this a blow with a fall of 5ft. did not move it. A blow of 14ft. fall drove it 4 $\frac{1}{2}$ in. "Also at the Gunpowder River piles 40ft. to 50ft. long were driven until they did not sink more than 18in. under a hammer weighing 1,800lb. falling 20ft. Four piles to the bent. In neither case was a hard stratum passed through or reached." "This," says Mr. W. M. Patton in his "Foundations," "is but the common experience in the Southern swamps. In all cases above alluded to, these trestles have carried, without settling, the heavy trains of the present day." Mr. Patton continues:—"Some eight miles of trestle constructed under the writer's direct supervision in the Southern swamps, the bents containing four piles, spans 12 $\frac{1}{2}$ ft., depth of pile in the soil varying from 30ft. to 35ft., the penetration varying from 6in. to 2ft. at the last blow of a 2,000lb. hammer falling only a few feet, has carried for twenty years the heaviest trains without any settling. In the abutments of some of the bridges in these swamps the piles have carried with perfect safety 17,000lb. to the pile. How much more they are capable of carrying is not known. In one of these abutments, piles only 30ft. in the soil could not be moved by continued hammering with high falls a few days after driving. The experiment was made as the writer was not satisfied with the record of the original driving, and desired the piles to be driven to a greater depth. Finding it impracticable to move the piles, he determined to hammer one or two to

destruction or move the piles; destruction was the result, and new piles were driven to take their place. We may therefore conclude that piles from 30ft. to 40ft., in even the softest alluvial soils, will carry, by frictional resistance alone, from 20,000lb. to 25,000lb., or 10 to 12 $\frac{1}{2}$  tons. There are examples of piles driven in stiff clay to the depth of 20ft. that carry from 70 to 80 tons per pile; this is an unnecessarily heavy load, and when driven from 2 $\frac{1}{2}$ ft. to 3ft. centres they will rarely have as much as one-half the above loads to carry. There are many instances in which piles carry from 20 to 40 tons under the above conditions. In sand and gravel, piles will carry to the full extent of the crushing strength of the timber, provided the depth in the material is sufficiently great to prevent vibrations from reaching the point of the pile; other considerations will require this depth to be at least 10ft. or, at most, 20ft. Any further hammering on piles in such materials is a waste of time and money, and injurious to the pile itself. To hit such a pile 100 to 150 blows to drive it an inch, as has been done, is simply folly."

##### SOUTH STREET BRIDGE, PHILADELPHIA.

In spite of this testimony in favour of increase of bearing-power with time, there have been instances of failure, due to various causes, not expected at the time of driving. Perhaps the most noted one, excepting London Bridge, is that of the western arched approach to South-street Bridge, Philadelphia, where nine segmental arches, 46ft. 6in. span, 14ft. rise, 55ft. width, were destroyed, owing to the failure of piles in one pier. The following is the theory of the constructive engineer, D. McN. Stauffer,\* to account for the stability of the structure for a period of six or seven years before failing:—"That at the south end of pier No. 2 the piles were driven almost, if not quite, to the rock, there not being a sufficient thickness of hard material to prevent this being the case, and, as a consequence, that end stood firm; but at the north end of the pier, under the heavy driving, the piles penetrated almost through the hard stratum, say to within 2ft. or 3ft. of the upper limit of the 'mud-pocket.' When this point was reached the direct and frictional resistance was sufficiently great to prevent further penetration. Just what this frictional resistance was, can, under the circumstances, only be estimated. Rankine's rule, as here applied, would give about 8 tons per pile. Be this what it may, from the nature of the material, it must have been considerable, and events prove that there was a sufficient amount of hard material between the mud and the toe of the pile to support the structure for a long time. But the tremor in the piles, produced by the heavy and constant travel over the approach, was in this case an element of destruction. This tremor had a tendency to loosen the pile from the impervious material into which it was driven, and allow the surface water to slowly find its way down along the pile. In time this water would 'lubricate' the pile, and destroy the frictional value of the mud, and constantly add additional load to that originally carried by the toe of the pile, which original load we will say, in this case, was 16 tons. Possibly before the whole of the 8 tons (previously carried by friction) was added to the 16 tons already on the toe, the safe-bearing value of the hard crust was reached, and the structure began to settle into softer material beneath it. Whether the piles punched through the crust, or whether piles and crust sank together, cannot be ascertained. No borings or test-wells were taken previously."

##### PROCTORSVILLE TOWER, LA.

Another instance of failure is that of the pile and grillage foundation for Martello Tower, Proctorsville, La., 1856-57.—*Van Nostrand*, 1882. Major G. Weitzel says: "The site of the tower, as determined by actual borings, was found to have the following character—viz.: For a depth of 9ft. there was mud mixed with sand; then followed a layer of sand about 5ft. thick; then a layer of sand mixed with clay from 4ft. to 6ft. thick; and then followed fine clay. Sometimes clay was met with in small quantities at the depth of 6ft., as well as small layers of shells. By draining the site the surface was lowered about 6in. The foundation piles were driven in a square of 20 piles on a side, 4ft. centres. Twenty-four piles were omitted to leave room for fresh-water cisterns, and two extra ones were driven to strengthen supposed weak ones. Total

\* A Paper by HORACE J. HOWE, member Boston Society of Civil Engineers, and read before that society.

\* American Society Civil Engineers, 1878.



number, 378. The piles were driven to distances varying from 30ft. to 35ft. below the surface, or from 10ft. to 15ft. into the clay stratum. The average number of blows to a pile was 55, and mainly hard driving. After all these piles were driven, ten additional hard ones were put in to strengthen supposed weak points. Each one required over 100 blows to drive it. Before beginning the foundation I drove an experimental pile exactly in the centre of the site. It was 30ft. long, 12in. by 12in. at top, and 11in. by 11in. at butt. It was sharpened to a bottom surface about 4in. square. Its head was capped with a round iron ring. Its weight was 1,611lb., and the weight of the hammer was 910lb. Its own weight sank it 5ft. 4in., and it required 64 blows to drive it 29ft. 6in. deeper. The fall of the hammer at the first blow was 6ft., increasing each successive blow by the amount of penetration, excepting the last ten blows, when the fall was regulated to exactly 5ft. at each blow. The penetration in inches were as follows for the last ten blows:— $\frac{1}{2}$ in.,  $\frac{3}{4}$ in.,  $\frac{1}{2}$ in.,  $\frac{1}{2}$ in.,  $\frac{1}{2}$ in.,  $\frac{1}{2}$ in.,  $\frac{1}{2}$ in.,  $\frac{1}{2}$ in.,  $\frac{1}{2}$ in.,  $\frac{1}{2}$ in. This pile, according to Colonel Mason's formula, should have borne 52,566lb. I loaded it with 59,618lb., and it did not settle. I afterwards increased the load to 62,500lb., when it settled slowly. The greatest weight to be carried by any one pile was between 30,000lb. and 35,000lb. The tops of the piles were sawed off on a level and the whole surface between them covered with a flooring of 3in. planks tightly fitted in, the upper surface of this floor being flush with the tops of the piles. They were then capped in one direction by stringers 18in. by 18in. by 85ft. long. Each of these stringers was constructed by splicing, using the regular scarf joint. These were bound together by 12in. by 12in. stringers let into the 18in. by 18in., so that their top surfaces were flush. In the little squares thus formed, and next to the 18in. by 18in. timbers, were laid short pieces 12in. by 12in. timbers, and the intervals filled in up to the level of the latter with concrete. The whole grillage was then levelled off with short pieces of 6in. by 12in. plank. This grillage was therefore 18in. thick. Long sheet piling was driven for the scarp of the wet ditch, the upper ends resting on the inside of the stringers on the outer row of piles. In order to distribute the weight of the tower uniformly over this foundation, strongly reversed groined arches were turned, the space between their backs and the grillage being filled in with solid concrete masonry. When the brickwork of this tower, which was carried up evenly on all sides, was about half-completed and the foundation had on it less than half the load it was designed to carry, the appropriation became exhausted, and the work was stopped. This was in the spring of 1858. When I visited the work six months after I found a marked settlement. The four salients apparently remained intact; but on every side the settlement was about the same, and largest about the middle, so that the courses of brick, which were laid perfectly level, had the form of a regular curve."

#### NEW ORLEANS CUSTOM HOUSE.

G. T. Beauregard, captain of engineers, had ordered experiments to be made by Architect Roy, who had charge of the new Custom House at New Orleans, La., and these had been made in 1851-52. There were thirty-five tests made, with sizes of bearings on the soil varying from  $\frac{1}{2}$ in. by  $\frac{1}{2}$ in. to 24in. by 24in., and the conclusion was that, "contrary to the general opinion, a larger surface sinks more than in proportion to its area." Major Weitzel further says: "The table of experiments sent by Mr. Roy, and the result of the experience gained at Proctorsville, La., show conclusively that, although Mason's rule may hold good for an isolated pile, it cannot be depended upon for a system of piles such as are driven for foundations. In order, therefore, to determine the factor of safety for such foundations, the views and experiences of the officers of corps would be valuable," &c.

#### OVERLOADING STRATUM.

Considering this point of the entire building area, Mr. J. Foster Crowell says (American Society Civil Engineers, August, 1892): "It is quite possible to overload the stratum by driving piles too thickly; it is sometimes thought that if three piles, for instance, are good in a certain area, six will 'make assurance doubly sure.' This policy is not only costly and foolish, but in many cases it is dangerous. A certain public building in New Orleans, of which the author has heard, stands

on an enormous number of square piles, driven so as to touch one another; in other words, there is a solid wall of wood, and instead of each pile having four surfaces in contact with the sustaining stratum, only the outer rows have contact, and they but on two surfaces; there are, therefore, from four to six times too many piles used, and the support is still much less than could have been obtained." Other instances of failure not expected at the time of driving are given in American Society Civil Engineers' *Transactions*, August, 1892, data by J. C. Trautwine, jun. Continuing the evidence, not strictly experimental, however, we have a paper quoted in *Proceedings of Institution of Civil Engineers*, written by Professor Franz Kreuter, of Royal Technical High School, Munich, 1896. After explaining the merits of the formula, he says:—

$$L = F \frac{h_1 - h_2}{s_1 - s_2} W.$$

"Preparing to ascertain the supporting power of piles by the method explained, the following precautions are of great importance:—(1) The piles should rest for some time, in order to allow the stresses produced in the ground by the penetration of the piles to be relieved. It has been stated from experience that piles frequently penetrate with renewed ease after some days' rest. An immediate test-driving might, therefore, lead to erroneous results, and to too high an estimate of the supporting power of the piles. (2) The head of the test piles should be sawn off to present a sound and solid surface to the blows of the hammer. (3) The number and force of the testing set of blows should be such as not to crush the head of the pile." Again, Mr. Charles Davis Jameson (Member American Society Civil Engineers) says (*Railroad and Engineering Journal*, 1889): "Another thing to be remembered in driving piles to a secure foundation is the difference between the ultimate load that is to rest on them and the quick blow of impact which is given them in driving. It is an established fact in mechanics, and also in practice, that a permanent load resting upon a pile will eventually have ten times as much effect upon it as that same load brought quickly upon it and as quickly removed. So that, although the pile may penetrate a very little distance from each blow of the hammer, and the weight of the hammer, multiplied by the velocity which it has at the time of impact, may give a blow that, in pounds, is much greater than any weight that will come on it from its permanent load, still, after the permanent load has been resting some time upon the pile, we very often see examples where it begins to yield; the foundation sinks; and as in very few cases it sinks with regularity over its whole surface, the result is that, if the superincumbent load consists of masonry, one part sinks while the other does not, and there is a crack or fracture in the masonry." Mr. Jameson apparently assumes that the pile receives its maximum skin resistance as it goes down, and does not increase it afterwards. He assumes that the same principle applies to pile-driving as to testing metals or timber in general; that is, that the ultimate strength may be made to depend considerably upon the time occupied in testing. No experiments accompany his statements. In several of the preceding papers much has been said in praise of the Nasmyth type of hammer, and much more can be said on that point. At the present time it is rare to see one hereabouts. For sandy soils, there was a question at one time whether it was not more economical than any driver. The following report of Lieut. F. N. Abbot, United States Engineers, discussed the matter (Chicago, 1883):—

#### "WATER-JET, ETC.

"The water-jet drivers on the long average do as much or more than the (Nasmyth) steam-hammer; and this in the class of work now under execution here, where the machine-shops of the company are available at any instant. The leads last between three and four times as long with the steam-hammer as with the drop-hammer. A hammer-line lasts the steam-hammer one month, while it needs replacing about once in five days with the other form. Say it will drive 500 piles on a jet, 3,000 on the steam-hammer driver. The steam-hammer leaves the pile head as good as it was before driving, while the jet driver injures the head to a considerable extent. On this account, in contracts for wharf work, it is not infrequently stipulated that all piles be driven by steam-hammering. On a car, in land driving, the steam-hammer is immeasurably superior, as

there is much less jar, and the water needed is not excessive. Sixty-five piles a day are expected of every driver in the Lake Shore protection; if less are driven the matter is looked into. Hard bottom is liable to reduce this number very largely." As to the possible economy of using steam-hammer drivers on the Mississippi River, he says:—"The cost of the Illinois Central Railroad driver of this form was:—

Steam-hammer (of weight 7,500lb.)	1,593.50dol.
License to build and use	500.00 "
Hull	2,000.00 "
Boiler and engine	2,333.59 "
Total	6,427.09 "

The weight of this size of hammer is too great for cottonwood piles; the second size, weighing one-half as much, would be what is required. Its cost, free of license, if obtained direct from the manufactory, is (price 1883) 875dol. The only possible saving would be in lessening the time now spent in actual driving, and this, with our present form, is but a small fraction of that needed per pile. The difference in the cost of the present hammer (80dol.) and the steam-hammer (875dol.) is 795dol., and, under the most favourable circumstances, it would take a long time to pay for itself. The more simple the machinery used the greater the chance of real efficiency when the work is carried on, as under this office, at a distance from machine-shops. If any saving is to be made by extensive change of plant it must be found in some method of driving more than one pile from each position of the flat, thus eliminating partly the slow and vexatious changes of position in severe currents." Major O. H. Ernst further says: "Lieutenant Abbot ascertained that the rapidity of penetration of piles sunk by the water-jet and hammer combined is remarkably uniform when the average of great number of piles is considered, and when the depth does not exceed 16ft., the rate being about the same for the last 2ft. as for the first two." It is not stated what is the cost of a pump to feed the water-jet. This item would reduce the balance of 795dol. referred to. The price of steam-hammers to-day is not more than one-half the figure given. However, the manufacturers do not claim a superiority in sandy soils. In general they claim a superiority for foundations of buildings, docking, and certain other classes of work. There has been evidence in support of their claims.

#### PILES DRIVEN BUTTS DOWN.

The jet has another advantage. Piles may be easily driven butt down, as appears in the report of D. M. Currie, United States Engineers (St. Louis, 1881), as to work on the Mississippi River. He says:—"There were in this place strong scouring currents, with line of piles broken by ice at times. The piles were prepared for driving by sharpening the butt-ends with glut points before they were placed in the water. They were driven 8ft. or 10ft. in the gravelly bottom, the hammer was lowered and used in connection with the jet, tapping the pile lightly with 2ft. fall, which, by keeping the pile continually in motion, prevented the sand from settling around it and stopping its progress. The piles were usually driven about 13ft., and the actual time of driving was about four minutes. The saving in cost of driving the piles does not represent the whole advantage gained in using the jet. The piles being driven butts down give a greater sectional area at the bottom, where the strain is greatest upon piles performing the duties required in that and similar works. Further advantages of having the butt down are that the piles have a much stronger hold in the bottom, and present less surface to the current. Piles were driven to any depth desired up to 18ft., although before reaching that depth the progress became very slow. Owing to the great quantities of gravel found in this locality, the maximum depth reached here would be lower than the same plant would accomplish under more favourable circumstances. It is safe to say, however, that whenever the ascending current fails from any cause whatever to bring the material excavated up to the surface of the river-bottom, the maximum depth to which that pile can be driven by the force acting upon it has been reached. The river would fill the space around the pile with the material composing its bottom, and pack it as soon as the upward flow was checked. The causes which might conspire to bring about this result are numerous, one of the most prominent being the collection around the foot of the pile of the heavy material through which it has passed."



## PILES DRIVEN HUTTS DOWN.

I would refer here to a lack of success in driving piles butt downward by drop-hammer only at St. Louis River Bridge, near Duluth (*Journal of the Association Engineering Societies*, E. H. Beckler, 1886). Tests showed that the expense was more, even for a less depth. Besides this, the small end was considered liable to decay. There have been no great repairs made there on account of ice. A pile sunk by the use of the jet is said to stand more pressure than one driven by hammer alone, as the sand about it is better compacted (*Journal of the Association Engineering Societies*, December, 1881).

## BORING MACHINE.

In certain soils it is possible to still further increase the efficiency of the jet by the use of revolving knives at the point. An account of this sort of machine and its successful use is given in the *Canadian Engineer*, April, 1895, by Major Henry A. Gray, Department of Public Works. He says:—"In 1893 extensive pile-driving was done as protective work when widening the river Sydenham at Owen Sound, to increase the harbour area. Previous work had shown the difficulty of driving piles through the sand and other compact material found there of sufficient length to allow the lower ends to be below the depth required to be dredged in the harbour. With the boring machine shown here rock-elm piles 12in. by 12in. by 40ft. were put down full length in three minutes, perfectly perpendicular and in proper place, with a few light blows. Eighty to 100 piles 20ft. long have been driven in 10 hours. The machine consists of a shaft to which a turbine about 5in. in diameter and screw are fixed and contained in a cylindrical casing, supplied with water under pressure, and having openings arranged in such a manner that the water forced into said casing will, in escaping, act upwards against the soil loosened by the cutting-blades fixed near the end of the shaft. These form a sort of two-blade propeller, forcing the earth, clay, &c., upwards. The machine is unsuited for a bottom where large stones are to be met with, and also, for obvious reasons, for pure sand." The preceding collection of notes serves to give us a due respect for the subject and its uncertainties. The question of "prognosticating" is still before us. Would Sir Christopher Wren himself consider that the work of "registering past times" had gone on far enough to warrant it? I leave this question and the general subject for your consideration.

SOUTHAMPTON TOWN HALL—  
DRAINAGE CONTRACTS.

AT last week's meeting of the Southampton Town Council, the municipal buildings committee, in their report, recommended that a site be selected for a town hall on one of the three following sites: Palmerston statue site, Watts statue site, and the site north of New-road. Instead of moving the adoption of the committee's report, however, Alderman Button asked to withdraw it. He said the matter was brought before the council on a resolution asking for a return of the cost incurred in reference to the repairing of the municipal buildings during the past five years. That return showed that the amount spent was at the rate of £560 per annum, besides the expenditure incurred in altering the premises at the Bargate this year, which had been virtually condemned. The only recommendation the committee made was to take steps to provide for a portion of the public lands for the purpose of public buildings. Since the committee brought up their report, they had had an opportunity of looking up the conditions on which the land could be obtained. They found that a statutory meeting would have to be held in August, and as many members of the council would then be away on their holidays, and the proposal would have to be carried by 42 members of the corporation, the impracticability of obtaining the public lands was evident. The whole scheme was based on the public lands. Seeing that was impossible, the whole matter would be considered at a future time, when other steps would be taken. With the consent of the other members of the committee, he would withdraw the report. No other member of the council objecting, the report was withdrawn, amid applause.

Later on, the town clerk said the works com-

mittee, at their meeting on June 14, in reference to the Western District drainage scheme, accepted the tender of Messrs. W. H. Saunders and Co. (£4,182) for the performance of the work. The firm had, however, since written stating that their sureties having called their attention to the difference between their tender and the borough engineer's protecting estimate, and also to the fact that the new Employers' Liability Act commenced on July 1st last, they were unwilling to be bound with them unless the corporation added £500 to the tender sent in. The firm asked the council to meet them in this way, so that the works could be carried out. The works committee last Tuesday thereupon had another meeting, and decided to recommend the next lowest tender, that of Mr. Osman (£5,106) for acceptance. Mr. Walton moved that Mr. Osman's tender be accepted, and said it was necessary for the work to be carried out at once. Mr. Doggrell seconded. Mr. McDonnell said he should like some reason to be given as to why they should pay £400 or £500 more than Messrs. Saunders were prepared to carry out the work for. Mr. Walton said it had been the established custom of the works and other committees not to be played with fast and loose by contractors. A man ought to send in a tender at a fair price, and not seek to alter it afterwards. Mr. Pearce asked if Messrs. Saunders were not bound to carry out the work if the corporation required them to do so? The town clerk said they might enforce the contract after a great deal of trouble. Mr. Gayton said that if the £500 were paid to Messrs. Saunders, their contract was £334 lower than Mr. Osman's. If this were a matter of emergency, they should advertise for tenders again. Mr. Wilson thought such a course as that would be very unfair, and supported the proposition. Mr. Walton: The council has previously accepted the same principle. Mr. McDonnell said the principle might be right; but when such a large sum of money was involved, one naturally hesitated to vote for a motion of that kind. Mr. Cooksey thought they should insert some protecting clause in future when seeking tenders. The motion was then agreed to.

BUILDERS' BENEVOLENT  
INSTITUTION.

THE fifty-first annual meeting of the Builders' Benevolent Institution was held on Thursday, July 21, at the offices, 35, Southampton-row, Bloomsbury, W.C. Mr. Charles Wall (president) occupied the chair, supported by Messrs. Thomas Stirling, H. Holloway, E. V. New, and other friends of the institution. Major R. A. Bruton (secretary) read the annual report, which stated that the committee desired to express to the subscribers their thanks for the continued support to the charity. Last year being the Queen's Jubilee, and also the jubilee year of the institution, every eligible candidate was rejoiced by receiving the benefits of the charity. This was very satisfactory, and it was hoped that the increased liability of expense would be cheerfully met by the subscribers. By the lapse of time, the decrease of many liberal contributors, and other causes, new subscribers were urgently needed, or the institution might eventually have to be curtailed in the dispensation of the great good it was so happily the means of affording. The warmest thanks were due to the president, Mr. Charles Wall, for the interest he had taken in the welfare of the institution. During the past year there had been four deaths amongst the pensioners, and three pensioners had been elected. The annual dinner will be held at the Carpenters' Hall on Thursday, Nov. 17, when Mr. Benjamin J. Greenwood, of the firm of Messrs. Holliday and Greenwood, will occupy the chair.

The chairman proposed the adoption of the report and accounts, which was seconded by Mr. New, and unanimously agreed to. On the motion of Mr. Thos. Stirling, a cordial vote of thanks was passed to the retiring president, Mr. Charles Wall. Thanks were also accorded to the vice-presidents and to the hon. treasurer (Mr. George Plucknett, J.P.), with a request that he should continue his valuable services. A similar compliment was paid to the committee, the retiring members being reappointed, with the addition of Mr. A. Ritchie. The hon. auditors were re-elected, and a vote of thanks accorded them for their services. The chairman proposed that Mr. Benjamin J. Greenwood be the president for the ensuing year, and believed he would do his

utmost for the charity. Mr. New seconded the motion, which was agreed to. On the motion of Mr. Holloway, a cordial vote of thanks was passed to the chairman for presiding, and the proceedings terminated.

## THE NEW SHIRE HALL, DURHAM.

THE new Shire Hall at Durham was opened on Tuesday. The new building is a handsome structure. Unfortunately, the site upon which it has been erected stands somewhat in a hollow, and its shape is also peculiar, forming, as it does, almost an equilateral triangle. However, the difficulties presented by these circumstances have been well overcome by Messrs. Harry Barnes and Fredk. E. Coates, A.A.R.I.B.A., of Sunderland and West Hartlepool. Standing, as the hall does, upon rather low-lying ground, and overlooked as it is from many parts of the city, the architects' decision to grace the building with a tower at the corner has been abundantly justified in the result. The tower, which is capped by a dome of beaten copper supported by a drum of clustered shafts, not only gives the building greater prominence among the surrounding erections, but adds appreciably to its dignity. Ruabon red terracotta is the principal material used in the building, the appearance of which is further enhanced by its roofing of Westmoreland green slates.

Around the entire length of the hall, which has a frontage of over 200ft., runs a balustrade. In the centre is the main entrance, through an elaborately enriched archway, approached by a fine flight of Mansfield stone steps some 30ft. in width. The grill is richly wrought in hammered iron, after passing which is seen the grand staircase. Its steps are of marble, while the balustrade is of terracotta, and the supporting columns of polished white Parian. All the corridor floors are fireproof and laid with wood blocks. Upon the ground floor the council chamber and committee rooms and the offices of the county clerk are found. Accommodation is provided for 100 members, in addition to the officers and Press. Between the council chamber and the county clerk's department is the chairman's room, overlooking a pleasant garden, and upon either side of the chamber are grouped committee and retiring rooms.

On either side of the principal entrance are to be noticed the county clerk's departments, and the first floor contains the offices of the county surveyor, medical officer, accountant, and technical education secretary, all the departments being self-contained, while the second floor is devoted to photographing rooms, laboratories, and a library. In the basement are the strong-rooms and the county surveyor's plan and sample rooms, together with the caretaker's premises, the heating chamber, ventilating fans, &c. At the north-west corner of the building the weights and measures office is reached from the street level. Well-ventilated lavatories are provided in a block disconnected from the corridors by a lobby. Excepting the council chamber, the building is warmed by low-pressure steam; but all the principal offices have open fires. The original estimate was £18,081; but this amount being considered too high, the architects, at the desire of the council, reduced it to £13,875, which sum was accepted. The contract for the whole building was intrusted to Messrs. D. and J. Ranken, of Sunderland; Mr. J. G. Kilburn, of Durham, being appointed clerk of works, and Mr. J. E. Miller, A.M.I.C.E., of Sunderland, quantity surveyor.

CURIOSITIES IN COTTAGE PLANNING.  
—II.

By GEORGE H. BINBY, F.R.I.B.A.

IN the town of Nottingham there are several cottages formed by excavations in the rock of a hillside. These are said to be of great antiquity, although the existing frontages have been executed in brickwork of modern date. These residences were still occupied as dwellings when I last saw them some few years ago, and are probably amongst the oldest cottages in this country. As is well known, the whole of Nottingham is, more or less, built upon rocks which are honeycombed with caves, many of which have been utilised for various purposes from the earliest times. Nottingham Castle is erected upon a high rock, in which are numbers



of galleries (partly natural cavities and partly chambers formed for various purposes), and external indications of the existence of these may be seen in the form of doors and windows cut out of the solid rock. The interior of these rock-cut cottages must have always been ill-ventilated and dark at the back, but are said to have been more comfortable as dwellings than might be expected, and one or more of them had staircases at the rear cut in the stone and leading upwards to the ground above the rock; the chimney was formed at the front in all, or nearly all, cases.

For districts where the land was uneven and on hillsides double cottages have been erected (one residence above the other), as shown in Figs. 4 and 5. The ground plan corresponded generally with the first floor plan shown on Fig. 5. Each cottage contained a kitchen and living-room and two chambers; but the kitchen contained a recess for a bed—thus each floor level provided for bedroom accommodation in three apartments. This description of cottage is to be found in the hilly districts of Lancashire, Derbyshire, and Yorkshire. As one roof and one foundation serves in such cases for two cottages the cost is correspondingly reduced. The bed in the kitchen being concealed usually by a curtain during the day, the apartment would not be considered to lose its distinctive appearance as a living-room.

Some years ago a curious cottage was manufactured by a Hampshire villager in the following manner. Above an ordinary cottage of one story a disused railway-carriage was fixed, and utilised for the purpose of a first-floor apartment, the building being thus converted into a very comfortable-looking abode. The chimneys from below (at each end) were raised to the additional height required, and a roof formed with two gables. From a photograph recently published it would not be easy to divine the origin of the material forming the upper portion of the house, although the carriage-door and window openings are retained. The effect of the whole is decidedly good, and creeping plants have been trained into service with a line of low rails in front. Disused railway-carriages have been frequently used in many localities for single-storied cottages, offices, and other purposes; but this is the only two-storied arrangement of a railway-carriage cottage of which I have heard. (A photograph of this appeared in the *Strand Magazine* for January, 1898.) But perhaps the cottage described by Charles Dickens in "David Copperfield" may be considered as a fair example of curious planning. It was "a black barge, or some other kind of superannuated boat, high and dry on the ground, with an iron funnel sticking out of it for a chimney, and smoking very cosily." David Copperfield is made to say: "I suppose I could not have been more charmed with the romantic idea of living in it. There was a delightful door cut in the side, and it was roofed in, and there were little windows in it; but the wonderful charm of it was that it was a real boat, which had, no doubt, been upon the water hundreds of times, and which had never been intended to be lived in on dry land. That was the captivation of it to me. If it had ever been meant to be lived in, I might have thought it small, or inconvenient, or lonely, but, never having been designed for any such use, it became a perfect abode."

Many cottages in country districts are of great age. Although built merely in woodwork and with timbers of slight scantlings, numbers of these exist in Essex, and are partly weather-boarded on the exterior and partly plastered; the rooms are frequently small, and the cottages have one room below and one above; probably the original cost of each was not more than £60 or £70. The repairs have been frequently left entirely to the tenants, and it is not, therefore, a matter for surprise that many such cottages have become so exceedingly dilapidated that if they stood in well-cared-for districts, they would probably be immediately closed by the authorities as unfit for habitation; yet, in some instances, such cottages are carefully repaired by the tenants, generation after generation remaining attached to the humble abode of their forefathers, and I have recently inspected a two-roomed cottage to which the present occupant was conducted, as a labourer's bride, 45 years ago. Small and low are the rooms, and distinctly bad the insanitary condition of the cottage and its adjuncts; but, probably owing to the pure country air and temperate habits of the tenant, she may possibly occupy her home for yet a lengthened period, in

spite of the fact that the cubical contents of the rooms, and the structural condition of the premises, are such as would not be tolerated in the worst wards of the most inferior workhouse in existence.

In connection with the extensive parks which surround mansions in the country small lodges are usually to be found at the entrances from the public to the private roads; very often these are commodious and picturesque, but, on the other hand, cottages have been frequently erected for this purpose which have been planned without the slightest regard to the comfort and happiness of the intended occupants. A favourite form of the plan is an octagon, and this is sometimes so small that

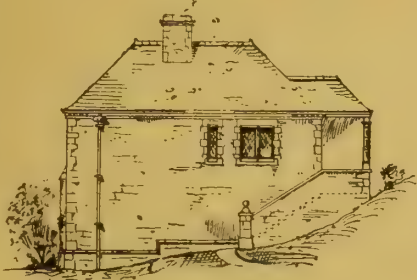


FIG. 4.

the tenant must necessarily suffer the greatest inconvenience, while, perhaps, the exterior is handsomely designed and executed as befits an adjunct of the mansion to which it indicates the entrance. The smaller a house is so much the less desirable is it that the plan should be otherwise than square or oblong.

William Hutton, the historian of Birmingham, wrote:—"In 1768 a small property fell into my hands, situated in a neighbouring village. I found the tenant had entered upon the premises at the age of 22, that he had resided upon them, with poverty and a fair character, during the long space of 46 years; I told him he was welcome to spend the residue of his life upon the spot gratis. He continued there ten years after, when, finding an inability to procure support from labour, and meeting with no assistance from the parish in which he had been resident for an age, he resigned the place in 1778, after an occupation of 56 years, and was obliged to recoil upon his own parish, about twelve miles distant, to be farmed

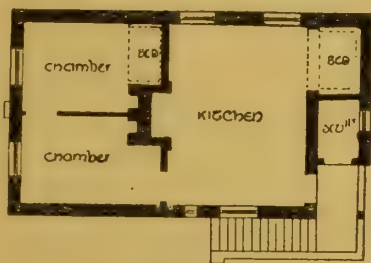


FIG. 5.

with the rest of the poor." Considering that the tenant was living rent free, and that the cost of maintenance of an old man 80 years of age could not be great, one is led to conclude that the rector of the parish and his congregation grossly failed in their duty to their neighbour in not securing for the old man the means of living in the humble home he had occupied for so lengthy a period; but the probability is that the cottage was desired for a young or able-bodied labourer, and that cottages were planned and intended in those times for those who were required to work on the land and were able-bodied, and were not intended as residences for those who might become old and feeble, and in utter disregard of the fact that, although the tenant may have passed through life without growing rich, yet he may by his labour have contributed to make others so.

Many of the cottages erected at the middle of the 18th century were not very costly, for William Hutton stated: "We have a people who enjoy £400 or £500 a year in houses none of which, perhaps, exceed £6 per annum. It may

excite a smile to say I have known two houses erected—one occupied by a man, his wife, and three children, the other pair had four, and twelve guineas covered every expense! Pardon the omission of a pompous encomium on their beauty or adornment."

In the year 1834 there were 23,000 houses in Birmingham the rents of the best of which did not reach £10, while there were only about 8,000 houses rented at £10 and upwards; many of the former were old and miserable tenements let at 2s. per week or less, but comfortable dwellings fit for the humbler mechanics were not to be obtained for less than 2s. 6d. to 4s. per week.

There are, of course, more cottages in the world than any class of buildings, and, if we may take the town of Birmingham as an example of the necessity for an increase in the provision of buildings for the habitation of the poorer classes of society, we find that from the year 1700 until the present time the population has increased from 15,000 to about 500,000 persons in that town. There were in the year 1700 only 28 streets, with 2,504 houses (about six persons to each house); in the time of the ancient Britons it has been stated that there were 80 houses in the hamlet of "Bromycham" or "Brumwycheham" (under which name Birmingham was known at an early period), with about 400 inhabitants; by the year 750 there are said to have been eight streets, with 600 cottages and other erections, and about 3,000 inhabitants. By the year 1,066 only one more street had been added, and the number of cottages, &c., then amounted to 700 and the inhabitants to 3,500; and it is remarkable that during the next six centuries the town of Birmingham only increased from 700 to 900 houses, with 5,472 inhabitants, located in 15 streets—this was in the year 1650. Therefore, taking this town as an example, it is not difficult to perceive that the cottages built prior to the year 1650 must have been erected of somewhat unsubstantial materials; had it been otherwise, surely there would have remained to this day more examples of the 5,472 cottages, &c., which existed in that year than the very few that have survived. It is not unreasonable to assume that the greater number of these have been rebuilt from time to time upon account of their not being worth further repairs. That few remains of ancient cottages earlier than the 15th century should still exist is not a subject for surprise if it be remembered that many of the older villages and towns consisted of straggling huts without order, built of timber, the interstices wattled with sticks and plastered with mud, covered with thatch, boards, or sods, and none of them higher than the ground story. The poorer cottages contained only one room, which had to serve for all purposes; the better sort had two or three rooms (for work, kitchen, and sleeping purposes), all three in a line, and sometimes facing the road or street.

There is good reason to believe that Birmingham, and many other now large towns consisted in the 12th century of low and mean houses composed of wood and plaster and with little or no brickwork; the inhabitants had become frequent encroachers upon the streets, which became narrower than in earlier times. In the 14th century the private buildings multiplied rather than improved, and two or more storied buildings became more usual, but the streets, by trespass, became still narrower, more filthy, but perhaps the more picturesque. But by the year 1741 thatched roofs and other undesirable adjuncts to cottages and houses are said to have quite disappeared from many of the improved towns. A writer of the period states that many of the towns in this country were composed of cottages and other erections replete with dirt and poverty; in the larger towns, especially, thatched and boarded roofs must have frequently led to the spread of fire; but in many parts of the country slates, tiles, or stone slabs for roofing purposes could only be obtained from distant localities, and for economical reasons it is probable that the inferior materials were frequently adopted for use.

Charles Dickens, in "The Chimes," makes the tenant of a miserable cottage say, "Gentle-folks, I have lived many a year in this place. You may see the cottages from the sunk fence over yonder; I've seen the ladies draw it in their books a hundred times. It looks well in a picture I've heard say; but there an't weather in pictures, and, maybe, 'tis fitter for that than for a place to live in." 'Tis harder than you think for, gentle-folks, to grow up decent, commonly decent, in such a place."



## NATIONAL ASSOCIATION OF MASTER BUILDERS.

THE National Association of Master Builders of Great Britain paid their first visit to Leicester this week, and held their half-yearly meeting in the Co-operative Hall, High-street, on Tuesday afternoon, under the chairmanship of the president of the association, Mr. T. Stephenson Jones, of Liverpool. The council meeting was held previously, when routine and special business was transacted. About eighty delegates were present at the general meeting, when the scheme for the federation of districts was discussed and adopted. It was decided to hold the next half-yearly meeting at Bradford. In the evening a complimentary banquet to the association was held at the County Assembly Rooms. Mr. George Hardington, the president of the Leicester Master Builders' Association, filled the chair, and the company present included the president of the association (Mr. Stephenson Jones), the Mayor of Leicester (Ald. Wakerley), Sir Israel Hart, Sir Thos. Wright, Ald. the Right Hon. J. M. Meade, P.C. (Dublin), Ald. Sawday (president of the Leicester Society of Architects), Mr. E. G. Mawbey (borough surveyor), Mr. T. R. Lumley (chief constable for the borough), and Mr. E. Holmes (chief constable for the county), the gathering numbering about 130 master builders from all parts of the United Kingdom. The loyal toasts having been duly honoured, Councillor Henry Green (Northampton) gave the toast of the "Municipality and Town and Trade of Leicester." He said he considered the municipality of Leicester a very progressive one, and worthy of imitation. The Mayor, in responding, spoke of the advantages accruing to the town through the acquirement by the corporation of the gas and other public works which had secured such a large reduction in the rates during the past twenty years. He also referred to the large increase in the number of houses, 5,000 having been built within the last five years, and alluded to the excellent housing of the artisan classes in the newer parts of the borough. Mr. G. Hewitt gave "The Architects, Engineers, and Surveyors," saying the object of the borough was to insure sound and honourable friendship between tradesmen and the profession. Alderman Sawday and Mr. E. G. Mawbey responded to the toast, and spoke of the friendly relations existing in the town between architects and builders. Sir Thomas Wright was entrusted with the toast of the evening—viz., "The National Association of Master Builders of Great Britain." He spoke of the necessity of the Association obtaining Parliamentary assistance in connection with matters relating to the building trade when necessary, and remarked upon the importance of their dealing with the labour question in general. He trusted that the Association would go on and prosper. The President, in reply, alluded to the fact that the building industry was the largest in the country, and paid something like 60 millions a year in wages. One in every seven of the working population of the country belonged to the trade. He thought that employers in this vast industry were indebted to the national association for the work it had done on their behalf during the past 20 years in labour questions and matters affecting the trade. He commented upon the advantages of federation whereby local and county trade disputes might be made national. The toast of the local association was proposed by Mr. T. F. Ryder, F.R.G.S. (London), in suitable terms, and responded to by Mr. Hardington, who said eight years ago it was found necessary to reform the Leicester Association. The object of their association was not to take up an aggressive attitude, but to maintain the right of those who had the responsibilities of building in Leicester.

## NARROW-GAUGE RAILWAYS.

MR. LESLIE S. ROBERTSON, London, read a paper on this subject on Tuesday at the Derby meeting of the Institution of Mechanical Engineers, devoted chiefly to railways of 2ft. gauge and under. Comparatively few engineers, he said, realised the saving that could be effected by such railways when applied to large industrial undertakings. The heavy expense of cartage over bad roads, and of plank and barrow work, was in itself a sufficiently strong argument for the adoption of rails, more particularly if the work had to be done rapidly; and yet it was surprising to notice how slow was the appreciation

of the facilities afforded by the adoption of light railways. A narrow-gauge light railway should be viewed as a mechanical appliance for carrying out work which no doubt could be done, and was being done, by inefficient mechanical appliances, but at greatly enhanced cost. The same arguments which had led to the substitution of labour-saving appliances, machine-tools, &c., in place of manual labour, applied with equal force to light railways, and should ultimately lead to their more extended adoption. The principal disadvantages associated with narrow-gauge light railways lay, no doubt, in the difficult question of the break of gauge, entailing as it did transshipment, and in their comparatively small carrying capacity and low speeds. Moreover, should the traffic increase to any large extent, the light line might ultimately have to be superseded by a standard-gauge railway. When the adoption of a light railway was under consideration, one of the most difficult questions that had to be decided was that of the most suitable gauge. Narrowing the gauge reduced the cost of construction, but at the same time reduced the carrying and earning capacity of the line. Widening the gauge improved the carrying capacity and the passenger facilities of the line, but increased the cost of construction. The selection of the most suitable gauge must, therefore, be largely determined by financial considerations. Again, the gauge had a considerable influence on the speed; but in most instances the circumstances which warranted the adoption of a narrow-gauge light line were such that speed of transit was not of cardinal importance. The number of different gauges which were at present being put forward for light lines was detrimental to the general extension of these lines, and steps should be taken to settle upon one, or at most two, standard gauges, when the ordinary 4ft. 8½in. gauge had to be departed from.

In the course of the discussion that followed it appeared that the general opinion was altogether favourable to the extended adoption of narrow-gauge railways, particularly in districts frequented by tourists, where, without injury to the appearance of the district, such railways might be substituted for horse traction round mountains, in the bends of rivers, and in other places where there were narrow, quick curves. In this connection reference was made to the Festiniog railway and to the high speeds which were possible on it, one speaker remarking that he had gone over it at the rate of 48 miles an hour without the slightest trouble. Mr. T. Daniel, an ex-president of the Manchester Association of Engineers, said he hoped the Chinese authorities, in railways they made there, would not have a narrower gauge than 4ft. 8½in. For a nation that was going to deal with trade and commerce anything less than that would be a mistake. In fact, he thought a 5ft. gauge would be still better in many cases.

## BOOKS RECEIVED.

*The Cathedral Church of Lincoln*, by A. F. KENDRICK, B.A. (London: George Bell and Sons), is another volume of "Bell's Cathedral Series," edited by Gleeson White and Edward F. Strange. All that we have said about other of these excellent handbooks may be repeated as to this one. Mr. Kendrick has done all he can to make this little guide a useful one to visitors to the great Minster. The late Precentor Venables' researches have been consulted, besides the works of Freeman, Scott, Parker, and others. The illustrations are well selected, and are taken from photographs by the Photochrom Co., Messrs. Bolas and Co., F. G. M. Beaumont, &c. The author has gone to the Rolls series and various chronicles in the compilation of the various facts, and he has interwoven these and other historical incidents into the narrative of his descriptive history. The volume adds another important contribution to the handbooks of the Cathedral series.—*Specifications for Building Works, and How to Write Them*, by FREDERIC RICHARD FARROW, F.R.I.B.A. (London: D. Fourdrinier, 46, Catherine-street, and Whittaker and Co.), is a reprint of a series of articles that have appeared in the columns of our contemporary, and will prove of service to the architectural student who desires to learn how to frame a specification. The author gives just those general clauses which occur in most specifications, and his examples illustrate the principles and procedure to be adopted. With this general treatise, and a fair knowledge of building construction, any student

ought to be able to write his own specifications, and to avoid serious omissions.—*Mechanical Engineers' Office Companion*, by ROBERT EDWARDS, M.Inst.C.E. (London: Crosby Lockwood and Son.)—This is a useful compilation of tables, rules, and data for mechanical engineers and others. The structural engineer will also find this little book useful in designing ironwork and mechanical details. Factors of safety, weights of metals, weight of flat bar iron (given at ¼in. thick, which is useful as a thickness from which to find others), and other tables supply all the engineer wants. As a workshop and office companion we can recommend it.—*The Law of Light and Air*, by ALFRED A. HUDSON and ARNOLD INMAN (London: Sweet and Maxwell, Ltd.), is a compact and useful digest of the law for the use of lawyers, surveyors, and students. The method of arrangement is lucid; the appendix contains the full text of the Prescription Act, and one or two forms of agreement which have come before the Courts. There is also a useful table of cases and an index.

## NEW PORCELAIN.

A COMPLETE revolution would take place in the ceramic industry if a new process called "Thonguss" (clay casting) should be successful. The mass is not, as heretofore, worked cold upon the potter's lathe or pressed into a mould, but is finely ground after careful drying, then melted at about +3,215° C. in an electric furnace and poured in a heated, fireproof casting mould. Glazing becomes unnecessary in most cases, if the walls of the mould are sufficiently smooth. Otherwise it is allowed to cool off after the solidification of the cast to about +1,860°, and finely-powdered glass is thrown on in a uniform, thin layer. The advantage of the new process is said to consist (aside from the considerably reduced cost) in an almost complete prevention of the unforeseen shrinking of the mass on cooling; so that henceforth instruments of precision and accurately divided measuring vessels of every description can also be made from porcelain. By means of a still unpublished process—viz., the admixture of a suitable substance to the melted clay, the inventor expects to render the cooled mass pliable—malleable—and also to make a remelting considerably more difficult. A difficulty which still remains unsolved with the clay-casting method is the coloured decoration. Solid coloured designs, such as the much employed onion pattern, can be readily pressed with suitable stamps on the melting glass layer which forms with the said glazing method; but one has not been successful, for instance, to produce in clay casting the popular coffee-cups decorated with flowers by hand-painting.—*Pharmaceutische Centralhalle, through Neuss's Erfindungen und Erfahrungen.*

## CHIPS.

A Congress for Art History is to be held at Amsterdam from September 29 to October 1. Persons desiring to attend the meetings or to read papers are requested to communicate with Heer B. W. T. van Riemsdyk at Amsterdam.

The Consumption Hospital at Bowden has been enlarged and improved. Mr. W. Cecil Hardisty, of Manchester, was the architect, and Messrs. J. Hamilton and Son, of Altrincham, the builders.

The new Leigh sewage works are now practically completed, and the sewage on Monday was turned into the tanks for the first time. Loans to the amount of £64,089 have been sanctioned for the work, and nearly £55,000 has been already expended. The farm contains 233 acres, and the works are amongst the finest in the country.

It was reported last week at the meeting of the Bristol Sanitary Committee that the sanction of the Local Government Board had been given to a loan of £10,000 for wood-paving, but for its repayment only five years had been allowed, whilst for a loan of £266 for relaying a sewer in Redcross-street 30 years were allowed.

The foundation-stone of the new smallpox hospital for Barnsley and the townships round about was laid on the 21st inst., at Lund-lane, Monk Bretton. The hospital, which is in course of erection by the Barnsley Corporation at a cost of £6,000, on a site purchased from Colonel Wombwell's trustees for £1,000, will be built in five blocks, and will provide accommodation for sixteen patients.

The eighth annual excursion of the Potteries, Newcastle, Leek, and Crewe branch of the Federated Builders of England and Wales took place on Thursday week, when, under the genial guidance of Mr. J. Bowden, honorary secretary to the branch, a company of over 200 members and friends had a day trip from North Staffordshire to the Dukeries and Sherwood Forest, including a 25 miles' coach drive through the delightful scenery of this romantic district.



## Building Intelligence.

**BROUGHTON.**—On Tuesday afternoon Dr. McLaren laid the foundation-stone of the Broughton Baptist chapel, Great Clowes-street, Broughton. The structure will seat 530 people, apart from free accommodation. The building will be of red Ruabon brick and terracotta dressing, and the gradient from the back of the chapel towards the pulpit such that those sitting at the back will be able to see well to the front. The main building will cost about £2,500.

**DUDLEY.**—The Earl of Dudley laid the foundation-stone of the new Grammar School at Dudley on Wednesday. The new buildings, which will accommodate 150 boys, comprise a large central hall, five classrooms, and head-master's house, and are being erected by Messrs. Webb and Round, of Dudley, from the designs of Messrs. Woodhouse and Willoughby, architects, of Manchester. The total cost is estimated at £10,000.

**EDZELL.**—The Inglis Memorial Hall was opened last Friday. The style of the building is 16th-century Scottish. The architects are Messrs. C. and L. Ower, of Dundee, whose designs were selected in competition. The building contains a library and reading-room, council-chamber for the use of the parish council, one large hall for public meetings, and one smaller hall, which can be used either separately or combined with the main hall. A complete scheme of cloak-rooms, kitchen, sculleries, with store-room, &c., is provided. Mr. Robert Scott, of Arbroath, was the clerk of the works.

**GRAVELLY.**—The foundation-stone of the new cottage homes which the Aston Board of Guardians are erecting at Gravelly Hill was laid on Tuesday. Messrs. Franklin, Cross, and Nichols (the architects) plans were originally drawn for the accommodation of "families" of thirty; but at the instance of the Local Government Board they have been amended, so as to provide for "families" of not more than sixteen, space being found in the altered designs for a total of 250 children. In each section are seven homes for the accommodation of sixteen children each, and one for twelve children. The boys' department contains workshops. The contract, which amounts to £42,000, has been let to Messrs. W. Lee and Son, of Aston.

**HORFIELD.**—The foundation-stone of a new Wesleyan school-chapel was laid at Horfield, Bristol, last week. The new buildings will consist of a large hall, 60ft. by 43ft., capable of accommodating 500 persons, designed so as to be easily adapted for a central hall, with classrooms on each side, and thus to form a fully-equipped Sunday-school. There are spacious entrances on each side, with granite columns, and at the further end is an arched recess containing the rostrum and Communion platform. In the rear of the hall are four classrooms opening out of a passage, which communicates also with the hall, and has an external entrance on each side of the building. One room is fitted up as a minister's vestry, and in the basement there is to be a kitchen with provision for tea meetings. On the first floor will be a handsome room 24ft. by 20ft., capable of seating 100 persons. The building will be in the Decorated Gothic style, the walls of red pennant, with freestone dressings. The roof will be covered with green slates, and surmounted by a handsome fleche, rising 70ft. The plans of Messrs. La Trobe and Weston, F.R.I.B.A., were selected in a limited competition, and the building is being carried out under their superintendence, Mr. E. Love being the contractor, and Mr. B. R. Lewis clerk of works.

**LIVERPOOL.**—St. Cyprian's Church, Edge-lane, was reopened on Tuesday. The several works comprised in the alterations and renovation, as originally intended, have involved an expenditure of £810. A wood ceiling has been substituted for the plaster ceiling of the nave, the work consisting of pitch-pine boarding, with moulded ribs. The principals have been strengthened in appearance by filling in the spandrels. The capitals of all the columns have been carved, and over each a sunk pattern has been worked in the stone. The whole of the wall-spaces have been painted and decorated. The works have been executed from the designs and under the supervision of Messrs. Willink and Thicknesse, architects.

**ST. CLEMENT DANES.**—St. Clement Danes Church, in the Strand, was reopened on Wednes-

day week, after restoration, which has been carried out at a cost of £5,750. The alterations are strictly restoration, apart from demolition. The mural tables have been fixed on the walls, and the ancient oak work carefully repaired, the pew doors and surplus oak having been transformed into a dado extending all round the galleries; the organ-case is enlarged by two turrets and circular wings of oak; the plaster has been removed from the windows, exposing the stone coigns to view. The stone doorways were extricated from their oak covering, and form the approach to the galleries. The screens which concealed the six pillars supporting the tower are removed, new oaken exterior doors are added, and porch-gates, originally designed by Mr. G. E. Street, are placed at the west entrance. All the pews have been lowered 10in., and the oak restored to its natural colour. The five chancel windows are filled with stained glass, representing the Nativity, the Agony, the Crucifixion, the Resurrection, and the Ascension. A chancel grille has been added, and the choir seats, designed in the old oak, correspond with the other parts of the church. The choir vestry has been enlarged, and a private vestry and separate robing-room arranged for the rector by a clever alteration in the gallery stairs. Seven hundred hassocks have been supplied, and seating for the pews, also Brussels carpet with massive brass rods for the pulpit and lectern.

**WOLSTANTON.**—The new aisle, vestry, and porch recently erected on the south side of St. Andrew's Church, Porthill, were consecrated on Saturday week. The extension has been carried out from the plans of Messrs. Wood and Hutchings, of Tunstall, by Messrs. Yorke and Goodwin, of Tunstall, the architects and builders of the main portion of the church. The contract for the added portion amounted to £780. The new south aisle and transept correspond with the north side of the church, and are finished in a similar manner, the external walls being of stone, with parpoint facings and Hollington dressings. The interior walls are of Bath stone dressing, with cement facing. The new vestry is at the west end, and there is a new porch and south doorway.

### CHIPS.

The foundation-stone of the New County Museum was laid at St. Albans on Wednesday week. The architect is Mr. A. L. Flower, A.R.I.B.A., and Mr. Stone is the contractor.

Some discussion arose at last week's meeting of the Chatham Town Council over a recommendation from the works committee that Mr. G. E. Bond, architect, Rochester, be forthwith instructed to prepare plans of a building for a public library, to cost not more than £2,250, to be erected on the sites of the two houses, New-road, Chatham, adjoining to and in the rear of the Technical Institute, and that, if necessary, application be made to the Local Government Board for their sanction to the utilisation of such sites for the purpose. By twelve votes to six the matter was referred back to the committee.

India has now got its first rack railway to the Nilgiri sanatoria of the Southern Ghauts. The Abt system of the Swiss engineer of that name is followed. A mixed engine is used, so that the motive power can be turned on to the different wheels according as it has to run over an ordinary line or to climb 5,000ft. up to Coonoor. The Nilgiri Railway runs from Mettappolium to Kullar at the foot of the hills in the usual way, and then begins the ascent to the pretty and cool station of Coonoor, using the rack. Thence the line is to be extended the 12 miles to the still cooler Ootacamund on the ordinary adhesion plan.

The building trade is brisk at Aldeburgh just now. Mr. Geo. O. Knowles has entered into a contract with Mr. R. W. Welford, of London, to erect two large shops in High-street; Mr. Scarlett is building two houses opposite the East Suffolk Hotel; and Mr. Jos. Flintham is having plans prepared for a number of cottages and villa residences upon his newly-acquired estate. Mr. Thompson, builder, of Peterborough, is carrying out extensive alterations at the Great Casino, the residence of Col. A. J. B. Thellusson, and also at the Little Casino, the residence of Sir Hugh E. Adair. Messrs. Barrell Brothers, builders, Woodbridge, are erecting villa residences upon the Crespiigny Estate. Mr. Edward Butcher is carrying out alterations and extensions at the South End Stores. Mr. Geo. B. Block, who has just built a large house near the Broadnell Hotel, is about to commence a second one of the same size and design. The new confectioner's shop and restaurant recently built by Mr. Geo. O. Knowles for Mr. A. V. Reading was opened last Saturday.

### ARCHÆOLOGICAL.

**PREHISTORIC REMAINS AT TODMORDEN.**—Three cinerary urns found on the hill above Todmorden were opened on Wednesday in last week at a meeting held for the purpose in the Co-operative Hall, Todmorden. The urns were found in the centre of an earth circle some 30 yards in diameter. Mr. Tattersall Wilkinson, of Burnley, inspected the place a year ago, and came to the conclusion that it had been used at one time for burial purposes; but it was not till within the last fortnight that he was able to put his opinion to the test. On Thursday, the 7th inst., in company with a number of other gentlemen, armed with spades and mattocks, he climbed the Stansfield Hill, and after some digging in the middle of the circle came upon the three urns, embedded in charcoal, some 6in. or 8in. below the surface. Pieces of other urns were also found. After being photographed, the urns were placed in the Free Library at Todmorden. A great deal of interest was excited by the discovery, and two or three hundred people, including representatives of various societies, attended the meeting to see the urns opened. The urns are of burnt clay, and in shape resemble the ornamental vases in which one puts flower-pots. The largest of the three is about 18in. high, and perhaps 1ft. in diameter at its widest part. Round the top there is some slight ornamentation of "fish-bone" character. It was soon found that the two smaller vessels contained nothing in particular, and the whole interest became centred on the large urn. Near the surface, and mixed with soil and charcoal, were small pieces of bone and earthenware, and the urn had been nearly emptied before anything more distinctive was found. But at the bottom the explorers came upon a small cup containing a bronze spear-head, a bronze pin, and a small quantity of bones which had been submitted to the action of fire. The bones were said to be human bones, and among them were two teeth, which had apparently seen some service. The cup rested in a socket, and was ornamented in the same style as the urn. Mr. Wilkinson and other gentlemen who afterwards addressed the meeting regarded the find as of some importance; but some regret was expressed that it was the Bronze period they had touched, and not, as some had hoped, the Flint period.

The Metropolitan Tabernacle, London, it is expected, will be ready for being reopened in about twelve months. A lecture-hall, with accommodation for 1,400, is being pushed forward for use in the mean time. The total cost is estimated at £32,000, which is £10,000 over the amount for which the building was insured at the time of the fire.

Tregoney and Cuby Church has long been in a dilapidated condition and unfit for worship. It is proposed to entirely renew the interior, to build a new roof, and repoint and clean the tower. The work has been intrusted to Messrs. Edwards and Sons, Praise, the contract price being £1,100, and it is expected to complete the restoration as far as the tower window by September next, this portion of the scheme being estimated to cost £960. The total estimated cost of the work is £1,200.

At the last meeting of the Cirencester Urban District Council, the Streets and General Purposes Committee presented a joint report with regard to the offices of surveyor, inspector, and collector. It appeared that during the last three years Mr. T. Hibbert has held these offices at a salary of £185 per annum, out of which he has had to pay about £3 per annum for fidelity insurance. He has, however, received a fee of £30 for extra work in connection with the surface water drainage. He now applied for an increase of salary and for relief from some of the duties. The committees had come to the conclusion that in order that Mr. Hibbert should be able to properly perform the duties of surveyor and inspector he should be relieved of the collectorship, and they recommended that for two offices of surveyor and inspector he be paid an increased salary of £225, to be increased in the course of three years to £250, another collector being appointed at a salary of £60. The committee's report was agreed to.

Mr. T. W. Cubbon, who is architect for the Well-lane Schools, Birkenhead, has recently received instructions from the Clothworkers' Company to proceed with an important educational scheme in the Isle of Man, comprising the erection of a new higher-grade school, also new science and technical school. It has also been decided to materially enlarge two of the existing schools. Mr. Cubbon has just completed a new pupil teachers' centre and science school for the Douglas School Board, which is the fourth he has carried out for this board.



## Engineering Notes.

**BASINGSTOKE AND ALTON.**—Mr. Ritchie, President of the Board of Trade, cut the first sod of the Basingstoke and Alton Light Railway last Friday. Promoted by the London and South-Western Railway, the new line, which is 12½ miles in length, will afford a means of communication with the small towns and villages in this part of Hampshire. The railway, which will join the London and South-Western main line below Basingstoke Station, is the first to be constructed under the provisions of the Light Railways Act. It will run through a large agricultural district in North Hants, and will connect the main line at Basingstoke with the Alton and Winchester branch. Eventually it will be joined with the new Wye Valley line, making the communication with Portsmouth more direct. The railway will cost about £4,000 per mile to construct, and is to be completed within 18 months.

**THE GREAT CENTRAL RAILWAY.**—The London extension of the Great Central Railway has been in course of construction for nearly four years. The main line is now practically finished, and is being inspected in sections by the Board of Trade. It was opened throughout for coal traffic on Monday. The Marylebone coal depot covers an area of about six acres. But the coal depot is only a small portion of the London terminus, which covers some 60 or 70 acres. It is approached from the north by a double line, through a tunnel about a mile long. Then follows the "cut and cover" work, completed for six sets of rails, four of which end in "dead ends" at the southern portal of the tunnel, and will be used until a second tunnel becomes necessary for storage sidings. All the lines pass over the Regent's Canal, and there the first lot of goods lines leave the main line to the right, or west, and follow round the edge of the canal. The canal, which has been widened, here forms a long basin, about 100ft. wide, and is retained by a fine wall, along which the barges will lie. On this wharf there will be a shed covering four lines of rails, and six hydraulic cranes are in position, so that goods will be lifted out of the waggons into the barges, or *vice versa*, and sent direct to the ship's side at the docks. A little further south the coal line into the coal depot leaves the main line and makes a dip in order to get under Grove-road. Still a little further south the lines into the general goods yard branch off to the west. The main feature of the goods yard is the magnificent warehouse which will shortly be finished. It has five floors, each 25ft. by 350ft., giving an aggregate storage area of 12½ acres. It is being fitted with all modern appliances for expeditiously handling goods. The building is fireproof, and the skeleton is composed entirely of steel girders and columns. After passing the goods yard the line splits up into the five lines of the terminal passenger station, which will have two arrival and two departure lines and one siding line against the east wall. The platforms are 1,000ft. long. There is a broad road or promenade between the station building and the fine hotel designed by Colonel Edis. It is expected that the hotel will be opened next spring. It should also be mentioned that Colonel Edis designed the front elevation of the station building, though all the engineering work of the southern and London divisions has been designed by Sir Douglas and Mr. Francis Fox, whose resident engineer for the London division is Mr. Edmund Wragge. The contractors are Messrs. Firbank. In addition to the works and buildings so briefly indicated there are gasworks, extensive electric-lighting works, a large hydraulic pumping station, carriage works, and stables for 700 horses, all of which are in a forward state.

**THE PROPOSED NEW CUMBERLAND AND DURHAM RAILWAY.**—The proposal of West Cumberland traders to build a railway from Workington to the East Coast, so as to secure cheap coke, has for its principal promoters the Cammell and Moss Bay Iron and Steel Works and the Workington Hematite Iron and Steel Company. Three routes have been surveyed by Mr. J. Eden, C.E. The one most favoured will probably be that giving the Midland Railway access to West Cumberland. The new line will serve many large collieries, limestone quarries, and works in Cumberland and Durham which now have no direct railway communication. Wear Head is proposed as the terminus in Durham.

## PROFESSIONAL AND TRADE SOCIETIES.

**KENT ARCHAEOLOGICAL SOCIETY.**—The annual two days' meeting of the Kent Archaeological Society was held on Wednesday and Thursday last. The society made Deal their headquarters, and met there on Wednesday morning under the presidency of Earl Stanhope for the despatch of business. The Mayor welcomed the members to the borough. Deal Castle was afterwards visited under the guidance of Mr. W. L. Rutton, F.S.A., who briefly described the fortress. Progress was next made to Betteshanger, where Lord Northbourne entertained the archaeologists to a light luncheon. Subsequently Ash Church was inspected. Lord Stanhope again presided at the annual dinner of the society, in St. George's Hall, at 5.30. This was followed by an evening meeting in the Town Hall, to hear papers by Mr. G. Dowker, F.G.S., and the Rev. T. S. Frampton, B.O.L., M.A., F.S.A., on "Deal and its Environs" and "The Journal of a Bailiff to Yarmouth" respectively. The programme for the second day opened with a visit to Walmer Castle, by kind permission of the Marquis of Salisbury, K.G., Lord Warden of the Cinque Ports. Mr. Rutton took charge of the party. From Walmer the members proceeded to St. Margaret's-at-Cliffe, where they found luncheon awaiting them at St. Margaret's Hotel. This was followed by a visit to the church under the guidance of the Rev. G. M. Livett, M.A., vicar of Wateringbury. Progress was next made to East Langdon Church, which was described by the rector (the Rev. J. Lindsay, M.A.). An object of special interest in the building is the mediæval embroidered cope of the 14th century, which is described and illustrated in "Archæologia Cantiana," Vol. XI. On leaving East Langdon the party returned to Walmer, whose ancient parish church, now converted into a mortuary chapel, was inspected under the guidance of Mr. Geo. Patrick, A.R.I.B., hon. secretary to the British Archaeological Association. Last of all, Mr. W. H. Burch-Rosher and Mrs. Burch-Rosher welcomed the members in the garden of Wigmore House, and refreshed them with afternoon tea.

**MAIDSTONE AND MID-KENT NATURAL HISTORY AND PHILOSOPHICAL SOCIETY.**—The fifth excursion of the season took place on Saturday. A party of nearly 40, under the leadership of Mr. George Payne, F.S.A., of Rochester, left Maidstone by the 12.10 train for Hawkhurst, and were driven to Bodiam Castle, the history and description of the building being given by Mr. Payne. Bodiam Castle is noteworthy in this respect, that it was built on a very definite plan, and the building, once taken in hand, would seem to have been completed without interruption, and it remains now in the state in which it was finished about the year 1385, not having since then been altered or added to, except in the matter of ordinary repairs and as affected by the ravages of time, for the castle is now in ruins. These, however, are very extensive; the towers and gateways seems to be in a fairly complete state, and enough remains of the edifice generally to give a good idea of what it probably looked like in the days of its prosperity. The public are greatly indebted to the present owner, Lord Ashcombe, who has had it, with great judgment, repaired sufficiently to prevent further decay, but without in any way affecting its appearance of antiquity, and Bodiam Castle stands to-day a fine and picturesque example of a feudal castle, in the midst of a country of surpassing beauty.

**ROYAL ARCHAEOLOGICAL INSTITUTE.**—The members of the Royal Archaeological Institute have had good weather for their meetings and excursions during the week they have been in Lancaster and the neighbourhood, and Tuesday, when the last excursion was taken, was no exception to the rule. At the concluding sectional meeting, the preceding evening, several local ladies and gentlemen were elected members of the Institute, and the Rev. Sir Talbot Baker, in moving a vote of thanks to the mayor and corporation of Lancaster for their hospitality, said in no place had their reception been more cordial or generous than in Lancaster. Thanks were also accorded to the readers of papers, and to the owners of houses and vicars of churches who had thrown them open during the week for the pleasure and edification of the members of the Institute. Yesterday morning the party travelled by special train to Whalley, for Mytton Church and Whalley Abbey. The archaeological features

of the former place were explained by the Rev. Dr. Cox. of Belper, and those of the latter by Mr. W. H. St. John and Mr. Micklethwaite.

**THE INSTITUTION OF MECHANICAL ENGINEERS.**—The summer meeting of the members of the above institution commenced at Derby on Tuesday morning, when there was a large and representative attendance of engineers from all parts of the country. The president of the institution is Mr. Samuel W. Johnson, the locomotive superintendent of the Midland Railway Co. The proceedings commenced at ten o'clock, at the Midland Railway Institute. Amongst those present, in addition to the president, were Mr. E. Windsor Richards (Low Moor), past-president of the institution; Sir William H. White, K.C.B. (chief constructor to the navy) and Mr. J. Hartley Wicksteed (Leeds), vice-presidents of the institution; and Mr. A. Tannett Walker (Leeds).

## CHIPS.

The tender of Mr. Elwin Whittingham has been accepted for the erection of a new infant school at Newport, Salop.

At the meeting of the Wolverhampton Board of Guardians, on Friday, it was decided to appoint Mr. T. W. Oldwinckle, F.R.I.B.A., of Westminster, to assist the guardians in deciding upon plans and estimates in connection with the erection of the new workhouse.

In accordance with a proviso of the will of the late Mr. Gladstone, a marble tablet is about to be placed in Penryford Church, near Hawarden, to the memory of the Rev. John Edward Troughton, for many years in charge of the church. With his own hands this clergyman adorned the interior of the church.

The foundation-stone of the new St. Barnabas' Church, in Morescombe, was laid on Friday. The estimated cost is close upon £7,000. Seating accommodation is to be provided for 700 persons.

Mr. Thomas Winn, architect, of Leeds, has effected a purchase of the premises belonging to the executors of the late Mr. Joseph Salter, in Park-lane, Leeds. The premises form a square block, with a frontage to Park-lane of 79ft. 10in., to Park-street of 131ft. 3in., and to Oxford-street of 147ft. 2in., and the property contains a net site-area of 1,397 square yards. The site is intended for the erection of a new Masonic Hall for Leeds, with central offices for the accommodation of the provincial lodges of West Yorkshire.

The gas committee of the Bradford Corporation have decided to adopt the "shilling-in-the-slot" gas meter.

The parishioners of Brondesbury having decided to enlarge their fine parish church, Christ Church, the foundation stone of a new south transept and south aisle, which will be erected at a cost of £3,000 from the designs of Mr. C. R. Baker King, the architect, was laid by the Bishop of London.

The Carver Street Wesleyan Church, Sheffield, is carrying out an extension scheme which will involve an outlay of nearly £5,000. The scheme includes the erection of new school premises, which are expected to be finished in October. The lecture-hall has just been opened.

The deacons of Rusholme Road Church, Manchester, have for some time past had under consideration a scheme for the renovation and lighting of the chapel and school. The work, it is expected, will be undertaken at an early date.

The town council of Chatham, at their last meeting, discussed a recommendation from the works committee that Mr. G. E. Bond, architect, Rochester, be forthwith instructed to prepare plans of a building for a public library, to cost not more than £2,250, to be erected on the sites of the two houses, New-road, Chatham, adjoining to and in the rear of the Technical Institute, and that, if necessary, application be made to the Local Government Board for their sanction to the utilisation of such sites for the purpose. By twelve votes to six the matter was referred back to the committee.

The old parish church of St. Nicholas, Norton, near Malton, which has been replaced by the unfinished church of St. Peter, is at last to be pulled down. The building only dates from the close of the last century. There is an east window of stained glass, with the emblems of the Four Evangelists, and this will be transferred to the west end of the new church. There are also some mural monuments and brasses which will be similarly dealt with. A vestry meeting was held at Norton on Wednesday in last week, when it was resolved to apply for a faculty to pull down the church to the level of the floor, sell the materials, and try to induce the urban district council to take the ground in hand, and use it as a pleasure garden for the use of the town.



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## ILLUSTRATIONS.

NEW COUNTRY HOUSE IN BEDFORDSHIRE.—NATIONAL GOLD MEDAL DESIGNS FOR DECORATION OF PIANO MANTEL AND OVERDOOR.—PENN MILL BOARD SCHOOL, YEovil.—HOME FOR EPILEPTICS AT CHALFONT ST. PETER.—SELECTED DESIGN FOR ROMFORD BATHS.—FOUR SHOPS IN HIGH-STREET, TUNSTALL.—AN AMERICAN STAIRCASE HALL.—THE WILSON BUILDING, BROOKLYN, N.Y.

## Our Illustrations.

## NEW COUNTRY HOUSE, BEDFORDSHIRE.

THIS country house has been erected for Mr. W. H. Allen, J.P. for the county of Bedford. It is built of Weldon stone, and red local tile roof. The main feature of the house is the large central hall, which is carried up to the roof; it is panelled with oak ribs and ornamental plaster ceiling. Across one side of the hall is the gallery, which gives access to the first-floor bedrooms, and this is reached by a grand oak staircase and arcading with columns and carved caps, designed in keeping with the style of the house. All the floors, panelling, and other woodwork are of oak, which has been toned down to a dark rich colour. The reception rooms lead out of the hall, and are treated in different styles, special care and attention being given to the mantelpieces and decoration. The drawing-room has a handsome marble mantelpiece, which was designed by the architect in the Italian style. The kitchen and offices are well provided, and all lead off a well-ventilated and tiled corridor. Stables, lodges, and farm buildings have been erected, and the grounds and gardens very well laid out by Messrs. Cheal and Son, of Crawley. All the buildings are lit with electric light. The contract for the work was given to Mr. S. Forster, of Kempston, and the whole of the buildings have been designed by the architect, Mr. George P. Allen, of London, and carried out under his supervision.

## NATIONAL GOLD MEDAL DESIGNS FOR PIANO FRONT AND OVERDOOR.

THE Gesso Panel, with two circles in pale colours and ornament in white, bearing the legend "Here Soundeth Sweetest Music" in gold on oak, is adapted for use in the ordinary type of piano, with the idea of distracting, to some extent, one's attention from its unlovely shape, accepted of the Philistines, and consequently commercially difficult to depart from, any radical alteration, however beautiful, being greeted with decided suspicion as "not a bit like a piano." The design for the music-room door is to be executed in slightly-fumed oak. The columns at either side, with capitals in wrought copper, each support a projection formed by three gesso panels, stained green and gilded, a simple moulding connecting the shelf at top. The lyre in centre of overdoor is to be carved in low relief. The whole scheme of brown would be pleasantly relieved by the green and gold of the gesso, and the bright reds afforded by the lacquered copper finger-plate and supports; also by employing bright glass of a

decided green tint for the leaded light in the door. These excellent designs are by Mr. Geo. Montague Ellwood, of Holloway.

## PEN MILL SCHOOLS.

THESE schools, which cost £4,390, are built of brick with Ham stone dressings, and have accommodation for 550 scholars—250 infants and 300 mixed. They are planned on the central hall system, and the classrooms are separated by sliding partitions. Mr. H. W. Pollard, of Bridgewater, was the builder, and the architect was Mr. J. Nicholson Johnston, A.R.I.B.A., of Yeovil.

## THE FREDERICK GREENE HOME, CHALFONT ST. PETER.

THIS additional home for men is being erected for the accommodation of 24 men on a site adjoining the Passmore Edwards' Home, at the cost of Mr. Richard Greene, one of the active friends of the National Society for the Employment of Epileptics. In general character this building will harmonise with the five others which the donor of the colony itself, Mr. Passmore Edwards, has given for the housing of epileptics at Chalfont. The plans accompanying the sheet of working details printed herewith sufficiently show the arrangement of the building, which has been contrived with strict regard to economy. The maximum amount of sunshine is secured for the patients, and the domestic part of the house is isolated completely from the patients' rooms. The kitchen is used only for the preparation of minor meals, as a central general kitchen will in all cases furnish the cooking for dinners, &c. Red bricks and tiles are used, with rough-cast gables and stone sparingly introduced, as shown. Mr. George Darlington is the builder, and Mr. Maurice B. Adams, F.R.I.B.A., is the architect.

## PUBLIC BATHS, ROMFORD.

THIS design was recently selected in competition for new baths by the urban district council of Romford. The building is to be erected in Mawneys-road, and the plan and view show the arrangement and appearance. Double entrances are placed in the front for men and women, and also for providing sufficient means of entrance and exit when the bath is used as a hall. The boiler-house is in the basement under laundry, and the rooms on upper floors of front block are to be devoted to classrooms and caretaker's residence. The fronts to Mawneys-road will be faced with red bricks and Bath stone dressings, and the roof covered with green slates. The buildings in rear will be finished in a simple and inexpensive manner. The water for the baths will be obtained from a well sunk on the site. The architects are Messrs. Harrington and Ley, of 108, Fenchurch-street, E.C.

## SHOPS AT TUNSTALL.

THESE shops have recently been erected in the High-street, Tunstall, for Mr. James Lindop. They are faced with red pressed bricks, with tile hanging and rough castwork in the upper parts, and the roofs are covered with red tiles, the architects being Messrs. Wood and Hutchings, of Tunstall and Burslem.

## THE WILSON BUILDING, BROOKLYN, N.Y.

THIS building is arranged for, and occupied by, several independent clubs and societies who are here provided with lodge-rooms, restaurants, galleries, and exhibition-rooms. Messrs. J. G. Glover and H. C. Carrel, Brooklyn, N.Y., are the architects. Our illustration is from the *American Architect and Building News*.

The Scunthorpe Urban District Council have resolved to promote a Bill next session authorising them to manufacture and supply gas, and conferring upon the council powers with respect to the supply of water and for other purposes. Messrs. Stevenson and Birstall, of London, have been appointed engineers. The amount of the first contract is £4,495. It is estimated that the total cost of providing the town with a proper water supply will be £16,000.

The foundation-stones of a new Bible-Christian Chapel were laid at Porthallow, St. Keverne, on July 14th. The new building will stand on the old site, with an addition of 8ft. to the length and 2ft. to the width, and accommodation will be provided for 130 people. There are to be a schoolroom, vestry, &c., under the chapel. Mr. W. P. George, Mullion, is the architect, and the contractors Mr. W. J. Nicholls (St. Keverne) and Mr. Cook (Rosevere).

## COMPETITIONS.

BRIDLINGTON.—In the recent competition for the Yorkshire Foresters' Orphanage and Convalescent Home at Bridlington, the design submitted by Mr. Robt. J. Beale, A.R.I.B.A., of 9, Victoria-street, Westminster, was placed first, and instructions have been given him to proceed with the working drawings. Mr. E. Ashton-Chapman, 305, Fulham-road, London, secured second place, and Mr. Joseph Shepherdson, of Driffield and Hull, was placed third.

GLOUCESTER.—In a limited competition the designs of Mr. Alfred J. Dunn, A.R.I.B.A., of Gloucester and Birmingham, have been selected by the professional assessor for new schools to accommodate 950 children for the City of Gloucester School Board. Messrs. Martin and Chamberlain, the referees, reported that the design marked "Complete Supervision" was the best, and placed the designs marked "Sinister Lux" and "Up-to-Date" No. 1 equal second. The committee recommended to the board that the design "Complete Supervision" was the best plan received. The committee further recommended that the designs "Up-to-Date" No. 1 and "Sinister Lux" were equal in merit, and that the premiums of £25 and £10 offered be divided equally between them. The first prize is of the value of £50. The committee then opened the sealed envelopes with the following names and addresses:—"Complete Supervision," "Sinister Lux," and "Compact," Mr. A. J. Dunn, St. Michael's-square; "Up-to-Date," Mr. H. Medland, Clarence-street; "X," Mr. Graham Nicholas, Brunswick-road; "Absout Studia in Mores," Mr. W. F. Jones, George-street.

ROYAL COLLEGE OF MUSIC.—The design by Mr. Sidney Smith for a new concert-room and examination hall for the Royal College of Music has been accepted in a limited competition. Mr. Belcher was the assessor.

ST. PANCRAS.—The St. Pancras vestry is about to advertise for designs for their proposed new public baths in the Prince of Wales-road. From the architects responding a selection of six firms will be made, and the architect placed first will be employed to carry out the work, while £50 will be paid to each of the other five competitors. A professional assessor will be engaged to report and advise on the designs. The Local Government Board has sanctioned the borrowing of £17,000 for the purchase of the site.

## CHIPS.

Contracts have been entered into by the Government for the erection of three powerful forts at Dover—one between Dover and St. Margaret's Bay and two near the Western Heights. The forts, which are for the protection of the national harbour, are to be completed in 18 months.

At St. Mary's Churchyard, Caterham, on Saturday, Colonel Eaton unveiled, in the presence of 800 men from the Guards' depot, a cross erected to the memory of soldiers of the Brigade of Guards buried in the churchyard since 1878.

The Duchess of Albany, on Saturday, formally opened the Queen's Wood, Highgate, which has hitherto been known as Churchyard Bottom Wood, but has received its new name in commemoration of the fact that it was secured for the public in the year of Her Majesty's Diamond Jubilee. It comprises 52 acres, and was purchased from the Ecclesiastical Commissioners for £25,000.

The new town-hall which has been erected at Nevin, a rising watering-place on the South Carnarvonshire coast, was opened on Saturday. Messrs. O. M. Roberts and Son, Portmadoc, are the architects.

A committee is now sitting at the War Office to consider the status and pay of the surveyors of the R.E. Civil Staff, whose grievances were the subject of lengthy correspondence in *the columns* some four or five years ago. It is hoped that this may not be a case of the mountain being in great labour and bringing forth a mouse.

The death is announced at Aston-on-Clun of Mr. William Leicester, some years ago the leading builder and contractor of Mid-Cheshire. Before leaving Northwich he held several public offices. Many of the principal buildings of Northwich were erected by him, including Messrs. Brunner, Mond, and Co.'s Winnington works, St. Wilfred's Church, and the United Methodist Free Church. The church and rectory at Crowton and the Middlewich milk factories, too, were built by Mr. Leicester, who was also intrusted with the work of restoring the old churches of Witton and Little Budworth.





THE WILSON BUILDING, BROOKLYN, NEW YORK.

MESSRS. J. G. GLOVER AND H. C. CARRELL, *Architects.*







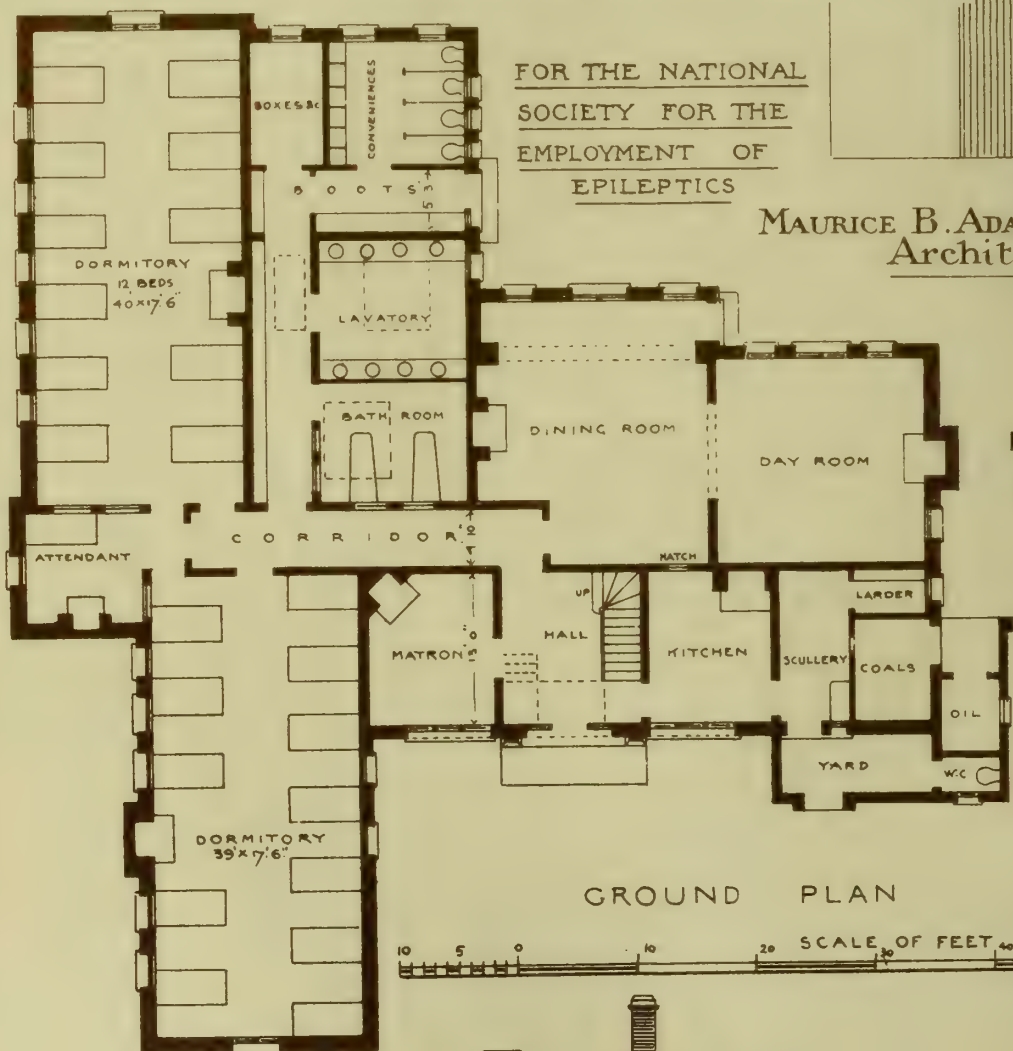
# FREDERICK GREENE HOME FOR 21 MEN



ELEVATION OF ENTRANCE FRONT



FIRST FL



FOR THE NATIONAL  
SOCIETY FOR THE  
EMPLOYMENT OF  
EPILEPTICS

MAURICE B. ADAMS FRIBA  
Architect

DETAILS OF  
ENTRANCE

HALF  
EXTERIOR

GROUND PLAN



SOUTH ELEVATION

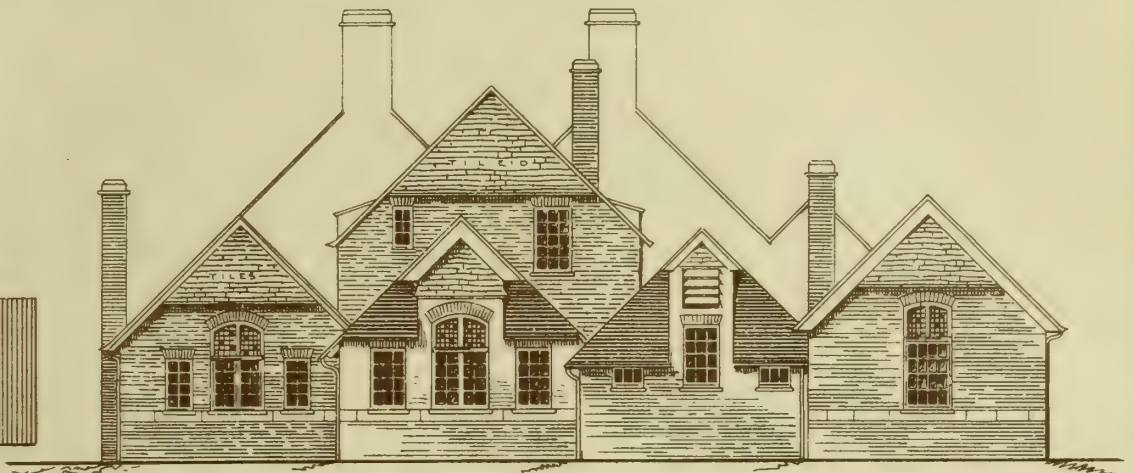




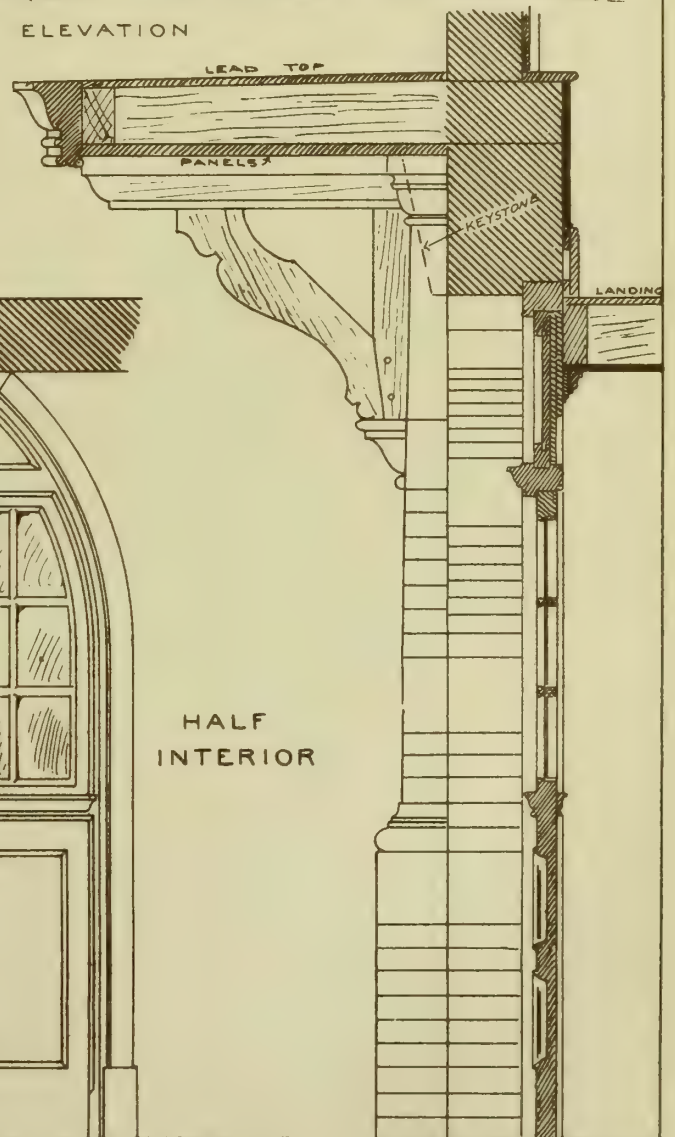
# CHALFONT ST PETER BUCKINGHAMSHIRE



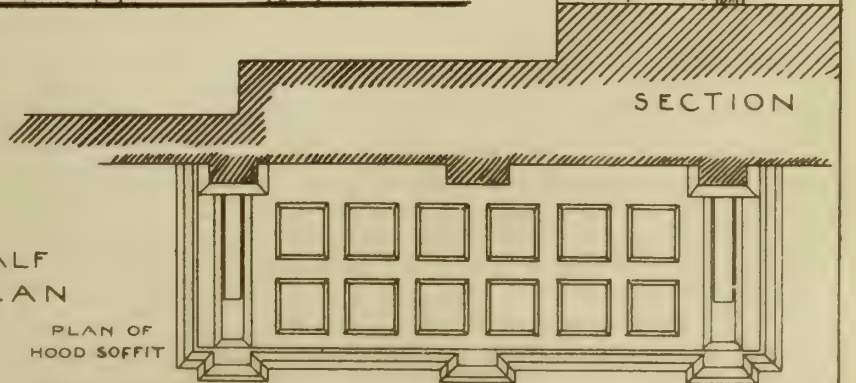
OR PLAN



WEST ELEVATION



HALF INTERIOR



HALF PLAN

PLAN OF HOOD SOFFIT













NEW COUNTRY HOUSE IN BEDFORDSHIRE FOR



S, JULY 29, 1898.



J. H. ALLEN, JR. J. P. — GEORGE P. ALLEN, ARCHITECT

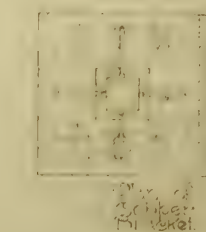












DETAIL OF TOP

OVERDOOR FOR  
MUSIC ROOM  
IN OAK FLUTED  
PANELS IN CRESSO  
SUPPORTING A  
PILASTER IN OAK  
FLUTED WITH  
CROSS BRACKET

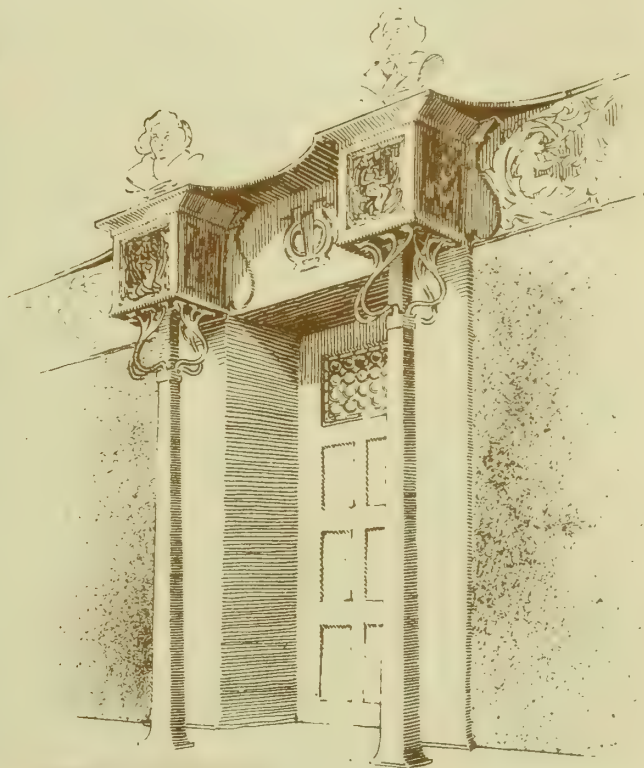
Detail of  
Backboard  
of A

Q. MELLWOOD



NATIONAL GOLD MEDAL A  
DESIGNS FOR PIANO F





PERSPECTIVE SKETCH FOR OAK  
OVER-DOOR OF MUSIC ROOM  
HAVING SIX GESSO PANELS  
SUPPORTING PILLARS IN OAK WITH  
COPPER BRACKETS











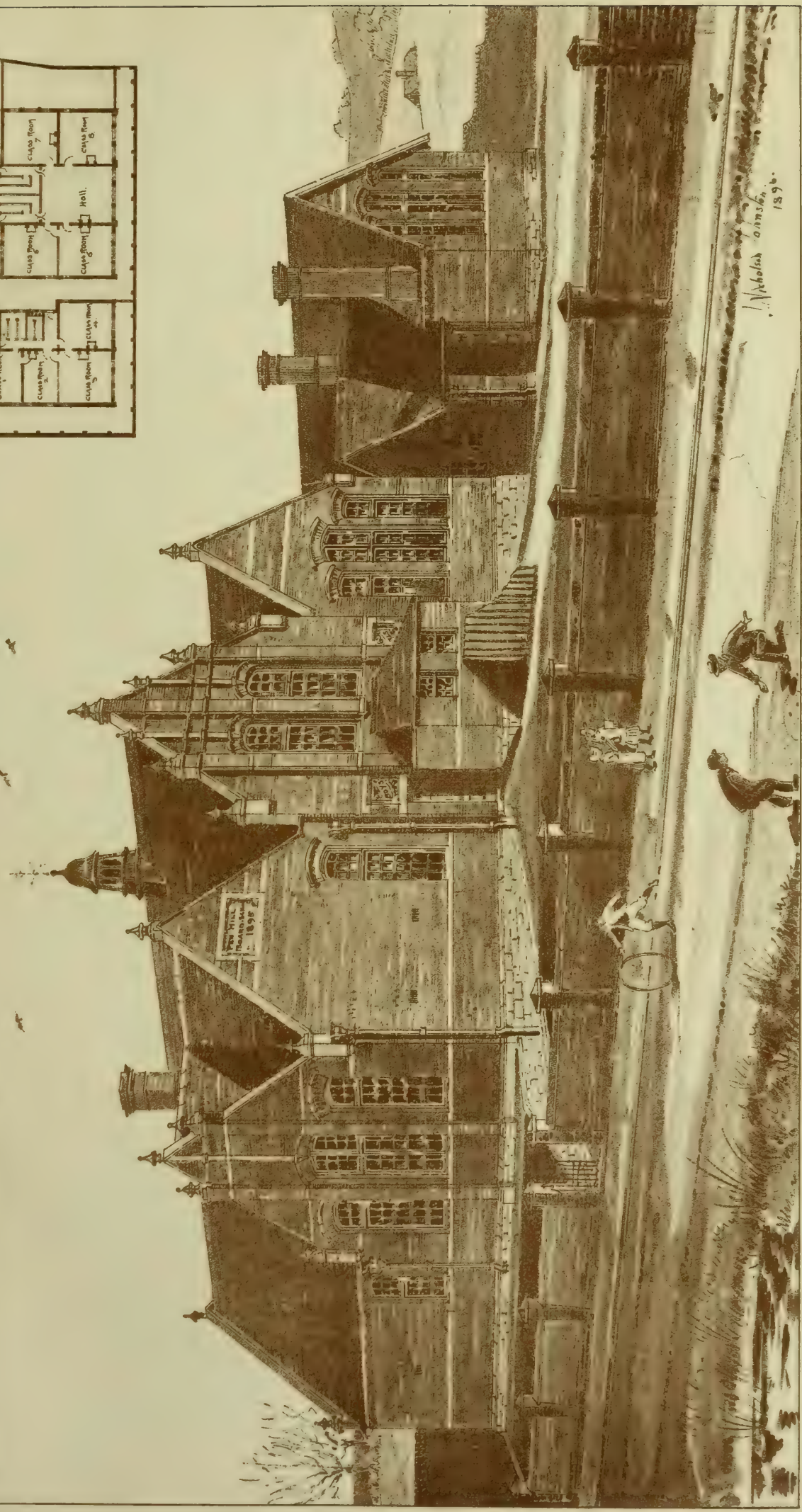
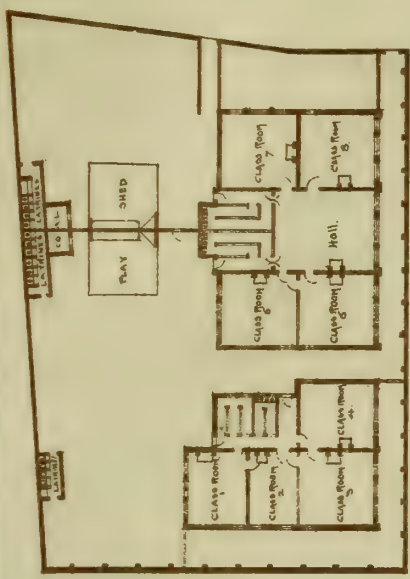


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"PHOTO-TINT", by James Akerman 6 Queen Square London W.C.



PENN. MILL BOARD SCHOOLS  
YEovil  
J. Nicholson Johnston. ARIBA

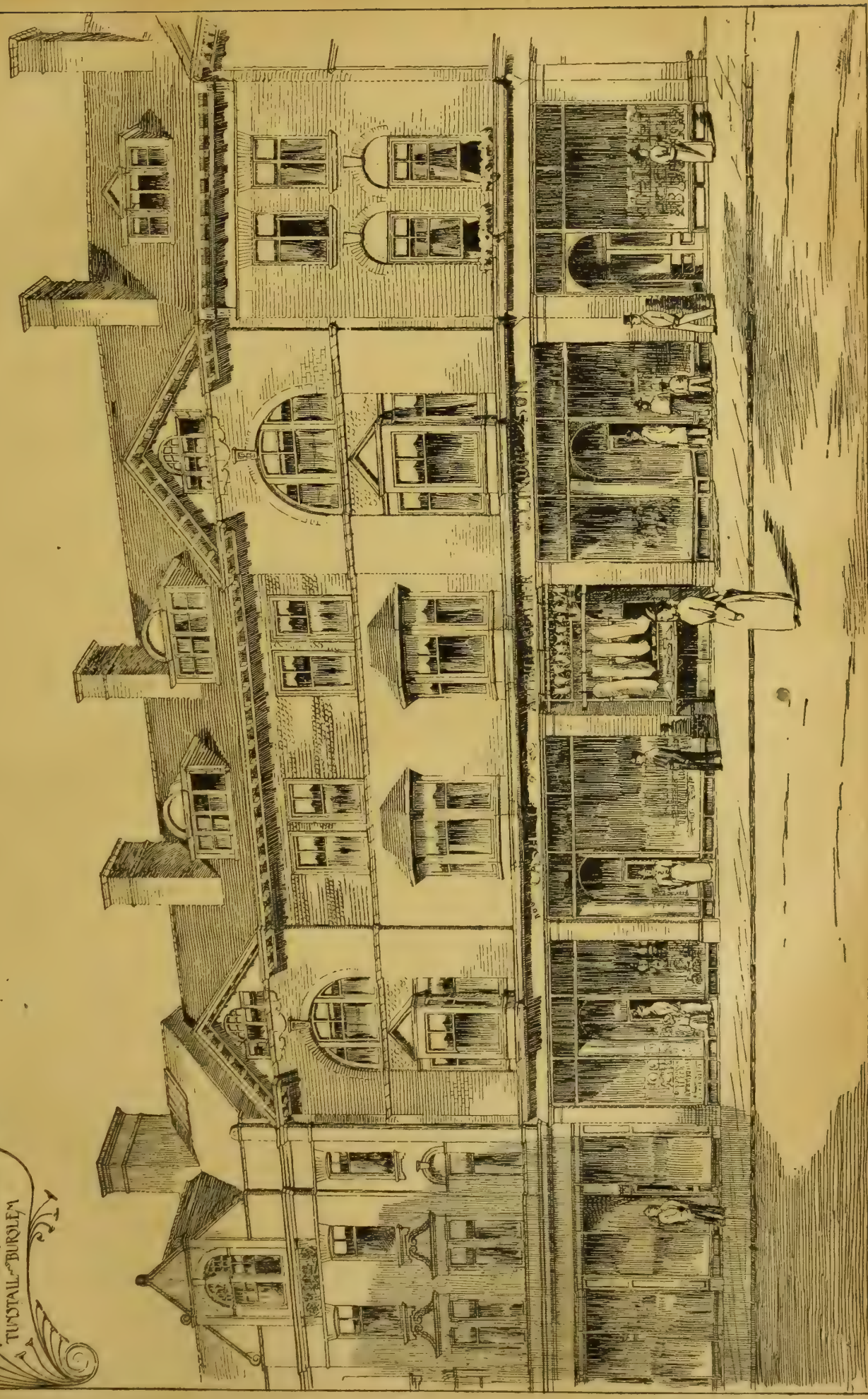








4 SHOP HIGH ST. TUNSTALL  
for Mr. Lindop  
Woods & Hutchings Architects  
TUNSTALL-BURLEIGH





## TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the BUILDING NEWS, 332, Strand, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

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## ADVERTISEMENT CHARGES.

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Front-page Advertisements 2s. per line, and Paragraph Advertisements 1s. per line. No Front-page or Paragraph Advertisement inserted for less than 6s.

Advertisements for the current week must reach the office not later than 3 p.m. on Thursday. Front-page Advertisements and alterations in serial advertisements must reach the office by Tuesday morning to secure insertion.

## SITUATIONS.

The charge for advertisements for "Situations Vacant" or "Situations Wanted" is ONE SHILLING FOR TWENTY-FOUR WORDS, and Sixpence for every eight words after. All Situation Advertisements must be prepaid.

## NOTICE.

Bound copies of Vol. LXXIII. are now ready, and should be ordered early (price Twelve Shillings each), as only a limited number are done up. A few bound volumes of Vols. XXXIX., XL., XLI., XLVI., XLIX., LI., LII., LVIII., LX., LXI., LXII., LXIII., LXIV., LXV., LXVI., LXVII., LXVIII., LXIX., LXX., LXXI., LXXII. may still be had, price Twelve Shillings; all the other bound volumes are out of print. Most of the back numbers of former volumes are, however, to be had singly. Subscribers requiring any back numbers to complete volume just ended should order at once, as many of them soon run out of print.

RECEIVED.—R. K. J.—E. N. (Birkenhead).—S. P. Co.—M. M. and Son.—R. M. I.—F. M.—W. L. N.

## Correspondence.

## ARE LEADEN PIPES DANGEROUS TO HEALTH?

To the Editor of the BUILDING NEWS.

SIR,—May I ask from our civic authorities some attention to the subject of lead-poisoning and some guidance from medical men and architects? It is held by some who have given special attention to the subject that one of the great causes of illness in the present day is the conveyance of water through leaden pipes. Water containing so dangerous a poison as lead, in even a small quantity, becomes a serious danger, since we consume so much of it in all we eat and drink. The subtle poison is most difficult to counteract, and most difficult to extract, either by filtration or boiling. It prejudicially affects everyone who uses it. The consequences of lead-poisoning are manifest in many ways, in rheumatism, liver complaint, and so on. One of the signs of its presence in the system is the brown appearance of the teeth, and this evidence is very apparent in Edinburgh. It is maintained by experts that the death-rate of the whole country is materially affected by this process of lead-poisoning, and that, were it not for this constant and wholesale method of shortening life, civilised men might all live to the age of a hundred years! The main pipes through which water is conveyed are tile; but the plumber, whose occupation gets its name from this poisonous substance (*plumbum*, lead), finds it a soft and easily worked material in which to bring the water from the main pipes to the cistern and taps. In many cases where another kind of pipe has been used for most

of the work, there will still be found a few yards or feet of leaden pipe which has been introduced for some finishing connection. The remedy for all this would be to get a law passed forbidding the use of leaden pipes. Blocked tin would afford a harmless and satisfactory substitute. Seeing that our authorities have interfered with the old methods of the plumbers and builders as regards sanitation, and made them conform to scientific ideas, this proposal to enforce the discontinuance of lead pipes would be no new departure.—I am, &c., J. R. R.

## CHIPS.

The grammar school at Richmond, in the North Riding, is about to be enlarged, from plans by Messrs. Clark and Moscrop, of Darlington.

The new sewage purification works of the Uxbridge Urban District Council, the effluent from which finally enters the Thames, were formally opened on the 9th inst. by Sir Frederick Dixon Hartland, M.P., in the presence of the Council and their engineer, Mr. C. Nicholson Bailey, of Westminster. The sewage is pumped into precipitation tanks after treatment with ferrozene and then flows on to filter-beds containing a layer of polarite.

Messrs. Siddons and Freeman, of Oundle, have secured the contract for drainage and sewage disposal works at Tring, Herts.

The prize distribution at the Royal College of Art, South Kensington, which was to have taken place to-day, has been postponed.

On Monday night, at the meeting of the members of the Holborn Board of Works, the Rev. E. E. Canney called attention to the condition of Farringdon-road, which, in its present state, is not only dangerous to vehicular, but to pedestrian traffic. So inconvenienced are the large ratepayers of the district by the bad condition to which the road is reduced, that one of them had offered Mr. Canney a sum of £50 to commence the repairs. After a long discussion, it was decided to obtain specifications for the work of repairing the road.

A new police court for the Highgate district, at the corner of Archway and Bishop's-roads, near the railway station, was formally opened on Monday by Mr. W. P. Bodkin, chairman of the bench. The new building has cost about £6,000.

The Duchess of Connaught opened, at Aldershot, on Monday, a new hospital for soldiers' wives and children. There are 53 beds—28 in the maternity block, and 25 in the general block. The building has cost £12,600.

A plain tombstone of polished granite has been erected in the graveyard of Llandaff over Dean Vaughan's tomb.

Mrs. Gunson, wife of Mr. John Gunson, J.P., Oak Bank, Ulpha, has signified her intention to present a new pulpit to Ulpha Church.

The foundation-stone of a monument in memory of the "Battle of the Nations," near Leipsic, is to be laid on October 18, the anniversary of that event. It will be designed by the celebrated sculptor Bruno Schmitz.

In carrying out the programme of her Majesty's Government, additional buildings are required at Lancaster and Bury, in this county, which are to be erected immediately, the contracts for these buildings having already been given to Mr. Samuel Warburton, of Miles Platting.

The vestry of the parish of St. Olave and St. Thomas, Southwark, recently appointed a special committee to consider and report upon the question of the adoption of the Baths and Washhouses Acts for the parishes of St. Olave, St. Thomas, and St. John. The committee reports that the baths and washhouse would have to be erected somewhere near the Tower Bridge, so as to be accessible, and the cost would probably be not less than £12,000. If swimming-baths were added, the cost would be £16,000. The estimated population of St. Olave and St. Thomas is 2,314, and of St. John's 9,301, making a total of 11,615; so that the parish of St. John would undoubtedly supply the greatest number of customers for any baths or washhouses which might be established in the district. Having regard to the small and continually-decreasing population in the parish, and to the existence of the St. Saviour's and Bermondsey Baths close by, the committee have come to the conclusion that if they can come to an arrangement with the vestry of St. John, limiting the liability of St. Olave's and St. Thomas's to a proportion of the cost (section 19 of the Baths and Washhouses Acts, 1864), they recommend the vestry to adopt the Acts (subject to the exclusion of a swimming bath), on condition that this parish shall contribute one-fourth of the cost of erection and management, such proportion not to exceed in any one year a sum equal to a rate of one halfpenny in the pound, which, on the present rateable value, would amount to £274 17s. 3d.

## Intercommunication.

## QUESTIONS.

[11994.]—**Preservation of Stone.**—(1) With what preservative was the outside of the Houses of Parliament washed? (2) How long is it since it was first done? (3) Is it necessary, either for the protection of the stone or to preserve the liquid from wasting, to give more than one coat, and if so, at what intervals? (4) In casting projections and carvings, should the stone be coated all over, or should the top or exposed part only be coated, leaving the underside open, to allow any moisture to drain out?—A. B. C.

## REPLIES.

[11997.]—**Elizabethan Lantern Slides.**—You can make these yourself, with a little trouble, from book illustrations, or you will no doubt be able to borrow them from one of the several slide-makers who lend them out on hire.—LOUIS ERWOLD.

[11998.]—**Old Timber Construction.**—I have sometimes seen the pins in half-timber work standing out so far as to make it impossible that shrinkage of the timber can account for it, especially as we generally understand that the timber was better seasoned than a lot that is used in our buildings to-day.—L. E.

[11999.]—**Wooden Villas.**—"X. Y. Z." wants rather too much information to be supplied in this column. I would suggest he reads some of the works on this subject that are kept in architectural libraries. I believe he will find that the Americans have most experience in this kind of work, which has its disadvantages when used in this country. Why not give sound bricks or honest stone the place that properly belongs to them where such an uncertain climate has to be dealt with?—L. E.

[11999.]—**Wooden Villas.**—I have been in Canada for several years, a much colder climate than this, and I have built wooden houses there, and very artistic they can be made. They are considered warmer than stone or brick. I see no reason why they should not do here. There is a book published in New York on this class of house, but I am sorry to say that I have not the address. If you write to Mr. Drysdale, bookseller, St. James-street, Montreal, Canada, he will send you one. I do not know what the law in regard to building wooden houses in England may be; but I know that in Scotland you are not allowed to build a wooden house, unless you cover it with galvanised iron—the ugliest covering you can possibly have. You should make inquiry as to this before you go further.—J. R. RHIND, 23, High-street, Inverness.

[11999.]—**Wooden Buildings.**—I have had some experience in the construction of frame buildings in the United States and Canada. If well constructed, they are thoroughly weatherproof and comfortable in this climate, the most serious objection to them being their inflammability. If "X. Y. Z." will communicate with me, I can give him full particulars of same.—J. W. B. HARDING, Architect and Surveyor, 62, Dale-street, Liverpool.

[11999.]—**Church Roof.**—The scantlings may be as follows:—Principal rafters, 8in. by 5in.; hammer beams, 7in. by 5in.; collars, 8in. by 5in.; wall posts, 4in. by 5in.; curved ribs, 4in. thick. These sizes will be found to give a large margin of strength.—L. E.

[11991.]—**Fireproof Floors.**—The various systems of fireproof flooring are illustrated and described in Rivington's "Notes," Vol. II., and the prices are quoted in Laxton's Price-Book; but I think it would be to your benefit to get particulars from the various firms, who would be pleased to quote you.—LOUIS ERWOLD.

In our description last week of Emmanuel Church, Exeter, it should have been stated that the contractor for the whole of the work was Mr. N. Pratt, of Clyst St. Mary, not Great St. Mary's, and the name of the clerk of works should be given as Mr. Glanfield, of Exeter, not Mr. Granfield.

Sir John Mowbray, Bart., M.P., Father of the House of Commons, of Onslow Gardens and Warrens Wood, Mortimer, visited the studios of Messrs. Harry Hems and Sons, at Exeter, on Tuesday. Amongst other commissions in hand, there is what will probably be the largest crucifix in the world. It is destined for St. Alban's Abbey, and is the votive offering of Lord Aldenham of Aldenham. Sir John is the son of the late Mr. Cornish, who was Exeter Cathedral surveyor. He acquired the name of Mowbray many years ago under a will.

On Monday afternoon Sir Henry Irving laid the commemoration stone of the Princess of Wales's Theatre, Kennington Park-road. It is being built by Mr. Robert Arthur, the well-known provincial theatrical manager, from designs by Mr. U. R. G. Sprague, and is expected to be one of the largest and most comfortable structures of its kind. The whole of the main frontage will be in white Portland stone. The theatre is to be opened about the end of November. In laying the stone Sir Henry Irving skilfully used the silver trowel. He carefully levelled the mortar, and then struck the stone with the mallet. But, after the usual formula, "I declare this stone to be well and truly laid," he paused, with mallet again raised, and to the architect said, quaintly, "But is that so?" Apparently the workmanship was not all that it should have been, for the stone was retouched, the mallet set again, and again. "Is that well done now?" asked Sir Henry, and he and those near him laughed heartily when the architect and the contractor signified their approval.



## LEGAL INTELLIGENCE.

**ANCIENT LIGHTS CASE AT BIDEFORD.**—Judge Beresford and a jury at Bideford last week heard a claim for £50 by William Lee, surgeon, London, and Richard Smith, Manchester (trustees under the will of the late James Lee, Bideford), against Mary Ann Down, Bideford, for loss of light to the house, No. 1, Mill-street, by the addition of two stories to the Kingsley Hotel and adjoining premises in High-street, Bideford. Defendant counter-claimed £50 for interference with a wall by the construction of a flue. Mr. A. F. Seldon, for plaintiffs, stated that a protest was written in April before the work had proceeded very far, and an offer to accept £35 was subsequently made. He asked the jury not to take this into consideration in assessing the damages, as plaintiffs had been anxious to settle matters without going to law. As regards the counter-claim, the action upon which it was based took place in the lifetime of Mr. Down, who was satisfied with what had been done. Messrs. C. A'Court (tenant), J. Cook (builder), Stephens (a former tenant), and Arnold Thorne and Malam Wilson, architects, gave evidence as to a material loss of light. Mr. Clutson (Partridge and Cockram, Tiverton), for defendant, laid stress upon the fact that plaintiffs had not applied for an injunction. It was simply money that they wanted. Dealing with the counter-claim, he said a flue was inserted in the wall of the Kingsley, and there was now a constant danger. George Radford, tenant of the Kingsley, stated that the flue, about 18 months ago, set the skirting of his dining-room on fire. His Honour: But the flue has been there 16 years. Witness: The bricks, I understand, are now more susceptible to heat. By Mr. Seldon: The insurance was paid. C. Ware, architect, Exeter, gave it as his belief that there had never been any but reflected light. As an insurance surveyor, he should not recommend an office to take the Kingsley unless the wall in which the flue was fixed was strengthened. R. T. Hookway, architect, was certain that there had been no substantial interference with the light. William G. Champion, borough surveyor, Southmolton, deposed to putting in the flue, which in no way encroached upon the wall. Mr. Down watched the work, and did not object. The judge said he had never heard a more absurd counter-claim, and declined to send it to the jury. Verdict for the plaintiffs, £25.

**SALISBURY V. EMDEN.**—In the Westminster County Court last week, the case of "Salisbury v. Emden" was before his Honour Judge Lumley Smith, Q.C., and was a somewhat complicated action in which Lord Salisbury was the plaintiff, Mr. Walter Emden, L.C.C., the defendant, and Mr. Mercer Simpson, of Warwick, was brought in as third party. Mr. Harper, counsel for the plaintiff, said the action was brought to recover £12 18s. 8d., being four years' redeemed land tax payments in respect of the Duke of York's Theatre, St. Martin's-lane. The solicitors to the third party intimated that in case it should be held that he was liable to Mr. Emden for the amount he should ask for the authority of the Court to recover from fourth parties. Mr. Harper said that Lord Salisbury was the ground landlord of the site upon which the theatre was built. Some years ago the land tax was redeemed and was invested in Mrs. Sarah Smith, of Worthing, and Lord Salisbury was responsible to her for the annual payments. A lease of the property was granted by his lordship to Mr. Kirk and Mr. Walter Emden. Lord Salisbury had already paid the amount now sued for to Mrs. Smith, and he sought to be repaid by Mr. Emden. Of the latter's liability there could be no doubt, because Lord Salisbury on a previous occasion brought an action against Mr. Emden for the recovery of money paid in precisely the same circumstances, and then the money was paid into court. What Mr. Emden now contended was that if the Court adjudged him to pay he should be able to recover from Mr. Mercer Simpson, the sub-lessee. Mr. Simpson's solicitor: And we say that if we have to pay Mr. Emden we are entitled to recover from Mr. and Mrs. Wyatt, to whom we have granted a lease of the property, and they have entered into an agreement to pay all "rates, taxes, and charges." Mr. Harper: That is not an indemnity. The question of title was next gone into, and it seemed from the evidence of a solicitor from Worthing that the land upon which this tax was a charge was originally covered by a house and garden. If Mrs. Smith sought to recover from the occupier of the theatre, and the occupier refused to pay, they could only distraint upon property covering that part of the theatre built on the site originally occupied by the house and garden, and it would not be an easy thing to locate the spot. For Mr. Emden it was urged that it would not be fair to make him pay when he had disposed of the property. No doubt he could recover from the person to whom he had granted a lease, but must first have proof of Lord Salisbury's title. To make himself safe he must have legal proof. His Honour said it was all very complicated, but the title had been proved and there must be judgment for Lord Salisbury against Mr. Emden with costs, and judgment for Mr. Emden against Mr. Mercer Simpson with such extra costs

as had been incurred. Mr. Simpson would be able to recover the amount of the charge from the Wyatts, but not costs, because they had not been made parties to the suit.

**GAS FITTER AND ARCHITECT.**—**STOTT V. PERCIVAL.**—(Tried last Friday at the Manchester Summer Assizes before Mr. Justice Ridley, without a jury). The plaintiff in this action, Mr. J. Stott, gas-fitting manufacturer, Manchester and Oldham, trading as James Stott and Co., sought to recover from Mr. H. Percival, architect, London, the sum of £99 3s. for goods supplied and work done. Mr. Sutton appeared for the plaintiff, and Mr. Crawford for the defendant. The plaintiff's case was that he received an order for the supply of certain gas-fittings to the Tivoli Theatre of Varieties, Manchester. He entered into a contract to do the work for £105, and the defendant signed the contract without indicating that he did so as agent for the company or otherwise than as principal in the transaction. The plaintiff, in evidence, said he asked the defendant for a certificate for the work done because it was the custom to do so. His firm naturally looked to the theatre company, but they repudiated the claim, and they then looked to the architect. In answer to the Judge, Mr. Crawford said his case was that the plaintiff had been informed that the defendant was only the architect, and was incurring no personal liability. The Judge said the defendant should take care how he wrote his letters. As he understood it, according to all the rules, he was answerable on the contract, and his writing to the theatre company did not deprive the plaintiff of his right to recover from the defendant. In evidence, the defendant said the plaintiff's representative was informed, when the goods were ordered, that the invoice must be made out to the theatre company. He did not say or do anything to indicate that he was rendering himself personally liable. Mr. Riddick, the builder of the theatre, said that if the plaintiff had applied to him for payment he should have done his best, by bill or otherwise, to meet it. He had an action pending against the company for work done, and the amount in dispute was included in his claim. Mr. Crawford said the evidence abundantly established the position that before the order for the goods was given the plaintiff knew that the defendant Percival was merely the architect, and Mr. Riddick the builder or contractor. That being so, and an order being given under those circumstances by the architect, it clearly could not have been understood by the plaintiff that the architect was holding himself out as being personally liable. In corroboration of that proposition; they found that when the work was done the account was made out, not to the defendant personally, but to the theatre company, and in the letter inclosing it there was a request for a certificate. Learned counsel argued that it was inconceivable that a person would send in an account made out to the company and at the same time ask the architect for a certificate, if he did not know that at the time or before the contract was made it was understood that the person giving the order was merely the architect, and not himself liable. After argument, judgment was given for the plaintiff, with costs.

**IN RE THOMAS GLOSSOP.**—This was an application for discharge of Thomas Glossop, Alfred-street, Sparkbrook, Birmingham, builder and contractor. Mr. Stubbins appeared for the bankrupt. Mr. Sharp (Official Receiver) reported that the receiving order was made in July, 1895. The liabilities were put down at £865, and the assets had realised £122. A first and final dividend of 1s. was expected to be paid. Bankrupt was a journeyman carpenter, who in 1891 started in business at Newtown-row as a builder. He had no capital, but borrowed £250 from his mother, of which £195 is still owing. Bankrupt became a speculative builder, and lost his creditors' money. He had omitted to keep proper books, and had traded with a knowledge of insolvency. The Birmingham County Court judge granted the discharge, subject to the judgment being entered up for £150.

**NOT BONUS BUT WAGES.**—Messrs. Martin, Wells, and Co., of Aldershot, were sued at the county-court last week by a man named Field for £1 10s. 6d. for wages. Mr. Jackson was for the plaintiff and Mr. Merry for the defendants. Mr. Jackson having pointed out that this was a claim for wages, his Honour asked what the defence was. Mr. Merry replied that this man was a moulder or brickmaker, and was paid at the rate of 7s. per 1,000. An agreement was entered into by which the firm retained 41. per 1,000 until the end of the season. If the men remained during the whole of the season that amount was paid to them. In this case an extra amount of 3d. per 1,000 was agreed to be paid, this money also being retained until the settling up. This claim, he understood, was for the amounts so retained. He contended that they were not liable to pay this money as the plaintiff left after only six weeks' work. Mr. Jackson pointed out that the money retained was in the nature of a fine; the firm were retaining wages on money earned. Proceeding, he quoted the Truck Act of 1896 as bearing on the matter. This led Mr. Merry to remark: "It is not in the nature of a fine; it is a bonus." "I cannot take it

as a bonus," said the judge; "there is nothing about bonus in the agreement." Mr. Merry replied that this was a very important point to this firm, and he had not had the opportunity of looking the matter up. He would ask for an adjournment. The judge replied that he did not see the necessity of an adjournment. He must give judgment for the plaintiff. Mr. Merry asked for leave to appeal. "Certainly not," said the judge. "There is nothing at all about a bonus." Mr. Merry: "This custom has been in force for 30 or 40 years. It is in the nature of a bonus." "Oh, no, it is a payment withheld," replied the judge; "the word bonus is not withheld."

**THE NOTTINGHAM BUILDING CASE.**—The hearing of this case was resumed this week. The plaintiff was Charles Richard Clark, contractor, Stoke-on-Trent, and the defendant was John Hart, advertising agent, London. The action was to recover £269 15s., balance of account for the erection of the building used for the purpose of holding an exhibition of ecclesiastical art at the recent Church Congress at Nottingham. Defendant paid £210 into court, and he counter-claimed £15 in respect of distemper on the roof of the building which plaintiff had undertaken to do, but had not done; £65 for half-profits of the letting of the building for the holding of a cycle exhibition; and £6 13s. 9d. the value of some drapery which defendant had sold to the plaintiff. Mr. Vachell was for the plaintiff, and Mr. Plumtre and Mr. H. Staveley Hill were for the defendant. Mr. Vachell, addressing the judge, who heard the case without a jury, said the contention of the plaintiff was that the contract between him and the defendant came to an end on October 5, which was the time named in the contract at which plaintiff should have possession of the building for the purpose of taking it down, and it was pointed out that the permission for the continuance of the building for the purposes of the cycle exhibition was given by the corporation to the plaintiff, whom they recognised as being responsible for the building. Plaintiff asserted that if defendant was entitled to anything, it was half of the net profits, and not half of the gross rent received from the promoters of the cycle show. Plaintiff received £170 for the building, £40 of which was paid to the corporation as ground rent, and £10 was given to Mr. Richards, the secretary of the cycle exhibition. The restoration of the building necessitated an expenditure of £50, and the requirements of the corporation with respect to the strengthening of the floor £11 8s. 9d. Plaintiff paid £2 5s. for insurance, £2 to the firemen, and he spent £6 in railway journeys to Nottingham, making a total, including the ground rent, of £101 13s. 9d., so that plaintiff's net profit was £60. Plaintiff denied that he agreed to do the distempereing work; and, as to the damask, all he did was to ask for the use of it in order to give the building a better appearance. His lordship disallowed the sums claimed by the plaintiff, and allowed those claimed by the defendant, with the exception of the sum charged for the drapery. Judgment was entered for the plaintiff for £254 15s., including the sum paid into court and costs; and for the defendant on the counterclaim for £65 and costs, the £210 paid into court by the defendant to remain in court until defendant's balance of £20 5s. and costs were satisfied.

**FAILURE OF AN IPSWICH BUILDER.**—The first meeting of the creditors of William James Smith, builder, Red House Villas, Woodbridge-road, Ipswich, was held at the Official Receiver's office on Friday. Debtor's liabilities were returned as £714 3s. 4d., and his assets as £35, leaving a deficiency of £679 3s. 4d. He commenced business about eight years ago, without capital, being originally a journeyman carpenter and joiner. Two or three years ago he entered into several contracts to build twenty or thirty small houses. When he had taken the last amount that was due to him under these contracts in May, 1897, he was left with practically no assets, and all the present liabilities. He attributed his insolvency to making a "little" miscalculation over the cost of some houses he contracted to build, and also to the fact his workmen struck for additional wages whilst he had several contracts in hand; and at the same time he was unwell himself, and unable to give to the contracts the personal attention they needed. All accounts had been kept in penny memorandum books, and it was impossible from these sources to do more than conjecture how the deficiency had arisen. The Official Receiver remained trustee. Debtor subsequently appeared for his public examination at the Ipswich Bankruptcy Court. Examined by the Official Receiver, he denied having employed men during the last 18 months: he had been employed as journeyman, and said his wages were about 38s. per week. He lent his employer some scaffold-poles, and though he admitted this was not customary, he justified his action by the explanation that he did so because he had no other use for them. He hired a stable last March, but the pony and cart he had been using were the property of his brother-in-law, and were lent to him. His wife had another cart, which she purchased with her own money, but he used the pony



lent to him. The pony and cart had been returned to his brother-in-law. He admitted he had had no experience to enable him to properly estimate for the contracts he undertook, that his calculations would not fill one side of a foolscap sheet, and that no quantities were taken out; but urged that he was "hardened" on to do the work. As a matter of fact he took contracts for which he could not make estimates. He had lived as a working man; the rent of the house he occupied was £10, and his furniture was only worth £10. Mr. Donald C. Warnes (Messrs. Lawton, Warnes, and Sons) appeared for Messrs. F. A. Christie and Son, the largest creditors, and subjected debtor to a lengthy cross-examination. He asserted that his daughter carried on business of a dressmaker, and remunerated his wife for her assistance. Pressed with regard to his wife's cart, he said it was of no use to him for business purposes, and was merely used occasionally by his wife or daughter, mostly on a Sunday. He spoke of his hopes to recover himself as a justification for increasing his liabilities, and said the money he had received was paid away to his creditors.—Examination adjourned.

**PLYMOUTH BUILDERS IN THE COURT OF APPEAL.**—The case of "Pethick Brothers v. Dorset County Council" came before the Court of Appeal, on Tuesday, on the appeal of the County Council from the decision of a Divisional Court of Q.B. on Jan. 14 last. Mr. J. Walton, Q.C., who appeared with Mr. Clavill Salter in support of the appeal, said the matter was in the form of a special case stated by the justices of Dorset, the question being whether Messrs. Pethick Bros. (builders and contractors, of Plymouth), the respondents, were liable for expenses occasioned by certain extraordinary traffic. Messrs. Pethick Bros. were contractors for extensive additions at Charrminster Pauper Lunatic Asylum. The contract price, without extras, was about £52,000. Pethick Bros. made a contract with a Mr. Trenchard to convey the materials from the railway station to the asylum, and the extraordinary traffic over the roads arose from the carriage by Mr. Trenchard of the materials between those places. Lord Justice Smith: Was there any defined way laid down by the contract? Mr. Walton replied that there was not. The learned counsel said that the justices held that Messrs. Pethick Bros. were liable, but the Divisional Court held that they were not. The Court adjourned.

**ACTION FOR SLANDER BY A SURVEYOR.**—At the Lincolnshire Assizes, Mr. Justice Lawrence heard an action for slander brought by the plaintiff, Mr. Jesse Clare, an architect and surveyor at Sleaford, against Mr. B. W. Willson, of Raucemy. Mr. Buzard, Q.C., and Mr. Bonsey were for the plaintiff, and Mr. H. Y. Stanger, Q.C., and Mr. Walker were for the defendant. In opening the case, Mr. Buzard stated that the action was for a slander affecting the plaintiff in the way of his professional business. Plaintiff was an architect and surveyor at Sleaford, holding several public appointments there, and in a good way of business as an architect. He had been for upwards of 25 years surveyor and inspector for the Sleaford Rural Sanitary Authority prior to the Local Government Act. Since that Act was passed he had been surveyor under the rural district council, which was now the highway authority of the district. The defendant, Mr. Willson, managed the property of his brother, Colonel Mildmay Willson, who was a very large landowner at Raucemy. In 1896 the question arose as to the state of the sewers of the village of Raucemy, and Mr. Sharman, the surveyor of highways in that district, reported to the Sleaford Rural District Council that the sewers were in a very bad state, that they were a nuisance to the village, and that they ought to be looked to. On receiving Mr. Sharman's report, the plaintiff was directed by the rural district council of Sleaford, his employers, to go to Raucemy to make a report as to the state of the sewers. He did make a report, to the effect that the sewers were unquestionably in a very defective state. The estimate of the cost was something like £185. The rural council then directed plaintiff, Mr. Clare, to prepare quantities and to get out the advertisement for tenders for doing the work. The result was that the tender of Mr. Rose, the lowest sent in, was accepted at £145. The work was at once proceeded with. The defendant was extremely hostile to the work being done, and as chairman of the parish council of Raucemy he had tried to induce the parish council not to have the work carried out. On June 12, 1897, the plaintiff went over to Raucemy to inspect the works. The contractor was there and the contractor's workmen were all round, and he went into the drainage for the purpose of testing the pipes. While he was there defendant came up and began to talk to Mr. Rose, to a Dr. Gibbs, of Sleaford, and to the plaintiff, and defendant then made use of the words complained of in that action. In addition to him, Mr. Rose the contractor, and some eight or ten of his workmen heard the conversation, and in the presence of them all the defendant said, "It is a great waste of money, and does not require to be done." Defendant

added that the plaintiff knew nothing about the work, and that it was evident he was making a good job for himself. Plaintiff remonstrated, and added that he had nothing to do with it, and that he had simply to make a report in the course of his duty to the Sleaford Council. It was they who ordered the work, and not he. He (plaintiff) got no benefit out of it. Thereupon Mr. Willson, the defendant, said, "I am not so sure you are getting no extra pay. I believe you are making a job for yourself." On June 15 plaintiff asked defendant to withdraw his imputations. Defendant took no notice of the letter whatever. On August 25, however, defendant wrote stating that he failed to see that he had libelled the plaintiff, as he still considered the sewer was not needed, and that was the opinion of the parish council. The plaintiff, Mr. Clare, Dr. Giles, and others were called, and gave evidence in support of counsel's statement. For the defence, defendant stated when Mr. Clare, the plaintiff, came up he (defendant) said "Are you joining the drains from different houses?" and plaintiff replied that they were only connecting with sanitary pipes. Defendant said "Are you not connecting with the grates off the roads?" and he said that was the road surveyor's business to do. Dr. Giles came, and the defendant made some remark to him, and said he wished they would keep plaintiff employed at Sleaford, and the doctor replied that they would not have been put to the expense of a new drainage unless it had been necessary. The plaintiff was in a drain at the back of him, and said, "I get nothing out of it." He (defendant) replied, "I am not so certain about that," and that was all that took place. Cross-examined: He (defendant) still considered that the work was unnecessary, and that it had been a waste of money. Pressed by counsel, he said it was not his opinion that plaintiff wanted to make money for himself. He admitted that he believed at the time that the plaintiff was making a job for himself. He never said plaintiff was incompetent. After a considerable absence, the jury returned and found for the plaintiff, damages one farthing.—Judgment accordingly.—Mr. Stanger pointed out that the farthing damages meant that the action ought not to have been brought, and he asked his lordship to deprive plaintiff of the costs.—His lordship said that the matter had better be left.

**PAINTERS' WAGES.**—Messrs. Kirk and Randall, the contractors for the Tooting Fever Hospital, were, on Tuesday, summoned by a painter named Samuel Ward, who claimed the balance of wages due to him. Mr. W. W. Young defended. The complainant was employed as a painter, and paid at the rate of 7½d. an hour; but he claimed 8d., which he said was the usual rate on all Government jobs. He added that no sum was mentioned when he was engaged, as it was not necessary. Mr. Young (addressing the complainant): Are you not aware that painters are paid according to their ability? Witness: No. Mr. Young: Well, I have a trade representative to prove that that is the custom. Witness: And I have John Burns. Mr. Young explained to the magistrate that in the painting trade a man was rated according to his abilities. The complainant was not considered to be a first-class man, and he was rated by the foreman as being worth 7½d. an hour. Mr. Francis: Does a man work from Monday to Saturday without knowing what he is going to be paid? Mr. Young: That is so, I understand. The complainant: A labourer's money is 7d. Two witnesses having been called to prove the contention that painters were paid according to their abilities, Mr. Francis decided in favour of the defendants, and dismissed the summons.

**RE JOHN CARSTER, SMETHWICK, BUILDER.**—On Monday, at West Bromwich County-court, before Mr. Registrar Watson, John Carster, of Lightwoods-road, Smethwick, carrying on business as a builder, came up for his public examination. The statement of affairs showed gross liabilities £3,372 16s., the amount owing to unsecured creditors being £382 16s. After taking into account a surplus of £410 from securities in the hands of creditors fully secured, there remained a surplus of £78 4s. The debtor stated that in 1897 he became the lessee of land at Milecote-road, and commenced to build 16 houses with funds advanced upon a progressive mortgage. £2,950 had been paid on account, and the bankrupt estimated the cost of completion at £50. Creditors commenced to press him in February last, and as the pressure continued he was advised to file his petition. He attributed his insolvency to not being able to dispose of his property. He estimated there was a real surplus of £800 in the whole of the properties. The examination was concluded.

**ACTION AGAINST A CONTRACTOR.**—THE SHAP GRANITE, & CO., COMPANY, LIMITED, v. BISHOP.—This was a claim at Liverpool Assizes, on Tuesday, before Mr. Justice Bruce, for goods sold, plaintiffs being represented by Mr. Pickford, Q.C., and Mr. Tobin. The defendant, Thomas Bishop, contractor, Barmouth, was represented by Dr. Thomas. It was mentioned that Thomas Blackburn, engineer, had originally been a defendant along with Bishop,

but that judgment had been signed against him, and he had gone to South Africa. The only question remaining was whether Bishop had to pay for goods which were supplied to him for the purpose of enabling him to carry out contractor's work at Barmouth for a Mr. Abraham, the amount of the contract being something like £10,075. The plaintiffs' contention was that the granite kerbings were ordered on Bishop's behalf, sent in consignments, and accompanied by an invoice debiting him with the price of the goods. No objection was taken until a summons was taken out under summary procedure, when defendant said he was not to pay for the goods, but that Mr. Blackburn had received the money for the purpose, and ought to have handed it over. Bishop, counsel said, might have been badly treated by Blackburn, but that had nothing to do with the liability of defendant. For the defence, Dr. Thomas contended, and called evidence to show, that Mr. Blackburn had no authority to order the goods from the plaintiff company in the name of Mr. Bishop. Mr. Blackburn, it was agreed, was to make himself liable for them. Mr. Abraham paid Mr. Blackburn for them. In reply to his lordship, defendant said he could not have performed his contract without the material in question from the Shap Company, and he had used the goods. After lengthy consideration in private the foreman announced that the jury were unable to agree. In discharging them, the judge remarked that the case would have to be re-tried.

**A PWLLHELI CONTRACTOR'S FAILURE.**—At the Portmadoc Bankruptcy Court on Tuesday, before Mr. Registrar Jones, the adjourned public examination was held of John Hunter, of Pwllheli, contractor. The bankrupt, who was examined by the Official Receiver (Mr. L. L. Hugh Jones) with regard to the building of several houses in Sand-street, Pwllheli, which he alleged belonged to his wife, stated that the land was purchased in 1894 for £160, which his wife provided partly out of money which she had by her, and partly from the proceeds of a mortgage. The conveyance was made out in her name. Four of the houses had been sold, the bulk of the purchase money passing through his bankruptcy account, cheques being drawn upon this account for wages and other payments. There was a mortgage of £500 upon the property, and the houses unsold were worth £760, so that there would be a surplus in them of about £260. He admitted that accounts in excess of this amount were still due to parties who had supplied building materials, &c., for these houses, and he had scheduled them as creditors in his statement of affairs. He considered that if he had not been pressed by one creditor he could have paid 20s. in the £, as he could have disposed of his interest in the brickwork to advantage. The examination was adjourned.

**FRANCIS MORTON AND CO., LTD., IN LIQUIDATION.**—The petition of the Pearson and Knowles Coal and Iron Company, for the winding-up of the above company under the supervision of the Court, was, on Monday, dismissed with costs. At the same court an order was made, in the debenture holders' action, under which the final balance due to the debenture holders will be paid very shortly. When this is done, the liquidator says he will be in a position to pay a dividend to the ordinary creditors.

The Swiss Federal Council has sanctioned the plans for the construction of the Simplon Tunnel, and also approved the estimate of the cost. The Government has now granted the guarantee of the confederation for the Simplon loan negotiated by the cantonal banks. It is expected that the contractors' concession will be granted early next month.

A meeting of the Yardley School Board was held on Friday week at Greet, to consider the question of the adoption of plans for new schools in College-road. The chairman said the board really had a light task, inasmuch as the assessor, Mr. E. R. Robson, had considered the whole of the plans submitted, which he had reduced to three in number. A heated discussion took place on the question whether or not the selection of an architect should be left to the board about to be elected. Eventually the assessor was asked to read his report; but it was found he had left the room, leaving a note stating that he was prepared to submit his report to the board "in committee." Some demur was raised to this, but it was resolved, by 4 votes to 3, to leave the matter over to the new board.

The joint-committee appointed with reference to the offer to take a building lease of the Boatstall-lane site and land adjoining for the purpose of erecting an hotel have drafted an important report, which will be considered at a special meeting of the Bath Council to-day. New plans, under which the roadway will open into the Orange-grove with an imposing sweep, have been prepared. Beneath the new road will be constructed a pavilion of an ornamental character, which will be contiguous to the gardens. The amended scheme requires the demolition of three more houses than the other, but the total cost of acquiring the property and building the road is put at £10,000.



## WATER SUPPLY AND SANITARY MATTERS.

**ASLOCKTON SEWERAGE.**—At a recent meeting of the Bingham Rural District Council, Mr. H. Smith, J.P., presiding, it was decided that Messrs. Sands and Walker, civil engineers, Nottingham, be instructed to prepare a scheme of sewerage and sewage disposal for the district.

**BIRMINGHAM.**—On Wednesday an inquiry was held at the council house by Mr. W. O. E. Meade-King, Local Government Board inspector, into an application made by the corporation to borrow £5,000 for sewerage works. The estimated population of the city last month was 510,343, and the assessable value £2,297,543. The loan was asked to be made to extend over 30 years. With regard to the application made for £25,000 for the erection of baths at Small Heath, the corporation desired to withdraw that. It had been proved to the satisfaction of the baths and parks committee that the estimates wanted amendment, as they were prepared twelve months ago, and prices had since risen. A fresh application would be made to the Board. The loan of £5,000 was required for the laying of a sewer along Court-road and Clevedon-road from Edgbaston-road to Balsall Heath-road. There were sewers existing in the district; but they were inadequate, and their state was deplorable. The cost of the new sewer was estimated at £5,500, and towards this landowners had promised to contribute £500. The inspector intimated that he would visit the neighbourhood of the proposed works, and the inquiry ended.

**POLLUTION OF STREAMS IN CHESHIRE.**—At the Nantwich Rural Council last Saturday Dr. Turner reported upon the bad condition of the River Weaver and other streams caused by pollution. In company with the medical officer of the county (Dr. Vacher) he had inspected the Crewe sewage works. They found that the brook which ran through the public park, and which was dammed up to form an artificial lake in the park, was considerably polluted. The artificial lake formed a settling tank for the material, and when from time to time the dam was opened a large quantity of black deposit was sent down the stream. They also noticed a strong smell of petroleum in the water. The land at Crewe sewage farm was evidently incapable of taking up the amount of sewage delivered to it, and was allowing it to run off the surface in little rivulets. The medical officer further reported that a brook was being polluted by the Madeley (Staffordshire) Coal and Iron Company and the Midland Coal Company. Pollution was also reported in connection with the Barthomley brook. The Council appointed a Rivers Pollution and Sanitary Committee, consisting of thirteen members, to report as to the condition of various streams in the district.

**RYDEDALE.**—On Tuesday the new waterworks, constructed by the joint rural sanitary boards of Kirbymoorside and Helmsley for supplying the Ryedale villages of Stonegrave, Nunnington, East Newton, and Laythorpe, were formally opened. The supply—a very ample and very good one—is by gravitation, the water being piped to a commodious reservoir on "Lousy Hill," near Gilling, and thence distributed through six miles of pipes along the dale. Mr. Bell, of Market Weighton, was engineer of the scheme, which has cost nearly £3,000.

**ST. PANCRAS.**—The St. Pancras Vestry, encouraged by the success of the Islington Vestry, has resolved to sink an artesian well at the baths in King-street, N.W., and is inviting tenders from firms engaged on well-sinking to undertake the work. Mr. W. Nisbet Blair, the vestry's engineer, is preparing the specifications.

The summer meeting of the Institution of Junior Engineers, of which Mr. John A. F. Aspinall (Lancashire and Yorkshire Railway) is president, is to be held at Liverpool from August 8 to 13. The president-elect is Sir William H. White, of the Admiralty.

Alterations are being made to the Public Library, Kingston-on-Thames, and special consideration has been given to the ventilation, which will be carried out on the Boyle system.

The Edinburgh University Court, on Monday, appointed to the new Professorship of Public Health and Sanitary Science at Edinburgh University Dr. Charles Hunter Steward, who for the last ten years acted as Chief Assistant in the Bacteriological Laboratory connected with the Chair and Medical Jurisprudence and Public Health in Edinburgh University.

During recent excavations at the Kingston Baths, Bath, a lead consecration cross, believed to be of the period of the 7th century, was discovered. The cross is worked on a circular plaque about 3in. in diameter, and bears the names of the four Evangelists, together with a Latin inscription, in a perfect state of preservation with the exception of the date.

## PARLIAMENTARY NOTES.

**WOOD PAVEMENT IN THE MALL.**—In reply to Mr. Monk (Gloucester) last week, Mr. Akers-Douglas (Kent, St. Augustine's) said: No decision has yet been arrived at as to laying down wood pavement between Buckingham Gate and Marlborough House. The matter is now under the consideration of the Treasury. Mr. Gibson Bowles (King's Lynn) asked whether, if it were decided to lay down wood pavement, the right hon. gentleman would consider riders on horseback, and would allow a space for them outside the wood pavement. No answer was returned. Why, we do not know. Mr. Bowles' objection is one of the many pertinent and sensible ones to the adoption of wood pavement with its many insanitary disadvantages.

**THE DIRECTOR FOR ART.**—Lord Balcarras, on Tuesday, asked the Vice-President of the Council whether the successor to the retiring Director for Art would be required to give his whole time to the public service. Sir J. Gorst: No change in the duties of the Director for Art has yet been determined on. Lord Balcarras: May I assume that the Director will give his whole time to the public service? Sir J. Gorst: No change is intended. I cannot say what may occur hereafter.

## CHIPS.

Dr. S. W. Wheaton, of the Local Government Board, has held an inquiry at Cardiff into an application of the Cardiff Corporation for sanction to borrow £21,600 for the erection and furnishing of new wards at the borough sanatorium for infectious diseases.

The Penygroes County School, Carnarvonshire, is being warmed and ventilated by means of Shorland's patent Manchester grates, the same being supplied by Messrs. E. H. Shorland and Brother, of Manchester.

A group of public buildings is about to be erected for the urban district council of Crompton and Shaw, near Rochdale. The cost is estimated at £5,300, and Messrs. Wild, Collins, and Wild are the architects.

The Mayor of Southampton will lay shortly the foundation-stone of the common lodging-house, which, together with several blocks of tenements for the working classes, is being erected on the site of a recently cleared insanitary area in Sainell-street in that town. Mr. W. B. G. Bennett, the borough surveyor, has prepared the plans, and the contractors are Messrs. Dyer and Sons, of Southampton.

The town council of Wolverhampton have decided to raise the salary of their water engineer, Mr. Woodward, from £350 to £450 per annum.

The parish church of Fletton, Hunts, is about to be restored and enlarged from plans by Mr. Boyer, of Peterborough.

The new Exeter and Christon Railway is approaching completion, five of the eight lines being ready for the permanent way. It extends from Exeter to a junction with the existing Teign Valley line at Christon, via Alington, Ide, and Longdown. Mr. F. Bluett is the engineer, and Messrs. Dickson are the contractors.

The Newport, Mon., Town Council have decided to increase the salary of Mr. J. Macdonald, engineer at Wentwood Waterworks, from £250 to £300 per annum.

A committee of the Glasgow Corporation Waterworks Department met on Monday for the purpose of receiving a report regarding tenders for the supply of 1,000 tons of piping. It was stated that six tenders had been received—four from local firms and two from firms in Philadelphia. The American offers were the lowest, amounting to £4,282 and £4,965 respectively. The local estimates were £5,461, £5,734, £5,910, and £5,960. In respect, however, that the American firms tendered for 12ft. lengths, instead of 9ft., as specified, it was agreed to re-advertise for fresh offers.

A handsome and commodious three-story building to replace the hotel at Machrihanish, the well-known Kintyre golfing resort, which was destroyed by fire in February last, is about to be erected on the site of the old hotel. Plans by Messrs. Sydney, Mitchell, and Wilson, architects, Edinburgh, have been approved, and schedules are in the hands of tradesmen for estimates. The new hotel will have a frontage to the bay of 176ft.

The collection of paintings bequeathed by the late Mr. Adam Teacher to the Glasgow Corporation has now been temporarily hung in the Peoples' Palace in that city, where it occupies the greater portion of the Art Galleries. The collection is supplemented with a series of water-colour drawings, contributed on loan principally by the National Gallery, London; Dr. W. G. Blackie, Councillor Bileland, Messrs. James Donald, Robert Ramsay, John Tullis, John Wordie, Joseph Henderson, John Carlaw, and A. R. Henderson.

## Our Office Table.

NOTHING seems to be settled yet as to the election of a successor to Mr. T. Armstrong, who is now retiring from the honourable position of Director of Art in connection with the Science and Art Department at South Kensington. It is not by any means an easy matter to select a candidate for such a post, and there can be no doubt that the ability and taste displayed by the present holder of the office has not made the task easier. Among those who are said to prominently attract attention as likely competitors for the position are Professor Hubert Herkomer, R.A., Mr. Alfred Gilbert, R.A., the sculptor, and Mr. Walter Crane, A.R.W.S. There may be other equally eligible candidates; but of these just named the experience obtained by Mr. Walter Crane at Manchester as director of the Art School there, and his capabilities in applied art, undoubtedly indicate special fitness for the position, which, be it noted, requires the exclusive time of the holder of the office. The salary is £1,200 a year, less income-tax.

**WATERLOO BRIDGE** just now is being refitted with lamps. Possibly the new lights, judged merely as such, will be an improvement; but the new standards on which these new lamps are being fixed are as poor and commonplace as they can very well be made. The old ones were entirely in keeping with the bridge. They were artistically designed, at any rate, and were in scale with their surroundings. As lamp standards for the position in which they were placed, they could hardly be improved upon. Their simplicity was their chief merit, and dignity was secured without ostentation. They looked like gas-lamp standards, and held their own from the distance without needless bulk or bigness. The new ones are thin and tasteless, and quite unworthy of their position.

The London water companies seem determined to resist not only the scheme for buying them up by the London County Council, but also the project for deriving part of the future supply of London from Wales. At the sitting of the Water Commission on Monday, counsel for the companies stated that they would propose to increase the present daily supply of 185,000,000 gallons from the Thames to 300,000,000 or even 400,000,000 gallons, from the same source, without diminishing the flow over Teddington Weir below 200,000,000 gallons per day. They would give evidence by chemists and also evidence as to cost, and would show that their scheme was far cheaper than bringing water from Wales. The increased supply from the Thames would involve the construction of immense reservoirs at Staines or elsewhere. If London stands that, it will stand anything!

A GIANT BAROMETER has been mounted at Paris in the tower of St. Jacob's Church. It is 12.65 metres high and 2m. thick. The filling consists of coloured water, which is prevented from evaporating by a layer of oil above. While a mercury column, about 760mm. high, will keep an air column of the same cross-section in balance, a barometer filled with water must be much longer, because mercury is  $13\frac{1}{2}$  times as heavy as water. On the other hand, the fluctuations of the liquid column with such large barometers are  $13\frac{1}{2}$  times as great as with mercury barometers, for which reason they are admirably adapted for scientific observations.

THERE are now to be seen at the South Kensington Museum, in one of the galleries of the South Court, three designs of great interest by the late Sir Edward Burne-Jones, Bart. Two of them were purchased at the sale on July 16. The most important work is the design for the mosaic of the "Tree of Life" in the American Episcopal Church of St. Paul, Rome. This was painted in 1892, and the glass mosaic was produced by Salvati, of Venice, in the following year. In the centre is the outstretched figure of Our Lord before the Tree of Life, Adam stands on the left, and Eve with the infants Cain and Abel on the right. Beneath is the following quotation from the Vulgate version of the Bible: "In mundo pressuram habebitis: sed confidite, ego vici mundum (St. John xvi. 33)." The water-colour drawing of the symbols of the Evangelists, a design for portion of a stained-glass window at Castle Howard, was also acquired at the same sale. The third design is due to the liberality of Mr. C. Fairfax Murray, who



presented to the museum a model showing the scheme of the mosaic decoration in the apse of the same church in Rome. The subject represents the "Heavenly Jerusalem." To the right are the three archangels, Michael, Raphael, and Zophiel, and to the left the archangels Chemuel and Gabriel, the place for Azazel (or Azrael) being vacant. Above is a company of angels, and beneath are the four rivers of Paradise. The model has unfortunately been somewhat damaged in transit from Rome, so that the two figures, probably Zadkiel and Uriel, in the outside arches, are wanting.

The village of Allesley, near Coventry, was, on July 21, the scene of water-finding operations by means of the divining-rod. The operations were conducted upon land belonging to Mr. W. I. Iliffe and Mr. Greswolde Williams, the water-finder being Mr. Joseph Mullins. Accompanied by Mr. and Mrs. Iliffe, Mr. Parker, jun. (representing Colonel Parker, Mr. Williams's agent), and a few friends, the diviner commenced operations. His rod consisted of a V-shaped twig of hawthorn, several of which—and also of hazel—he had cut from the hedges adjoining. This twig he held one fork in each hand, with the point downwards, and explained that as he walked slowly over the ground to be prospected the point would immediately turn upwards whenever he came to any subterranean stream of water. Stagnant water would not affect the stick. His first attempt was in Mr. Iliffe's kitchen garden, and he had not proceeded more than a dozen paces or so before the twig violently jerked its point upwards. Here he made a stand, and stated that at a depth of about 40ft. a spring of water would be tapped, yielding some 800 to 1,000 gallons per day. Those present were invited to try and prevent the twig from moving, but it went up in spite of them. Several different places were prospected during the day, about a score or more springs being located.

Dr. SVEN HEDIN will shortly return to Eastern Turkestan, whence he has already brought home a large collection of antiquities. It is satisfactory to know that, thanks to the encouragement given by the Government of India to this class of work, Great Britain will not be behind other countries in securing a fair share of Central Asian antiquities to be recovered from the sand-buried tracts and towns of the country. These antiquities consist of terracottas, coins, images, and miscellaneous objects of metal, stone, or other material; but the main find is manuscripts. All acquisitions of this character are, under the orders of the Government of India, transmitted to Dr. A. F. R. Hoernle for examination and report; but their final place of deposit is to be the British Museum. Of late a large number of such antiquities has been secured, and more are coming in at Calcutta.

It is confidently stated that the report of the experts appointed by the Home Office to investigate the extent of the evils of lead-poisoning in the potteries, and to suggest remedies, practically confirms the worst which has been said in recent debates about the seriousness of the evils, and suggests drastic remedies. This report is now in the hands of the Home Secretary, and it is feared that it may be treated as a confidential document. Members who have taken up the cause of the pottery workers naturally desire the publication of the report, and every effort will be made to compel the Home Office to make it public without delay.

THE report of the Department of Science and Art, published on Tuesday as a Blue-book, containing close upon 400 pages, gives full particulars of the working of the department last year. The increase of the number of students under instruction is especially dwelt upon, the number being 197,796, as compared with 194,354 in the preceding year, and 112,808 nine years ago. There were 101,526 students examined last year, and 151,212 papers worked, of which number 62,261 were passed, while 43,073 of the students took first classes in the elementary and advanced stages. For the Whitworth Scholarships and examinations there were last year 73 competitors as against 107 in the previous year, but although there was a falling-off in the number of competitors, there was none in the standard of attainments of the successful students.

MESSRS. MILDE and GRENET, of Paris, are introducing a new lightning-conductor. It has short discharging points on all chimneys or elevated parts, connected with each other by ribbons

of copperplate, so as to inclose the building in a sort of cage, as suggested by Faraday. Instead of the platinum points as used in conductors of the older type, a copper cylinder, 2½ ft. long, and inclined 15° from the vertical, is employed. The "earth" is made by a volute of copper sunk in a well. The cost of the new system is said to be about one-third of the ordinary conductor, with thick, stout stems of copper.

At last! A welcome announcement appeared in the half-yearly report of the Metropolitan Railway Company issued last Friday. The directors have agreed with the District Company for an experimental working by electricity of a portion of line in their system between the Kensington High-street and Earl's Court stations. In order to carry out this arrangement an estimated cost of £20,000 is to be borne in equal proportions by the two companies. It may be presumed, we hope, from the sum to be expended, that there is an intention to construct such works as will be adapted for a more extended application of electric power than would suffice for the limited length of line which will serve the initial purpose. The directors state that "the time has now arrived when electrical traction can be introduced with success and advantage." Most people think it "arrived" long ago, and wonder why the directors of the Metropolitan Railway have slept so long, while electrical railway transit has been proved safe and practical by their more go-ahead rivals.

SOME extraordinary suggestions appear to have been made to the committee who are directing the movement for erecting a national memorial to Mr. Gladstone. The recommendations submitted by the executive committee to the meeting at Grosvenor House, that memorials be erected in the capitals of England, Scotland, and Ireland, and also at Hawarden, will probably meet with general approval, as they did that of the meeting. As Sir William Harcourt remarked in expressing his satisfaction with the proposals of the committee, we may hope that the memorials will be greatly in advance, from an artistic point of view, of the "frock-coat" statues which are so unpleasantly familiar. The adoption of the Roman toga would be an anachronism; the top-hat is an abomination, and trousers seldom drape well. The sculptor, therefore, must despair, with his freedom of selection thus limited. Possibly he may drape the statue of the eminent statesman in his academic robes. Already there are whispers that the only man able to give the nation a really fine piece of work is the French sculptor, M. Auguste Rodin. Is there not an Englishman equal to the task?

## The Society of Architects.

Founded 1884. Incorporated 1893.

THE SOCIETY OF ARCHITECTS, St. James's Hall, Piccadilly, W., will hold an EXAMINATION in Architecture and Construction on OCTOBER 5th, 6th, and 7th, in the following subjects:

Section I.—ARCHITECTURE. Subject—*a* Architectural History; Subject—*b* Planning and Design.  
Section II.—BUILDING CONSTRUCTION AND MATERIALS. Subject—*a* Construction; Subject—*b* Materials.  
Section III.—PRACTICE. Subject—*a* Specifications; Subject—*b* Contracts; Subject—*c* Sanitary Science.

All Candidates are requested to give notice to the Secretary, not later than August 9th, when particulars will be supplied with regard to time, place, fees, &c.

To that candidate who shall pass the highest examination the GOLD MEDAL of the Society will be presented, a SILVER MEDAL to the second in merit, and MEDALS of BRONZE for special excellence.

ELLIS MARSLAND, Hon. Sec.  
MONTAGU BALDWIN, M.A., Sec.

The Southampton school board have decided to build at Bittern Park a school capable of accommodating 1,150 children, at a cost of £12 12s. per head, to include a central hall, furniture, fencing, tar paving, and caretaker's house.

From a financial point of view the electric light has been a remarkable success in Edinburgh. It is under the management of the corporation. The light is supplied at an unusually low rate, and despite this there is a profit to the community. During the year ended May 13, 1898, the total output was, for private lighting and power, 2,059,763 units—an increase over the previous year of nearly 90 per cent.—and for public lighting 834,660, making a total of 2,894,423 Board of Trade units. The income from private lighting and power has been £30,024 4s. 2d., and from public lighting £7,993 5s., in all £38,017 9s. 2d. The total expenditure, including interest and sinking fund, has been £30,368 1s. 11d., leaving a net profit of £7,649 7s. 3d. Of this sum £4,000 is to be put to reserve, leaving £3,649 7s. 3d. available as a contribution to the rates.

## LATEST PRICES.

IRON, &c.			
	Per ton.		Per ton.
Rolled-Iron Joists, Belgian.....	£6 0 0	to	£6 10 0
Rolled-Steel Joists, English.....	6 10 0	"	7 0 0
Wrought-Iron Girders (Flat Plates).....	5 15 0	"	6 10 0
Bar Iron, good Stuffs.....	7 0 0	"	8 0 0
Do., Lowmoor, Flat, Round, or Square.....	17 0 0	"	17 5 0
Do., Welsh.....	5 15 0	"	5 17 6
Boiler Plates, Iron.....			
South Staffs.....	7 17 6	"	8 5 0
Best Snedshill.....	10 0 0	"	10 10 0
Angles 10s., Tees 20s. per ton extra.			
Builders' Hoop Iron, for bonding, &c., £6 15s.			
Builders' Hoop Iron, galvanised, £15 10s. 0d. per ton.			
Galvanised Corrugated Sheet Iron—			
No. 13 to 20. No.			
6ft. to 8ft. long, inclusive gauge.....	£10 15 0	to	£11 0 0
Best ditto.....	11 6 0	"	11 10 0
Per ton.			
Cast-Iron Columns.....	£6 0 0	to	£8 10 0
Cast-Iron Stanchions.....	6 0 0	"	8 10 0
Rolled-Iron Fencing Wire.....	7 0 0	"	8 0 0
Rolled-Steel Fencing Wire.....	7 0 0	"	7 10 0
Galvanised.....	10 10 0	"	11 10 0
Cast-Iron Sash Weights.....	4 0 0	"	4 2 6
Cut Clasp Nails, Sin. to 6in.....	9 15 0	"	9 15 0
Cut Floor Brads.....	8 10 0	"	9 10 0
Wire Nails (Points de Paris)—			
0 to 7 8 9 10 11 12 13 14 15 B.W.G.			
8/6 9/0 9/6 10/8 11/0 12/0 13/0 14/9 16/9			per cwt.
Cast-Iron Socket Pipes—			
3in. diameter.....	£5 10 0	"	£5 15 0
4in. to 6in.....	5 5 0	"	5 10 0
7in. to 24in. (all sizes).....	4 15 0	"	5 0 0
[Coated with composition, 2s. 6d. per ton extra; turned and bored joints, 5s. per ton extra.]			
Pig Iron—			
Cold Blast, Lilleshall.....	106s.	to	110s.
Hot Blast, ditto.....	87s. 6d.	to	92s. 6d.
Wrought-Iron Tubes—Discount off Standard Lists f.o.b.			
Gas-Tubes.....	76p.c.	Fittings	77p.c.
Water-Tubes.....	70	"	72
Steam-Tubes.....	82½	"	65
Galvanised Gas-Tubes.....	60	"	62½
Galvanised Water-Tubes.....	55	"	57½
Galvanised Steam-Tubes.....	45	"	47½
10cwt. casks. 5cwt. casks.			
Sheet Zinc, for roofing and work- ing up.....	£22 10 0	to	£23 10 0
Sheet Lead, 8lb. per sq. ft. super.....	15 6 0	"	16 5 0
Pig Lead, in 10lb. pigs.....	14 10 0	"	15 10 0
Lead Shot, in 28lb. bags.....	17 10 0	"	18 10 0
Copper Sheets, sheathing and rods.....	60 10 0	"	61 10 0
Copper, British Cake and Ingot.....	61 15 0	"	62 15 0
Tin, Straits.....	72 12 6	"	73 12 6
Do., English Ingots.....	75 10 0	"	76 10 0
Spelter, Silesian.....	18 0 0	"	19 0 0
TIMBER.			
Teak, Burmah.....per load	£13 0 0	to	£14 5 0
" Bangkok.....	9 5 0	"	14 0 0
Quebec pine, yellow.....	2 18 0	"	4 18 0
" Oak.....	3 15 0	"	5 0 0
" Birch.....	3 0 0	"	4 13 6
" Elm.....	4 3 0	"	5 3 0
" Ash.....	3 18 0	"	5 3 0
Dantisc and Memel Oak.....	2 0 0	"	3 0 0
Fir.....	2 13 0	"	4 3 0
Wainscot, Riga p. log.....	4 18 0	"	5 18 0
Lath, Dantisc, p.f.....	4 10 0	"	5 10 0
St. Petersburg.....	5 0 0	"	6 10 0
Greenheart.....	8 0 0	"	8 10 0
Box.....	4 0 0	"	15 0 0
Sequoia, U.S.A. ....per cube foot	0 1 8	"	0 1 10
Mahogany, Cuba, per super foot			
lin. thick.....	0 0 5	"	0 0 8½
" Honduras.....	0 0 4½	"	0 0 6½
" Mexican.....	0 0 4	"	0 0 5
Cedar, Cuba.....	0 0 3½	"	0 0 4½
" Honduras.....	0 0 3	"	0 0 4
Satinwood.....	0 0 5	"	0 1 0
Walnut, Italian.....	0 0 3	"	0 0 7
Deals, per St. Petersburg Standard, 120—12ft. by 1½in. by 1½in. :—			
Quebec, Pine, 1st.....	£18 15 0	to	£21 15 0
" 2nd.....	13 5 0	"	15 15 0
" 3rd.....	5 15 0	"	9 5 0
Canada Spruce, 1st.....	10 15 0	"	12 5 0
" 2nd and 3rd.....	8 5 0	"	9 5 0
New Brunswick.....	7 5 0	"	8 5 0
Riga.....	7 5 0	"	7 15 0
St. Petersburg.....	9 5 0	"	13 5 0
Swedish.....	9 15 0	"	16 5 0
Finland.....	8 15 0	"	9 5 0
White Sea.....	9 15 0	"	16 5 0
Battens, all sorts.....	5 0 0	"	18 0 0
Flooring Boards, per square of lin. :—			
1st prepared.....	£0 9 6	"	£0 17 9
2nd ditto.....	0 8 0	"	0 13 6
Other qualities.....	0 6 3	"	0 7 0
Staves, per standard M :—			
Quebec pipe.....	—		—
U.S. ditto.....	£35 0 0	"	£42 10 0
Memel, cr. pipe.....	220 0 0	"	230 0 0
Memel, brack.....	190 0 0	"	200 0 0
OILS.			
Linseed.....per ton.	£16 12 6	to	£17 2 6
Rapeseed, English pale.....	22 10 0	"	23 15 0
Do., brown.....	22 0 0	"	22 5 0
Cottonseed, refined.....	15 15 0	"	16 5 0
Olive, Spanish.....	32 10 0	"	33 0 0
Seal, pale.....	20 0 0	"	20 5 0
Cocoonut, Cochin.....	29 0 0	"	29 10 0
Do., Ceylon.....	24 5 0	"	24 10 0
Palm, Lagos.....	23 10 0	"	24 0 0
Oleine.....	18 15 0	"	19 15 0
Lubricating U.S.....per gal.	0 6 3	"	0 7 6
Petroleum, refined.....	0 0 4½	"	0 0 4½
Tar, Stockholm.....per barrel	1 0 0	"	1 5 0
Do., Archangel.....	0 12 6	"	0 15 0
Turpentine, American...per ton	23 15 0	"	24 0 0



# THE BUILDING NEWS AND ENGINEERING JOURNAL.

VOL. LXXV.—No. 2274.

FRIDAY, AUGUST 5, 1898.

## LESSONS FOR LOCAL AUTHORITIES.

RECENT fires and structural defects which have involved disastrous consequences have shown the importance of building by-laws. Had the Sunderland Corporation enforced certain regulations as to building their houses and business premises, the serious fire that occurred the other day might have been restricted to controllable dimensions. The county council of that town have just adopted new by-laws, and one of the clauses provides for making fireproof staircases a *sine qua non* of hotels, public buildings. The clause in question was strongly objected to by a section of the council as being unnecessary, and as one that no other municipality had adopted. Strange to relate, a few days after the discussion and the denunciation of the clause in question, a fire occurred which has demonstrated in a remarkable and unexpected manner the desirability of such a regulation. The fire in question supplies the best evidence that could have been given. The premises destroyed, Havelock House, undivided by cross or party walls, formed a great "risk," as it would be called, only awaiting such a catastrophe. Within half an hour the whole building area was a scene of devastation, girders, columns, and stonework scattered about in dire confusion. The only recent catastrophe we can compare with it was the disastrous fire at Spurgeon's Tabernacle, which, within an hour, was a complete ruin, only its outer walls remaining. These two instances ought to be sufficient to convince the most obstinate believers of ordinary unregulated construction of the danger of large areas inclosed by walls and roof in which any inflammable material is stored. What might have been the consequences if the Sunderland building had not possessed a wall-inclosed staircase, or if the Tabernacle had been filled with people, we may well dread to think. The existence of a structure fulfilling one condition of the London Building Act, and which was opposed by a section of the council as to staircases at Sunderland, prevented a loss of life it would be appalling to imagine. We are told a square tower of brickwork containing the stairs to the dwelling-rooms for the employes on the upper story, enabled the numerous occupants to descend safely. These steps were probably of stone, not concrete, and were soon destroyed; yet the fact of the brick wall inclosure was the sole means of saving the occupants from what otherwise would have been certain destruction. Here we have a valuable illustration of the necessity for inclosing staircases which are constructed in public buildings and in large business premises. The Sunderland Council have been happily relieved from a sad or tragic warning, and from what they might have had cause to consider a dereliction of duty. The warning has not come too soon. There may be other establishments in the town similarly situated. The London Building Act may be usefully taken as a model of provision. Section 68 provides that in every public building and other building of more than 12,500ft. cubical extent, and which is used as a dwelling-house for separate families, the floors of the lobbies, corridors, passages, and landings, and also the flights of stairs, shall be of fire-resisting materials, and carried by supports of a fire-resisting material. This clause refers largely to dwellings for families in flats, large business premises, hotels, and the like. Further on, a new

clause has been added (section 80) which prescribes for churches, chapels, meeting-houses, public halls, lecture and exhibition-rooms, and places of assembly or additions or alterations to them, staircases supported and inclosed by brick walls not less than 9in. thick, and of not less width than 4ft. 6in. wide under ordinary circumstances.

Not only is it necessary to provide staircases inclosed by walls of brick of certain thickness, but the stair material also should be of fire-resisting material, such as concrete strengthened by steel or iron. Stone, especially limestones, quickly crack and calcine. Several excellent materials are in the market suitable for floors and steps and partitions; structural methods and natural materials offer us means of replacing ordinary combustible floors and partitions at a cost very little above their cost. But there is still the *inertia* of custom, habit, or conservative ideas to overcome. Even by-laws will not be enforced till a few disastrous fires or building accidents take place, or until a decimating epidemic sweeps away a large percentage of the inhabitants. How strangely indifferent the ordinary building owner, or town councillor, is to make improvements, which may to a slight extent make a call upon him! Property owners, of course, regard by-laws with natural aversion, and it is not till the Nemesis of fate seeks vengeance on indifference or callousness that they are tolerated. Take the importance of dividing large buildings by cross-walls into cubic capacities that can be safely dealt with. How slow local authorities are in requiring party-walls to be built above the roofs of buildings; yet, probably, this rule has saved more life than anything else. In the Sunderland disaster, the party-walls of a national provincial bank and an hotel are said to have arrested the progress of the fire, and to have prevented it reaching the alarming magnitude it otherwise would. Yet we know this is one of the hardest regulations which a local or district surveyor has to enforce. It costs a little more to build party-walls of sufficient thickness and height above the planes of roofs than simply covering the walls over with slate and tile roofs; walls, indeed, not even built up to the underside of roof, but often left at the level of the ceiling joists of the upper floor, affording a horizontal funnel for the conveyance of fire and smoke to other houses on either side, adding immensely to the spread of fire and to the appalling nature of the devastation.

## NATIONAL ART COMPETITION: THE RESULTS.

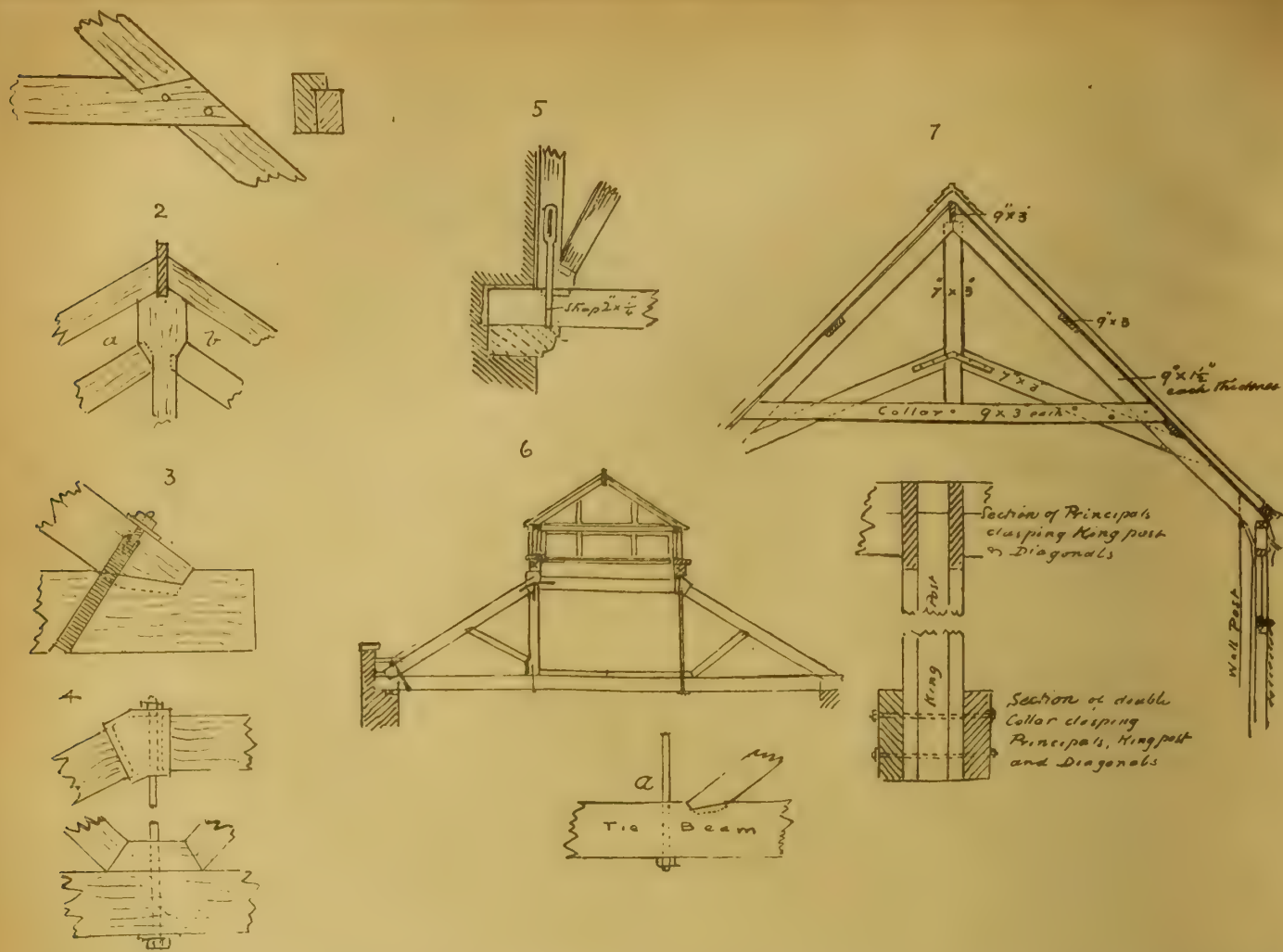
IN our issue for last week we referred to a few of the leading designs which have received medals or have been awarded merit in this national contest. Some of them are devoid of the element of practicality. If we take the designs for municipal buildings, market halls, and country houses, which we described last week, there is a decided improvement manifested. We observe a more rational use of material, more restraint in ornament, and a truer realisation of practical wants; yet we cannot avoid the reflection that mere style, or what passes for it, has a too strong hold on the students. The designs for the municipal buildings savour too much of the school or classroom model, both in respect of elevation and plan, the "cut and dried" arrangement of entrances and offices—just, in short, the kind of plan which a Pecksniffian pupil, with a few copies before him, and no particular requirements as regards site or real business wants, would be likely to turn out. The designs for art school are an instance of designing by book or model rather than from actual wants. Planning

has been hurried in the desire to produce a good elevation or a picturesque effect. The examiners point out, indeed, that the half-timber designs often show an inconsistent use of that feature, a want of reality. And this lack of reality and meaning is met with in some of the more successful work, as whenever certain features are dragged into use to give effect. In one design for a municipal building the student has introduced mullioned windows, but without considering why mullions are used. A great width of window-light is inconsistent with the style, and is quite as absurd as timber studs placed with wide intervals of walling, or a thinly-columned colonnade or portico. Each is an error in its way, and contradicts the very reason of the style. So with other attempts of copying a feature, but in a different sense to that in which it was originally used. We must look, however, at the results, and be thankful for certain improvements.

The "local personal examinations" are useful exercises, and some of the sketches and studies shown on the walls are creditable. We noticed particularly the work done in one subject set to the pupils, a one-story billiard-room, with cloak-room, tea-room, and conservatory attached. A sketch plan of the requirements is given to the competitors, upon which they base their designs. One of the best-worked-out designs "awarded Class I." shows a centre billiard-room top-lighted, with ingle recess, and tea-room, cloak-room, &c., on either side as projecting wings. The centre is accentuated by a high roof and loggia in front, the wings are circular-gabled, and the design is in a French Renaissance manner artistically treated and drawn in colour. The internal modelled plaster decoration in a Louis XVI. style is cleverly put in. Another design in a similar style with lantern roof is exhibited; and a free pencil sketch for an Old English treatment with dormers on roof and a bell-turret picturesquely handled, has merit. Other sketches are shown for a hanging cabinet for wall or corner of room, for a medicine cabinet; an inlaid panel in green and yellow with *repoussé* hinges, showing some skill in adaptation and an artistic sense. The book-binding competition has called out a creditable design, and the wallpaper, in three colours, is effective.

The designs which are classified under that somewhat ubiquitous and not very definite section, "Subject 23c," without doubt comprise a great many skilful works. The modelled designs comprise a few clever productions. These are in white plaster. We quite agree with the report that in many of the figure designs the figures do not show study from the life; but anatomical or grammatical analysis, however useful to the designer, is by no means the best way to encourage invention. The modelled design for finger-bowl and cruets, to be executed in silver, by William Albert Bennett, of Salford, is worthy of the gold medal. There is a true sense of adaptation, the outlines are simple and elegant, and the surface ornament delicate and suitable for chasing in silver. The modelled design for a panel by Henry James Strutt, of Westminster, receives the gold medal for a very refined design for a panel in low relief. There is much charm and delicacy in this work, briefly alluded to by us last week. The figure is gracefully arranged, and the piercings help to set off the design. The colour wash assists the work rather than the contrary. We also admire a design for wall decoration by J. Bancroft, Macclesfield (silver medal), and W. E. Horne's figure design in gesso. In this connection we may mention some designs for silver work by a New Cross student, Lilian F. Baxter, for which a silver medal has been awarded, a silver hot-water jug and rose-water bowl, and a claret-jug in glass and silver mounts, extremely elegant in





outline and simplicity of ornamentation. Another exhibit in metal-work, that of Selina Harding, Deptford (bronze medal), exhibits a judicious adaptation of the material; but practical details are not given, or are unsuitable for use. In the finer and more delicate objects, such as jewelry, the designs entirely lack adaptation. A silver medal is awarded to Mary Croom, New Cross, for a design for a cope and hood in silk damask; and a jewelled morse in pierced and repoussé silver-gilt is of merit.

The wall-papers and stencilled designs admit of some improvement. We have noticed a few of the best works. The gold medal design for wall-filling and frieze by H. Ernest Simpson, of Bradford, based on a wild rose with thorn briars, is characterised by elegance and delicacy of treatment—a conventional adaptation—and the grey ground and tints are delicate. Near it we notice a stencilled panel for fire-screen, in which the peacock is adapted, and a figure-subject of some merit. A good distribution of pattern is shown in No. 58, by G. Phillip Parker, Chelsea, for stencilled wall-filling. The design appears based on a chrysanthemum, the character of which is preserved although adapted to stencilling. The colour is in low shades of yellow and green and brown. The design takes a silver medal. No. 77, by Harry Tattersall, is also marked by boldness. Several bronze medal designs are exhibited. William Morse, Chelsea (247), has a stencilled wall-filling and frieze. The pattern is well distributed, and the use of vertical lines of stems is a feature, the tints being delicate tones of green and red or pink. The frieze is delicately treated. No. 321, by Charles C. Lowther, Hull, a stencilled hanging, is quiet in the scheme of colour. John Oswald Johnson, Newcastle, has a bold

stencil design, on which birds and foliage are the elements. No. 446 is more pleasing as a design than as a colour scheme. The flowers, a bold kind of convolvulus in orange hue, are overpowering.

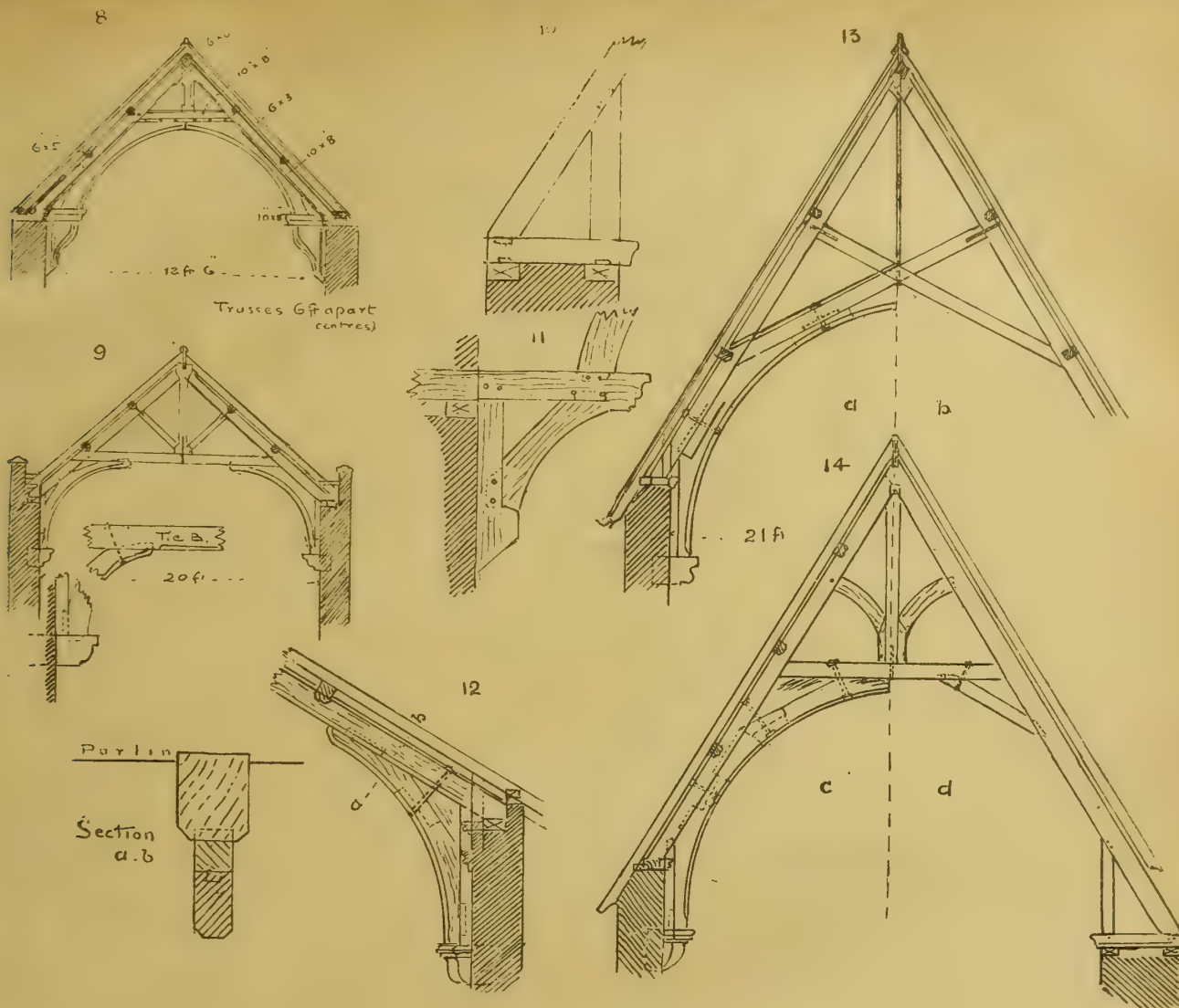
No. 246—a stencilled diaper by Frederick A. Brown, Chelsea—is a design marked by some merit, introducing birds and foliage in green and yellow on a white ground. There is some freshness and originality in 134—a stencilled hanging by Esther E. Tatlow (silver medal)—a winding river and trees. Jessie Monk's design is clever, and the colour pleasing; but only a book prize is given. There are certain conditions imposed by stencil-cutting which seem to be overlooked by some of these designs; but the works as a whole show improvement. Some nice colouring is shown in Beatrice Waldron's silver-medal design for a wall-paper and frieze, "Evening." The rising moon and clouds, suggested in the frieze in grey and blue tints, is a pleasing idea. No. 45, and also Nos. 160 and 310, are clever.

In the modelling design section we omitted to mention Gertrude Smith's design for a fireplace panel, which obtains a book prize. The figure of a reposing child, a metal electrotype, is well conceived, and the lines of the composition artistic. A great many of the works which receive book prizes and honorary awards are meritorious. In this place we may refer to a book-cover of patch-work appliqué, simple in arrangement, and very effective (149), awarded a silver medal, and for a china dish (179) with fish and shell border. Before concluding our view of this section, we may refer to the success which has attended certain schools. This year New Cross has distinguished itself for the number of awards it has secured—a success which compares favourably with the larger centres of industry like Glasgow, Birmingham, Bradford, Leicester, Nottingham, Leeds, and

other large towns. We can only refer very briefly to other important sections of the exhibition, such as modelling from the antique and from foliage, from the human figure from life, and the drawings from the living model. While the drawing from the full-length figure is not a great success, the drawing of hands and feet has been very good, and the examiners say it is the best show of work seen for some years. Leicester is conspicuous as an example of encouraging students to study these details. Margaret Joan Reynolds, of that town, wins the gold medal for chalk drawings of hands and feet from life in various positions. These studies are very masterly and delicate drawings from the life. In other departments, as in the full-length figure, too much attention has been bestowed on the shading and mechanical details than upon correct drawing and proportion or action. The studies of drapery are also useful. Lastly, painting from the living model, from the cast, from flowers, and still life is meritorious, and we can only name a group in oil-colours by Rossetta Harty, Dublin (silver medal), another group by Ada E. Simpson, Otley, and Nos. 170, 501, and 1193. As a whole, the exhibition is satisfactory. We see fewer instances of mistaking drawing for design, finish for correctness, and, on the whole, a sounder knowledge of principles. As indicating the results of years of teaching, the exhibition is useful at least, as showing how the raw material of art may be turned to account. At the same time the results indicate certain errors to be avoided.

The new workhouse hospital, Birkenhead, is being warmed and ventilated by means of Shorland's patent Manchester stoves, with descending smoke flues and patent Manchester grates, the same being supplied by Messrs. E. H. Shorland and Brother, of Manchester.





# MODEL SPECIFICATIONS.—XXIV.

## FRAMED ROOFS FOR HALLS AND CHURCHES.

**R**OOF-TRUSSING is an important branch of carpentry; though there have been few treatises that have described, and none that have thoroughly treated, the open-framed timber roofs. We now illustrate a few ordinary types. The specification of timber roofs also has been neglected, and the contractor or carpenter has been relied upon to carry out the architect's not very often intelligible drawings. How it is to be framed and the joints made; how the curved braces or ribs are to be executed, and what ironwork is necessary, are points which occur over and over again. A roof with a tie is comparatively a simple matter; all books on carpentry give examples of king-post, queen-post, and other forms of truss; but when a roof has to be constructed over a church, a hall, or a swimming-bath, models are not always within reach. Roofs have been divided into (1) those with tie-beams, as most of those over French cathedrals and churches; (2) roofs with trussed rafters or single-framed roofs; (3) roofs carried on trusses with or without collars; (4) hammer-beam roofs. The single-framed roof generally consists of rafters framed with diagonal braces or ties tenoned into underside of collar. Many church roofs are of this kind (see sketch 14, b), each couple or pair of rafters having a collar, angle-braces, and upright ashlar pieces, resting on an inner wall-plate, as shown (Fig. 10). When the walls are of considerable thickness, and the space is not more than 25 ft., this kind of roof is sufficient, the inner plate receiving a portion of any thrust.

The inner and outer plates are also strutted from the feet of the trusses. Many of our old church roofs are constructed in this manner, and ceiled or boarded round the collar and braces, and the stability of such roofs depend largely on the thickness of the walls. Several modern churches are framed in this manner, boarded underneath, and moulded ribs are run along the angles horizontally and vertically as bays. Collar-beam roofs, such as shown in section 8, which illustrates an old roof of a church in Suffolk, are common; but if the angle is not very sharp, they are apt to become strained at the angles of collar and principal rafters, and therefore braces are introduced, which are carried down to corbels in the walls (see Fig. 9), or they rest on hammer beams (see 8 and detail 11). These curved braces strengthen the rafters, and tend to throw the weight lower down the walls, as in the roof, sketch 9.

We also illustrate a cross-brace roof with curved ribs resting on corbels in the walls, section 13, for a nave of 21 ft. span. The cross braces tie the principals together, except at the feet. These are strengthened by the curved pieces, which are rebated at the ends, the edges tenoned into grooves of collar and principals, and bolted at certain points. A roof of this construction can be boarded or ceiled along the upper side of cross-braces and down the main rafters, or left open. Intermediate principals, with only collar and upper braces (or cross-braces) can be placed between the main pairs. Section 14 shows two other arrangements commonly met with. Figs. 6 and 7 show roofs adapted for a school or library and a mission-hall (see clauses 22 and 23, p. 130). The other sketches illus-

trate different methods of jointing timber, and explain themselves.

The following are a few clauses for roofs suitable for halls, schools, libraries, swimming-baths, and churches:—

24. *School-Room Roof* (20 ft. or 22 ft. span.—(See Section 9.) The roof trusses over schoolroom (describe how many) to be framed according to drawings, and the timbers to be of the following scantlings: principal rafters, 10 in. by 6 in.; common rafters, 4½ in. by 3 in.; collar, 9 in. by 6 in.; purlins, 7 in. by 4 in.; wall-post, 9 in. by 6 in.; brace, 9 in. by 6 in.; the king-post, 8 in. by 6 in.; struts, 6 in. by 4 in. The principals to be framed into king-post, and to be tenoned for collar, and secured by wrought-iron straps 1½ in. by ½ in., with bolts, heads, nuts. The curved brackets below collar to be tenoned into the collar and principal (by stop-grooves), and bolted to same by two bolts to each bracket, as shown, with ½ in. wrought-iron bolts, heads, nuts, and washers. The whole of the timbers exposed to view to be wrought and top-chamfered. Or—

The roof trusses to be framed according to the drawings in a workmanlike manner, and to the architect's satisfaction; the timber to be of the scantlings figured, and the joints to be those best fitted for their respective purposes, or approved and secured by wrought-iron bolts, ¾ in. diameter and 2 ft. 6 in. long, with heads, nuts, and washers, or by wrought-iron straps, 1½ in. (or 2 in.) wide by ½ in. thick, with ½ in. bolts, heads, nuts, washers, jibs, and collars. The curved braces to be tenoned into grooves on the principals and collars, and secured by bolts where shown (or, otherwise, angle brackets to be screwed to principals and collar and secured by wrought-iron straps, 1½ in. (or 2 in.) by ½ in. thick bolted through).

When a large lantern or skylight is to be carried in the centre of a roof, the framing of lantern can be carried by two main principals or girders of the queen-post type. Specify in this case as follows:—

The main girders to be of two 11 in. by 4 in. fir



timbers, with  $\frac{1}{2}$ in. wrought-iron flitch of the same depth between, bolted through every 2ft. apart, as shown, with  $\frac{1}{2}$ in. bolts, heads, nuts placed where directed. The girders to rest on tooled York templates 2ft. 6in. by 9in. by 3in. on the walls. The cross girders connecting these main girders is to be each 11in. by  $\frac{1}{2}$ in., secured to main girders with wrought-iron angle-plates of the same depth as girder, and 6in. wide and  $\frac{1}{2}$ in. thick on each side, bolted through with  $\frac{1}{2}$ in. bolts, heads, nuts, and washers. (For other parts of roof and lantern, see clause 22.)

25. *Roof over Swimming-Bath.*—The roof to be constructed with queen-post trusses of the following scantlings:—Tie-beams 11in. by 6in., principals 6in. by 4in., queen-posts 6in. by 4in., straining-beam 7in. by 6in., straining sill 6in. by 4in., struts  $\frac{1}{2}$ in. by 3in., common rafters  $\frac{1}{2}$ in. by 2in., purlins 9in. by 6in., with all necessary cleats, tie-plates, wrought-iron straps and bolts (see sizes), and all necessary framing. The wall-posts to be 6in. by 6in., framed to underside of tie-beam, and resting on stone corbels 12in. deep, 1ft. 6in. by 1ft. 6in., built into walls. The curved braces to be framed into tie-beam and post, and secured by  $\frac{1}{2}$ in. bolts with heads and nuts and washers.

26. *Lantern.*—The lantern to be constructed in accordance with the drawings with wrought and moulded curb, 9in. by 6in. staff-beaded; 7in. by 4in. twice-weathered throated and grooved sill; 6in. by 6in. angle-posts;  $\frac{1}{2}$ in. by  $\frac{1}{2}$ in. rebated and moulded intermediate posts;  $\frac{1}{2}$ in. by 4in. rebated and moulded head, and the framing to be fitted with 2in. moulded sashes, rebated for glass. Or, the lantern to be filled with 2in. framing, with 6in. moulded ridge-piece and hip stiles rebated for glass and rebated into ridge; 3in. by 2in. twice rebated and moulded bars, and with condensation gutter of 4lb. lead round upright light, with outlets bored through sill. Glaze with Hartley's (or rolled ribbed) plate in putty. Or, the lantern to be glazed by H. Hope, Birmingham.

27. *Ironwork to Roof.*—If iron "queen" bolts are to be used instead of queen-posts of timber, specify.

The principal rafters and straining beam to fit into a cast-iron head of  $\frac{1}{2}$ in. metal formed according to detail, and with  $\frac{1}{2}$ in. queen-bolts to be provided with proper heads, nuts, and washers properly secured to the beam (see sketch 4); or the queen-bolts are to pass through cast-iron sockets of  $\frac{1}{2}$ in. metal let into top of the beam to receive the wood struts. The tie-beam to be secured by nuts screwed on queen-bolts over sockets and below the tie-beam. (Sometimes rolled iron struts are introduced instead of wood struts, and iron ties with sockets secure the ends of principals. These roofs come more under the designation of iron or composite roofs.)

28. *Roof over Nave (21ft. span).*—The main roof over nave of church to be carried on trusses framed according to drawings. The trusses to be not more than 10ft. apart, with half-trusses at the ends. The scantlings to be as follows:—Principal rafters, 10in. by 6in.; common rafters,  $\frac{1}{2}$ in. by 3in.; purlins, 8in. by 6in.; cross-braces, 7in. by 6in., halved and bolted through at intersection, and secured to principals by wrought-iron straps 2in. wide and  $\frac{1}{2}$ in. thick, not less than 2ft. long, bolted through with  $\frac{1}{2}$ in. bolts, with heads, nuts, &c. The principals, wall-posts, and cross-braces to be stop-grooved  $\frac{1}{2}$ in. wide for 4in. framed circular rib in six (or seven) pieces, out of timber 18in. or 20in. deep, with rebated joints doweled with oak dowels, and bolted through at joints with  $\frac{1}{2}$ in. bolts, with heads, nuts, and washers, and to rest at springing upon corbels (or shafts) let into walls. The intermediate trusses to be framed as shown in drawing, with cross-braces (or collar and struts) without the curved ribs, and the purlins to be framed underneath with curved braces 7in. by 4in., with abutment joints into principals, and purlins secured by  $\frac{1}{2}$ in. bolts. Or—

The roof to be framed as shown in drawings, with principal rafters, 10in. by 7in.; collar, 7in. by 6in.; curved struts, 6in. by 6in.; purlins, 7in. by 5in.; wall-posts, 7in. by 7in.; common rafters, 6in. by 3in., with curved ribs out of timber 18in. by 4in., tongued into stop grooves  $\frac{1}{2}$ in. wide in the principals and collar and wall-posts, with rebated joints at the ends, bolted through at joints with  $\frac{1}{2}$ in. bolts, with heads, nuts, and washers. Each rib to be in six pieces, and to rest on wall corbels of stone. The intermediate ribs to be cross-braced with braces 7in. by 6in., halved and bolted through at the intersection. The timbers to be wrought and chamfered where exposed.

29. *Ribs in Thickness.*—The carved ribs to be put together in three  $\frac{1}{2}$ in. (or 2in.) thicknesses, so as to break joint with tongued joints, screwed together with long screws and bolted together, where shown, with  $\frac{1}{2}$ in. bolts. The centre thickness to be tenoned into principals and collar, and to be moulded on the edge.

30. *Hammer-Beam Roof.*—The roof to be framed with collar-curved struts and vertical pieces as before, resting on hammer beams, 7in. by 7in., coggled down upon wall-plates, and framed to the uprights and principals, the latter tenoned and pinned on the hammer-beams. The purlins to be notched down and housed into principals on each side, and well spiked.

31. *Aisle Roofs.*—The aisle roofs to be formed as shown, with wrought and chamfered (or moulded) timbers. The principals to be 10in. by 7in. (or 8in. by 6in.), resting on wall and corbel plates, 6in. by 6in., and on corbels at upper ends. The purlins to be notched and housed to principals, and to carry rafters  $\frac{1}{2}$ in. by 3in. The curved braces to be 4in. wide, cut out of timber 12in. (or 18in.) deep, and tenoned into grooves cut in principals, and wall-posts rebated at joints, and bolted through with  $\frac{1}{2}$ in. wrought-iron bolts.

32. *Boarding, &c.*—If the roof is to be boarded or plastered, specify whether above or below rafters, how laid, whether vertically or diagonally, if felted, &c., as for example:—The roof to be boarded above rafters with  $\frac{1}{2}$ in. (or 1in.) wrought, matched, V-jointed boarding nailed to rafters and laid diagonally; and cover the same with McNeill's felt under slating (or lath and plaster between rafters). Specify battens for slate, gauge, &c. (see Clause 21.)

## THE BRITISH MEDICAL ASSOCIATION.

### STATE MEDICINE SECTION.

At the meeting at Edinburgh last week, Sir Henry Littlejohn delivered the inaugural address in the State Medicine Section dealing with local matters.

### THE POLLUTION OF RIVERS.

Dr. H. McLean Wilson, Wakefield, read a paper on the pollution of rivers, in which he discussed the following five points:—(1) Who should administer the law for the prevention of the pollution of rivers? (2) Are the present laws sufficient? (3) Is the treatment of sewage on land to be required in all cases? (4) Should manufacturers' refuse be purified by the manufacturers themselves or by the sanitary authorities? (5) Should any standard of purity be adopted for effluents from sewage or for purified trade refuse? On the first question he said that to county councils had been committed the power of enforcing the Rivers Pollution Act, and that was a great step in advance; but county councils were naturally rather chary of dealing with cases of pollution of streams within their jurisdiction, and within the burghs a great many polluting processes were carried on. It had been advocated with some reason that the administration of the Act should be entrusted to a central authority; but, he thought, that would be going a step too far, and he suggested that for every large river or group of rivers a joint committee should be formed, on which the county councils should be represented. As to whether the laws were sufficient, he said that the river authorities that had been created had found that the Act of 1876 was very far from sufficient, and the Bill now before Parliament was even weaker than it in certain respects. The most important defect in that Bill was that there was no prohibition of any new pollution. He thought it would be a great misfortune if the Bill passed in its present state, as it would postpone indefinitely legislation for effectively dealing with the pollution of rivers. The question of the treatment of sewage on land was one which the Royal Commission at present sitting was expected to answer. Sewage farms had been laid out on land wholly unsuited for the purpose, and to that fact was due the discredit which attached to sewage treatment. As to whether manufacturers' refuse should be purified by themselves or by the sanitary authorities, he said that was one of the questions to which the Royal Commission was to give an answer. In England the legal question had not been definitely decided; but in Scotland the matter seemed to be settled by Section 110 of the Public Health Act of last year. A solution of the difficulty, which seemed fairly just for some districts, had been proposed by many of the manufacturers. It was that the manufacturer should have the right to call upon the sanitary authority to purify his trade refuse, but that the sanitary authority should have power to call upon the manufacturer to remove from his refuse anything which would interfere with the treatment of the sewage, and that the manufacturer should pay something extra to meet the cost of treatment. With reference to the last point, he maintained that the

establishment of a legal standard of purity was impracticable. In dealing with river pollution, their object must be to bring the rivers back as nearly as possible to their natural condition.

Professor Glaister, Glasgow, said there could be no doubt that the question of river pollution became of the greatest importance when the stream became so polluted that emanations from it might be injurious to health. He agreed with Dr. McLean Wilson that it was practically impossible to lay down any general standard by which the pollution of a river might be gauged, more particularly from a chemical point of view, because the character of the particular effluents differed materially in different rivers. He thought they should revert to the much simpler standard by which the effect of particular effluents could be gauged—namely, the effect upon the lower animals and plant life. Personally, he took his stand upon Dumas's dictum: that when water was so affected by town or manufacturer, and had become unfit for supporting the life of fish or green plants, the pollution should be considered an insupportable nuisance to the riparian population. In certain streams pollution was carried on to an enormous extent. The question came to be, Had the Rivers Pollution Act really effected any good in altering the currency of that pollution? However anxious county councils might be, the powers of the Act were so cumbersome and so difficult to set in motion that, as a matter of fact, they hardly ever had been put in motion. There existed a case in which the county council were of opinion that it was absolutely necessary that something should be done. They made an application to the Secretary for Scotland, but he declined to interfere. They might deal with river pollution either by the ordinary statutory Act, under certain clauses of the Gas Works Act, and of the Salmon Fisheries Act. But all these were difficult to put in operation. A simpler way of dealing with the matter was at common law, because any riparian proprietor had in his hands a power more potent than the powers conferred by the Rivers Pollution Act. In another famous case—the Esk case—the then Lord Justice General laid down a common-sense judgment. He said there could be no doubt that water had been sent for the use of man, and although he was to use it he was not to abuse it, and he considered it only right that man when using the water should again return it to the river in as pure and wholesome a state as when he took it, so that his brother and neighbour below might enjoy the same benefit. That was plain common sense, and had been the basis of actions at common law within the last few years. Parliament itself had recognised the insufficiency of the present Rivers Pollution Act, because in the preamble of the Yorkshire Act it was practically admitted that the restrictions in the Rivers Pollution Act were inoperative.

Dr. Reid, Stafford, said that in the matter of appointing joint boards the influence of local conditions should be felt. If they had in a county the tributary streams of a river which was also entirely within the county, it would be a great pity to form joint boards. The county council in most cases was a sufficiently representative body to deal efficiently with the subject of rivers pollutions if allowed to do so. With regard to the question of river boards and county councils constructing works for sewage disposal, he thought any movement of that sort would be unfortunate. They should be revisory boards, the responsibility for such works resting with those who were responsible for the pollution.

Dr. Bruce Low, of the Local Government Board, said it seemed that they needed some further assistance from Parliament in the formation of those joint committees. It should not be left to the option of counties to take steps for the formation of those joint committees. They wanted less option and more compulsion.

Dr. McVail, Medical Officer of Health for Stirlingshire and Dumbartonshire, said that in any new Act they must take care that the central authority exercised very firm control over the local authorities, so that if the local authorities failed to carry out the Act the central authority should compel them to do their duty. He did not agree with Professor Glaister that the present Act had done no good. In Scotland, in spite of its defects, it had done a great deal of good. It had compelled county councils and district committees to appoint river pollution prevention committees, and there had been inspection of



works and meetings with owners which, but for the Act, might not have taken place.

Dr. Hill, Birmingham, said that where sewage was discharged into small rivers, it seemed to him impossible to keep them pure; but it was different with large rivers. The Thames, for instance, received the sewage from a large number of towns, yet it came into London apparently pure, so that it must purify itself in its course.

Dr. Bond, Gloucester, described the new method for the treatment of sewage at Exeter, and said the results were so convincing that they hardly left room for doubt as to the applicability of the system. In a place not larger than the room in which they were met the whole of the sewage of the town was dealt with. It came in as ordinary sewage, and left the works as clear as the stream into which it flowed. He believed that far more could be done in dealing with these matters at common law than by process under the Rivers Pollution Act. He proposed that they should adopt the following resolution:—"That, in view of the greater facilities for dealing with river pollution which are offered by action at common law than under existing statutes, it is desirable, in the opinion of this section, that county councils and other river authorities should be empowered to proceed in this matter at common law when they think it desirable to do so, under such restrictions against the undue exercise of this power as may appear reasonable."

On the suggestion of the President, a sub-committee was appointed to bring up a recommendation on the subject on the following day.

#### SURFACE WELLS AS A SOURCE OF WATER SUPPLY.

Dr. Macmartin Cameron, Newton-Stewart, read a paper on "Surface Wells as a Source of Water Supply." He attacked the Rivers Pollution Commissioners for the way in which they had held up shallow or surface well water to general execration. They had classed shallow well water as palatable but dangerous, bracketing it along with river water to which sewage gained access. This classification, if placarded over the country, would be enough to make half their rural population die of fright, or follow the example of St. Patrick's snakes, and commit suicide to save themselves from slaughter. (Laughter.) He held that surface-well water, when reasonably safeguarded, ought to be placed under the head of "wholesome," and not under the "suspicious," much less "dangerous," heads. It all depended on where the wells were situated, and how their surroundings were protected. Stored rainwater was placed by the Commissioners in a higher category than surface-well water. The abominations of the water-butt, with its compost of rotten leaves, bird manure, kittens, rags, dirt, and creeping things innumerable, were known to all who had inspected stored rainwater. The most execrable surface well could scarcely be worse. He held, also, that it was a libel on surface wells to mark them down as inferior to and more dangerous than surface water from cultivated land. He had no great faith in casing surface wells. They should never be placed in situations so doubtful as to require it. It could do no harm, and might be of service as a second line of defence. But the first line of defence was the circumjacent ring of ground, which must be kept scrupulously clean, and be of a size adequate to the purification of any reasonable amount of polluted water percolating through it. No sewers, cesspools, or collections of filth should be permitted within one hundred yards or more of a well.

Professor Hunter Stewart, Edinburgh, said that a portion of the Edinburgh water supply came from surface wells, the maximum depth of which was about 9ft. Although situated on manured land they were sunk in the rock. Several of the wells were quite sterile, and the largest number of microbes found in any of them was eleven per cubic centimetre, while the best drinking water before filtration contained from 100 to 200 per cubic centimetre. Chemically, the water from these wells was as pure as the purest spring water, and abundantly answered in the affirmative the question whether a thin layer of rock would sufficiently protect the water underneath it.

Dr. Nasmyth, Cupar, as medical officer of health for three counties, said it was not the surface wells which they had to condemn, but the sources of pollution near them. The great difficulty was to get a quarter of an acre of pure zone to surround the wells.

#### THE WATER SUPPLY OF VENICE.

Dr. Van Someren, Venice, read a paper on "The Potability of Venice Water." Venice, he said, was a city that did not require so much water as others of the same size and population. They had no horses nor cattle, nor gardens of any account, nor streets to be watered. The drains were flushed by the tides. The physical qualities of the water supply were those of spring water, being beautifully clear, limpid, colourless, and without odour.

#### THE NEW LUNATIC ASYLUM AT WEST BANGOUR.

MR. HIPPOLYTE J. BLANC, R.S.A., has been appointed architect for the new asylum at West Bangour. The characteristic aimed at by the architect is the outward treatment of the designs is variety of expression, consistent with the internal requirements. In some instances a little more architectural style has been infused into the design, to relieve the eye as far as possible from any sense of uniformity or monotony. Having regard to the conditions of site, the position chosen on the plan for the main entrance is suggested as that affording the largest area of a uniform surface, and it is, therefore, most convenient for receiving and delivering all heavy goods for the colony.

The administrative block is placed in the middle of the medical and hospital blocks, conveniently near the localities to be served. The porter's house is placed at the back, with separate access and staircase, but with through communication to the main building. The plans of the kitchen block provide for the requirements, and show all the fittings and apparatus requisite for cooking for 1,000 patients and 200 officials. Bedroom accommodation for cook and assistants is also provided within the block. The stores block and the kitchen block are attached, and have through private communication. An abundance of lighting is afforded by means of continuous cupolas of clerestory side-sashes, with opening frames for ventilation, under simple and easy control. By this mode of construction the heating effect produced by ordinary roof-lying lights is destroyed. The church is designed to meet the requirements of Presbyterian or Ritual service as may be desired.

The recreation-hall is placed almost in the centre of the whole site. The floor area is unobstructed by pillars, and ample provision is made for stage and dressing-room requirements. At the main entrance are two cloak-rooms; and for an increase of accommodation a gallery can readily be constructed over the recess between the two vestibules to hold 130 persons. There are four doors of access, any two of which can be for males, and two for females, if desired. In treating the exterior of the hall, one of the vestibules has been designed to carry a lofty tower. In that tower it is proposed to place tanks of 30,000 gallons capacity, wherein water may be stored for the general service of the several blocks or for the washhouse, and also as a supply for fire hydrants. Above these is a clock chamber, placed at such elevation as will conveniently be viewed from any part of the colony. The hall is prominent, and, consistently with the idea of giving special consideration to prominent parts, it is more decoratively treated than are some other buildings. The bath-house is lighted from clerestory windows placed high. The mortuary block is planned upon the lines of the best-equipped mortuary in this country. A special addition shown upon the plans is a duplicate mortuary for the sexes, a dissecting-room, and a refrigerator. The situation of the mortuary has been specially considered. It is comparatively near the hospital, and from it bodies may be removed outside the precincts of the colony without observation by any inmates. The laundry block is quite close to the kitchen and store block. The fittings proposed are selected from the best of those found in use in good modern asylums. As in other blocks named, the natural lighting here is by continuous upright glazed cupolas, and the means for ventilation are of the simplest and most efficient construction—namely, opening frames by means of cords and pulleys. The boiler and engine-house block immediately adjoins the store-block. The dynamo-room is of ample space to admit of an increase in the number of dynamos, and also to afford space for storage batteries. The bakery is designed to meet the requirements of 1,200 people. The workshop block is, for obvious

reasons, attached to the engine-room block. The nurses' house is placed at the extreme west end of the site, being at a convenient distance from the medical section. Special accommodation for a matron is also provided. The medical superintendent's house is placed where it can be readily accessible to visitors and inquirers, within ready view and easy reach of the main entrance. The attendants' cottages are planned for varying accommodation of three and four apartments. The series is designed with a view to picturesqueness, without unnecessary ornamentation, but with sufficient form to give them architectural interest. The infirmary and sick-room blocks complete the group fronting the high land on which the medical section is placed. The hospital block is so arranged that one side or half is a counterpart of the other. The kitchen is arranged in the middle. A doctor's room is also provided. A feature of the plan is that at the ends of the wards are two single rooms, one of which is for a moribund patient, who, after death, can be removed by the outside door of the room without having to be conveyed through the ward. The arrangement has received careful consideration to secure separation of sexes and easy communication throughout upon an economical form of construction.

The asylum houses are arranged to supply the accommodation required, and variety is sought to be gained by varying the areas and consequent accommodation of dormitories in the several blocks. For the industrial or non-medical section ten separate schemes for villas are submitted—five for men and five for women. The aggregate number of 150 of each sex has been divided as follows:—One villa of 25, one of 26, one of 28, one of 32, and one of 40 patients.

Fire hydrants and hose chambers are provided for in every block at convenient places in the corridors or in staircases. No special fireproof construction is contemplated. There is comparative immunity from fire risks by the isolation of the different blocks. The lighting is proposed to be by electricity, with various candle-power lamps to suit the respective situations, the supply main cables being underground, and the house cables carried in steel tubes, all on the most approved system. The ventilation of the various dormitories and day-rooms is provided for by means of fresh-air inlets in the window recesses at the floor levels, under key control of the attendants. Radiators are proposed to be placed in the window recesses, so that in winter the incoming air would be warmed, while in summer the air would be admitted by the same openings in a natural state. For the release of vitiated air grated openings are proposed to be placed in the walls near the ceilings, and led in specially-constructed glazed brick flues into an outlet shaft and ventilator in the roof. A fan in the ventilating shaft driven at any time when required by an electric motor is much more satisfactory. All windows are intended to open, but by means of a small brass bracket permanently screwed to the case the extent of the opening is limited to about 7in., which is quite serviceable for all requirements. The cost of the building to accommodate 1,000 patients is set down at £235,000.

#### LONDON SCHOOL BOARD BUILDINGS.

THE annual report of the Works Committee of the London School Board, which has recently been issued, gives an abstract of the work done during the year ended March 25, and shows the progress made in the provision of accommodation which has been sanctioned by the Board and the Education Department. The report, after stating what action has been taken with regard to the purchase of twelve sites for new schools and additional land for nineteen existing schools, with regard to which compulsory powers were obtained in 1896-97, sets forth a list of sites for twelve new schools, and for enlarging schools or playgrounds, or for general improvements. During the past year the Board agreed to purchase various interests in sites at a cost of £84,361, the surveyors' fees amounting to £583, and, including these amounts, the total cost of the sites purchased up to the end of the year under review was £3,300,165, the surveyors' fees, &c., being £146,931. According to a table prepared by the finance department, the cost of the sites for 350 schools, the accounts of which had been completed on Sept. 29 last, was £6 14s. 6d. per child, and the average cost per head for school buildings was £13 14s. 1d., and for furniture and





THEATRE ROYAL, CHATHAM.

ittings 10s. 7d. Up to Lady Day, 1897, the total number of permanent schools which had been erected and opened was 418, and during the year under review 12 new schools and eight enlargements were opened. The 12 new schools were opened—one in Chelsea, one in Finsbury, one in Greenwich, three in Hackney, one in East Lambeth, four in West Lambeth, and one in Tower Hamlets. The total accommodation thus provided was for 12,948 children, and the cost of the sites, buildings, and furniture was £352,434 16s. 7d., or an average cost per head of £27 4s. 5d. The enlargements were carried out in Finsbury, Greenwich, West Lambeth, Southwark, and Tower Hamlets, and provided additional accommodation for 2,910 children, at a cost (exclusive of site) of £83,146, or an average cost per head of £28 11s. 5d. Loans were authorised by the Education Department in respect of the 12 new schools amounting to £364,668, and on account of the eight enlargements and sites amounting to £138,278.

Additional school provision has been made to the following extent:—Tenders have been accepted during the year for erecting nine new schools to provide accommodation for 7,719, and for carrying out 13 enlargements of schools to provide accommodation for 3,863 children. The new schools will be erected—two in Greenwich, one in Hackney, two in East Lambeth, two in West Lambeth, and two in the Tower Hamlets—at a total cost of £173,305, or £22 9s. per head. The enlargements will be made—two in Finsbury, four in Greenwich, one in Hackney, one in West Lambeth, three in Southwark, and two in the Tower Hamlets—at a total cost of £91,702, or £23 14s. 9d. per head. The tenders include the provision of halls which are not counted in the accommodation of the schools, the provision of centres, and in all cases a drawing classroom. In four cases a playground is being provided on the roof. Three of the schools are being erected under the special arrangements made with the

view of reducing the cost. With regard to the enlargements, the variations in cost arise mainly from the fact that the opportunity is taken to improve the existing schools by providing halls, &c., so as to make them thoroughly efficient. Tenders have also been accepted for erecting or providing, among various other works, 14 cookery centres, 17 laundry centres, 16 manual training centres, seven schools for special instruction, rooms for the teaching of the upper standards at nine schools, a blind centre, two housewifery centres, draining and other works at 19 schools, an infirmary and isolation ward in connection with the *Shafesbury* training ship, at a cost of £3,400. Sanitary works have also to be carried out at 21 schools, and the total amount of the tenders accepted in respect of 17 of these schools is £23,115. The system of carrying out repairs to school buildings by workmen employed direct by the Board is being continued in nine of the 18 districts of the clerks of works for repairs.

At Lady Day last the following work was in hand:—15 schools were in course of erection, providing accommodation for 13,789 children, and 14 enlargements giving accommodation for 4,467; 32 additional sites for new schools had been or were being purchased, the schools to be erected on 25 of which would provide for 23,157 children; 12 sites for new schools had been scheduled, the schools to be erected on four of which would provide for 3,494 children; 18 enlargements of schools had been sanctioned by the Education Department, providing for 5,840 children; and the Education Department had sanctioned the provision of sites in seven districts, which would be scheduled next session, the schools to be erected on four of which would provide for 2,820 children. The report adds that the playgrounds of 236 schools were opened on Saturdays for the use of children, and 47 were also opened on Sundays.

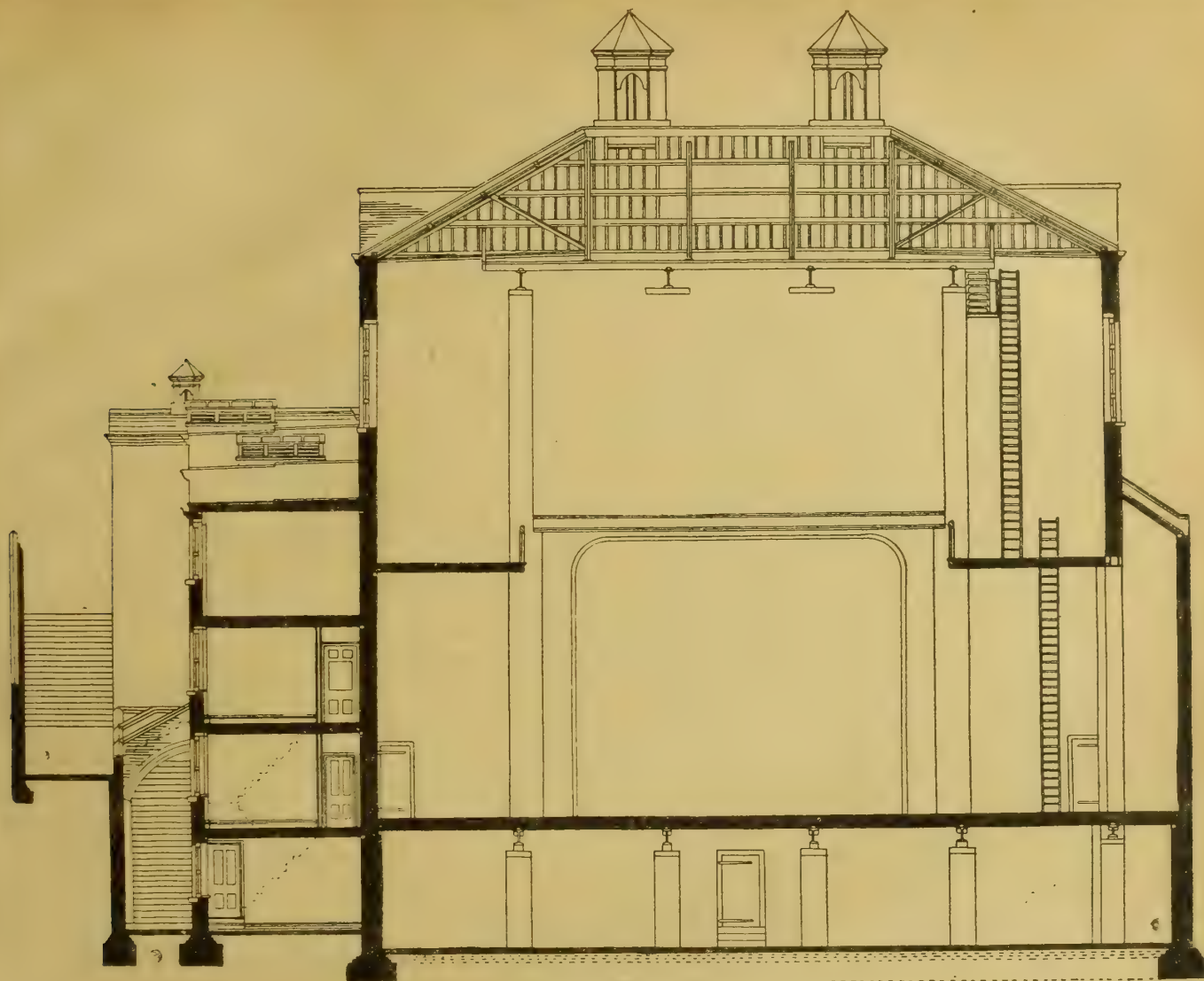
#### THEATRE ROYAL, CHATHAM.

THE Chatham Corporation, having purchased property in the High-street for street improvements, Messrs. C. and L. B. Barnard, of Birmingham and Chatham, took advantage of the opportunity offered in the rearrangement to secure a good site for a new theatre in the busiest part of the town. Only the entrances to stalls and circles, as shown in the perspective drawing about on to the High-street, the theatre proper running down behind the existing old shop property now facing the street. A new street will be formed up at the end of the theatre from the High-street, in which will be the gallery entrances and exits. The total accommodation will be about 2,500 seats. The fronts in the High-street will be entirely of Bowstone, and over these entrances will be placed the circle lounge and the manager's offices. Mr. Alderman C. E. Skinner, of Chatham, is the contractor, the amount of his contract being £16,100. The architect is Mr. G. E. Bond, M.S.A., of Rochester.

#### SANITARY INSPECTORS' ASSOCIATION.

THE Sanitary Inspectors' Association is holding its annual excursion, provincial meeting, and conference at Newcastle-on-Tyne this present week. The chairman, who will preside over the business meetings, is Mr. Thos. G. Dee, Assoc.S.I., of London. The proceedings commenced last night, when Earl Percy, the President of the Northumberland and Durham Branch, entertained the members at a garden party in Jesmond Dene. To-day the committees and council will meet in the Durham College of Medicine, Northumberland-road. At noon, the mayor, sheriff, and members of the city council will attend at the college and welcome the association to Newcastle. The conference will then be opened. There will be an adjournment at one o'clock for luncheon at the assembly rooms, Barras Bridge,





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and at two o'clock the conference will be resumed, the public being cordially invited. The following papers will be read:—"The Advantages of Sanitary Inspection," by Mr. W. Bland, sanitary engineer, Newcastle; "Sanitation of Colliery Districts," by Mr. W. F. Curry, surveyor and sanitary inspector, Morpeth; "Port Sanitary Administration," by Mr. C. Irvin, sanitary inspector River Tyne Port; "Testing Ventilation," by Dr. A. Scurfield, Medical Officer of Health, Sunderland; and "Some Defects in the Public Health Laws, with Suggested Amendments," by Mr. W. H. Wells, chairman of the Northumberland and Durham Branch, and chief sanitary inspector, Newcastle. A public dinner in the evening, presided over by the Mayor, will bring the talking to an end. Saturday will be devoted to excursions. In the morning the members will visit Messrs. Harri-man and Co.'s works at Blaydon, and in the afternoon they will embark at Newcastle Quay on the steamer *J. C. Stevenson*, proceed up the river to Elswick, and afterwards visit the Tyne Port Floating Hospital and disinfecting hulk, and the *Wellesley* training ship, and witness a drill by the Tynemouth Volunteer Life Brigade. On Sunday morning the members will attend service at the cathedral.

The visit is at the invitation of the Northumberland and Durham Branch, which has, with the assistance of a strong local committee, carried out the arrangements. The local honorary secretary is Mr. W. Cattliff, one of the Newcastle sanitary inspectors.

#### WORKING STRESSES FOR WROUGHT IRON BRIDGES.

**A**N elaborate paper appears in a recent number of the *Transactions of the American Society of Civil Engineers*, by G. E. Herbert

Stone, M.Am.Soc.C.E. The author deals with the determination of the safe working stresses for railway bridges of wrought iron and steel, and shows how the principle of apportioning the unit stress to the relative amount of moving load work to be done is to be dealt with. The theoretical "live" load is shown to be essentially different in its action and mode of application from that due to a locomotive travelling at full speed. The author points out that, while, forty years ago, a ton of moving load received no more consideration than a ton of fixed load, it is now recognised as involving any complex considerations. "It is found that for any member of a bridge, the immediate effect of the application of a ton of moving load is always greater than that produced by a ton of fixed load, and that the degree or percentage by which it is greater varies for different ratios of moving or fixed load." Mr. Stone defines "fixed" and "moving" load as follows:—

By fixed load is to be understood a load which may for practical purposes be considered absolutely constant, subject to no movement or vibration. The self-supported weight of the structure itself is treated as fixed load, and also any other load supported by the structure, such as ballast, sleepers, permanent way, &c. By "moving" load is to be understood a load subject to variation, or which is frequently applied and removed, and the violence or vibration with which the application of the load is accompanied is considered as an enhancement of the effect. Thus, a dead engine pulled over a bridge would be a moving load, the same locomotive at full speed would enhance the effect due to vibration. Having defined the meaning to be attached to these loads and contrasted them with the textbook definitions, the author shows the difference between them. He considers (1) the immediate effect of the moving load observed every time a train passes

over a bridge; (2) the cumulative effect produced in course of time by repeated loading and unloading. Mr. Stone refers to the deflection experiments made in India as showing the immediate effect of a moving load, and these are exhibited in a graphic form by a diagram. The cumulative effect of the moving load is illustrated by Wöhler's experiments, and a table is given deduced from them. The results applied to practice from these experiments are given in tables—thus, for wrought iron, the actual effects for a compound load as determined by experiment for different combinations of fixed and moving loads are shown. We must refer our readers interested in this subject to Mr. Stone's paper, and the tables of results for wrought iron and steel according to the ratio percentage of compound load. The author's paper is one of close research and study; but the reasoning may not be quite acceptable to those who place little reliance on the results of experimental data. Wöhler's experiments have been differently interpreted by Gerber and Taunhardt and others, who have put a different value on the coefficient as to the ratio of fixed load to moving load. Exact laws for materials, such as iron, will never be found from a few experiments, as a considerable percentage of difference in strength occurs.

#### THE TREATMENT OF MANCHESTER SEWAGE.

**T**HE city surveyor's annual report on the treatment of sewage at Davyhulme for the year ending December 31, 1897, was submitted at the meeting of the Manchester City Council on Wednesday. Details of expenditure for the year are given in tabulated statements under the following headings:—(1) Sewage Precipitation, (2) Sludge Pressing and Disposal, (3) Filtration, (4) Coal Supply, (5) Sundries and Incidental Expenses, (6) Summary of Annual Cost of Treat-



ment. The net cost of the work for the year has been £19,089 9s. 7d., as against £15,780 5s. 0½d. for the year 1896. These sums are exclusive of interest and repayment of capital, and are equivalent to £2 11s. 9d. and £2 14s. 3d. respectively per million gallons of sewage treated. A summary of the cost of treating the sewage for the year 1897 shows a reduction of 2s. 0½d. per million gallons on the cost of treatment for the year 1896. The volume of sewage delivered and treated during the year was 7,373,917,000 gallons as against 5,818,200,000 gallons for 1896, being an increase of 1,555,717,000, or 26·7 per cent. on the preceding year. The estimated population contributing to the sewerage system has increased from 400,360 on Jan. 1, 1897, to 512,500 on Dec. 31, 1897, being an increase of 112,140, or 28 per cent. The increase of population contributing to the sewerage system during the year 1897 has exceeded the increase during the year 1896 by 49,780, or 79·8 per cent. The daily average flow of sewage was 20,426,363 gals., that for 1896 being 15,896,721 gals., showing an increase at the rate of 4,529,642 gals. per day, or 28·5 per cent. The average daily flow of sewage treated per head has ranged from a minimum of 39·3 gals. per head for the month ending May 19 to 50 gals. per head for the month ending Dec. 1. The average amount of wet sludge precipitated has been 21·16 tons per million gallons, as against 21·84 tons for the previous year, yielding 7 tons 12 cwt. of pressed cake per million gallons, as compared with 7 tons 18 cwt. for the year 1896. The proportion of chemicals used during the year was less than in the preceding year. When the sewage is diluted by large quantities of storm water it has been customary to suspend treatment during the flush, as the chemicals have but little effect in increasing the purity of effluent at such times, owing to the rapidity with which the water passes through the tanks, and to the extremely attenuated condition of flocculent organic matter which it is the function of the precipitant to carry down. When it is necessary to allow a portion of the storm water to pass directly by way of the storm overflow into the canal, the addition of chemicals would only increase the amount of suspended matter in the sewage. Treatment was stopped on account of storm water on 21 occasions during the year for a total period of 128 hours. The result of chemical treatment and precipitation are shown in a series of tables containing the result of the analyses made at various times. On no occasion did the oxygen absorption come within the requirements of the Mersey and Irwell Joint Committee, and the albuminoid ammonia was below the grain per gallon in only a few instances. Land filters have been at work as far as practicable during the year. Experiments have been continued with the coke and cinder filters which were constructed at the end of 1895 under the advice of Sir Henry Roscoe. As in 1896, the cinder filter has throughout given better results than the coke, both as regards the percentage reduction of impurity effected, and in non-putrescibility. The results obtained from the experimental coal filters are equal to, or even better, than those obtained from the cinder filter. During the year an experimental red-sand and a burnt-clay filter have also been tried, and likewise an automatic self-cleansing filter. Various experiments have been made during the year in connection with the settlement of solids in suspension in the sewage without the addition of chemicals, the exposure of the effluent to the air, and the passing of air through the effluent. Tests have also been made to ascertain the effect of the effluent on the water in the Ship Canal, and the effect of the admixture of acid and of water with the effluent. In all cases the effluent contains the larger amount of impurity than the Canal water, although in most cases, unless diluted by rain, the amount of impurity in the Ship Canal above Barton Locks is sufficient to cause putrefaction of incubation. The putrefaction which takes place in a mixture of Ship Canal water and tank effluent is generally greater in amount than in either taken separately. The experiments also showed that although it is possible to sterilise the effluent by the addition of a small quantity of acid, yet if a sterilised effluent be mixed with Ship Canal water the effect of the acid is largely destroyed, and putrefaction again occurs. If an acidified sample of tank effluent be mixed with tap water, the sterilising effect of acid appears to be maintained. When the Ship Canal water is largely diluted by rain, putrefaction does not, as a rule, take place in the mixture of effluent and

Canal water. Sea salt has been added to samples of tank effluent with the result that a large quantity is found to be necessary to prevent putrefaction taking place.

### THE ARCHITECTURAL ASSOCIATION EXCURSION TO WARWICKSHIRE.

THE annual excursion of the Architectural Association commences on Monday, and the following is the itinerary:—

	Arr. h. m.	Stay. h. m.	Dep. h. m.
<b>MONDAY, August 8—</b>			
Leamington (Breakfast 8 a.m.)..	...	...	...
Leamington (G.W.R. Station)..	...	8.55	...
Kingwood Station .....	9.22	...	...
(Baddesley Clinton (Luncheon)...	10.0	3.0	1.0
Knowle Church. Village, and	...	...	...
Grimshaw Hall .....	1.45	2.0	3.45
Temple Balsall .....	4.0	0.30	4.30
Ram Hall .....	5.0	0.30	5.30
Berkswell Station .....	5.40	...	...
Leamington (Dinner 7 o'clock)...	6.25	...	...
<b>TUESDAY, August 9—</b>			
Leamington (Breakfast 8 a.m.)..	...	...	...
Trams to and from Warwick:—	...	...	...
Leycester Hospital .....	10.0	...	...
The Priory (Luncheon at 1 o'clock,	...	...	...
by invitation) .....	11.0	...	...
St. Mary's .....	2.0	...	...
The Castle .....	3.0	...	...
St. John's House .....	5.30	...	...
Leamington (Dinner 7 o'clock) ..	...	...	...
<b>WEDNESDAY, August 10—</b>			
Leamington (Breakfast 8 a.m.)..	...	...	...
Leamington (G.W.R.) .....	...	...	9.50
(Stratford-on-Avon (Station) .....	10.45	...	...
Honington Hall (Luncheon) .....	12.15	3.0	3.15
(Darlingscote (Farmhouse Cot-	...	...	...
tages) .....	3.45	1.0	4.45
(Stratford-on-Avon (Station) .....	6.15	...	...
Leamington (Dinner 7.30) .....	7.13	...	...
<b>THURSDAY, August 11—</b>			
Leamington (Breakfast 8 a.m.)..	...	...	...
Leamington (G.W.R.) .....	...	...	8.55
(Solihull (Station) .....	9.38	...	...
Hampton-in-Arden Church and	...	...	...
Houses .....	10.30	2.0	12.30
Castle Bromwich .....	2.30	3.0	5.30
Acocks Green Station .....	6.14	...	...
Leamington (Dinner 7.30) .....	6.58	...	...
<b>FRIDAY, August 12—</b>			
Leamington (Breakfast 8 a.m.)..	...	...	...
Leamington (G.W.R.) .....	...	...	9.50
(Stratford-on-Avon (Station) .....	10.45	...	...
Salford Hall (Luncheon) .....	12.15	2.0	2.15
Bidford (Houses) .....	2.30	0.30	3.0
(Stratford-on-Avon Church and	...	...	...
Houses .....	4.0	2.15	6.15
Stratford-on-Avon (Station 6.15)	...	...	...
Leamington (Dinner 7.30) .....	7.13	...	...
<b>SATURDAY, August 13—</b>			
Leamington (Breakfast 9 a.m.)..	...	...	...
Leamington (G.W.R.) .....	...	...	10.0
Kenilworth Castle .....	10.10	2.30	12.47
Leamington (Luncheon 1.15) .....	12.59	...	...
<i>Baddesley Clinton.</i> —Moated manor-house, containing work of the 16th and 17th centuries.			
<i>Knowle Church.</i> —Fine late screen; good tower; Perpendicular; Guild-house close to church.			
<i>Grimshaw Hall.</i> —Now a farmhouse, picturesque, brick and half-timber; good staircase, oak panelling.			
<i>Ram Hall.</i> —Small manor-house, brick and stone.			
<i>Warwick</i> abounds in interesting buildings, both ecclesiastical and domestic; special permission will be granted to the members by Earl Warwick to view parts of the castle not usually shown to the public.			
<i>Honington Hall.</i> —Manor-house of Queen Anne period; brick and stone.			
<i>Darlingscote.</i> —Quaint village. Old farmhouses.			
<i>Hampton-in-Arden.</i> —Interesting church.			
<i>Hampton Hall</i> and cottages, by the late Eden Nesfield.			
<i>Castle Bromwich Hall.</i> —Lord Bradford's place; Elizabethan; fine gardens; Classic church.			
<i>Salford Hall.</i> —Seventeenth-century stone manor-house and out-buildings; panelled rooms; picturesque position.			
<i>Bidford.</i> —Village; 17th-century stone houses.			

### WATER PURIFICATION AND SOFTENING.

THE Secretary read a paper last week at the meeting at Derby of the Institution of Mechanical Engineers by Mr. Leonard Archbutt, analytical chemist to the Midland Railway Company, Derby, on "Water Softening and Purification by the Archbutt-Deeley Process." The process was fully described in the paper, and reference was made to the numerous purposes for

which it may be used. It was stated that the process has been in operation since January, 1892, in the Midland Railway works at Derby, clarifying and softening the sewage-polluted water of the river Derwent, reducing the hardness from about 15° to 4½° or 5°, and effecting considerable organic purification, at an inclusive cost for chemicals, labour, and interest on outlay of about 1d. per 1,000 gallons. By using more lime and alkali the hardness can be reduced to 3°, but as the softened water is used in locomotives, it is found desirable not to reduce it so low. Remarkable bacterial purification is effected by the process. Before treatment the water of the Derwent swarmed with bacteria, but after treatment few were left in the water. During the last five years the process has been adopted for softening water at home and abroad, including waterworks, dye and bleach works, woollen and worsted mills, paper mills, laundries, &c., where the quantities of water treated by it range from 500 gallons to 45,000 gallons per hour. It has been found to be applicable to all kinds of hard water, and gives the best results when magnesia is present, the hydrate of magnesia forming a coarser precipitate, which settles more rapidly than pure carbonate of lime. The process is not limited to the softening of hard water, but has proved very effectual in the clarification of manufacturers' waste water. During the last three or four years apparatus has been supplied for this purpose to about twenty-five works of various kinds, including bleach and dye works, calico printing works, paper mills, cloth mills, &c., and gives great satisfaction. No novelty of chemical treatment is adopted, but it is found that the thorough method of mixing leads to a great economy of chemicals, and owing to the rapidity of precipitation there is also considerable economy in the amount of tank capacity required. Lime and aluminio-feric are the chemicals chiefly used. The clarification of the water is perfect, and, when desired, the alkalinity of the effluent is neutralised by carbonating. The water is also decolourised. The discussion, which was taken part in by a large number of the members, turned to a considerable extent on the effect of deposit in boilers in regard to fuel economy. One speaker advanced the proposition that by the deposit of scale on the exterior of a tube the heating surface would be increased, and that therefore the boiler might become more efficient in evaporation. Another point brought out was that hard scale is very much less deleterious than a soft deposit. The general opinion appeared to be that for water with any hardness in it a softening process of some kind is economical; that it is cheaper to soften water before putting it into a boiler than to allow it to deposit on the inside of the boiler and to have to clean the boiler afterwards.

### THE PROTECTION OF TIMBER PILES.

MANY and various have been the methods, processes, pigments, and solutions of all descriptions employed from early times to protect not only piles, but all timber work, from the terribly destructive attacks of that hither invincible little insect the *teredo navalis*, better known as the shipworm. It is notorious that the ravages of this never-ceasing diminutive borer cost the British authorities thousands and thousands of pounds every year for the repair, maintenance, and renewal of large quantities of timber used at our different seaports. In every land, and in every sea as well, this devastating little creature is the regular *bête noire* of the engineer; in whatever position under water, whether in the open ocean or in marshy, swampy, inundated ground, timber may be located, the shipworm goes for it at once with ruthless determination. It is a matter of history that to such an extent has it made its baneful influence felt that the low-lying districts of the Netherlands have several times been threatened with inundation in consequence of the wholesale perforation of the piles and other woodwork which serve to support the mounds and dykes of the country. It is just at about this time of the year that in our part of the world the larvae of these insects make their appearance, swimming about in the water and seeking where to lodge themselves and to effect the ultimate destruction of the friendly material which affords them shelter. Working its flinty shell forward like a veritable animal gimlet or drill, it bores a hole in the wood, not for the purpose, as frequently wrongly supposed of supplying itself with wood, but to effect a permanent lodgment in the interior



or heart of the timber. When it is borne in mind that the holes thus pierced have often a maximum diameter of nearly  $\frac{1}{2}$  in. the state to which before very long wood attacked in this manner will be reduced need not be described.

Experience has fully demonstrated that chemically prepared solutions and injectors, comprising salts of almost every known metal, as well as different descriptions and preparations of creosote, have been long experimented with and tried in vain. At the best they only—that is, a very few of them—procrastinate the evil but inevitable result, for the reason already stated—that the teredo does not eat the produce of his persevering and malignant labour. It appears that at last our friends across the Atlantic have come nigh to satisfactorily solving the problem, which we will now proceed to describe. Referring to Fig. 1,

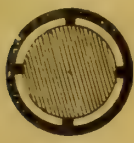


FIG. 1.

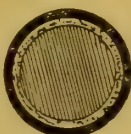


FIG. 2.

which represents a horizontal section taken along the line AB in Fig. 3, the shaded circular part in the centre is the timber pile, the outer black part of the figure is a cast-iron or a metal tube or pipe, which may or may not be, according to circumstances, of the full length of the pile itself, and the white portion is an annular space. A few temporary wooden plugs (shown in Figs. 1 and 3) are nailed to the pile to keep the clear space between the interior surface of the pipe and the body of the pile. The *modus operandi* is as follows:—So soon as the pile has been driven or sunk to its full depth the cast-iron pipe is lowered around and over it so as to completely encase it. After the necessary plumbing and adjustment, the annular space is filled in with Portland cement concrete grouting in the following proportions, by volume or bulk: one part of Portland cement, two parts of sand, and three parts of fine gravel, as shown in Figs. 1 and 3. It does

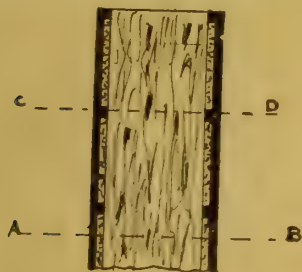


FIG. 3.

not require more than a very short time for so thin a layer of cement concrete to set, and then the pipe can be withdrawn ready for another operation. With a comparatively small stock of cast-iron casing pipes the work of protection could be carried on with great rapidity long before the destroying insects could get fairly to work.

As a proof of the practical efficacy of this method of protection for timber against its ancient and untiring enemy the experience gained on the Nashville and Louisville line of railway may be confidently alluded to; along this route over 4,300 piles have been protected upon the principle we have described and illustrated, though the details vary a little in different localities. The lapse of some years has confirmed the value of this method, not only in completely preventing the intrusion of the destructive invader, but in putting an end to his further depredations when he has succeeded in housing himself. Some piles coated in this manner have been drawn, denuded of their guardian casing and sawn through, and the teredos which had effected an entrance were discovered to be dead, probably stifled. It is evident, therefore, that even after the evil has commenced, provided it has not proceeded so far as to render the timber attacked worthless, the remedy can be successfully applied. Another mode of protecting

timber from the shipworm is to drive large flat-headed nails into it, but this is both a clumsy and an unscientific plan to pursue. In one sense, it makes holes in the timber, thus, to some extent, carrying out the work done by the torpedo itself. There is an undoubted smack of the *similia similibus curantur* principle in this method, which is still resorted to occasionally. T. C.

#### THE AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS.

THE summer meeting of the American Society of Heating and Ventilating Engineers was held at Atlantic City, N.J., on Friday, July 15. The first paper was by Mr. J. C. Northcott, and was entitled:

"SOME ACCEPTED TESTS OF VENTILATION—ARE THEY RELIABLE?"

Most of the methods and instruments by which we measure the results of ventilation have come into use within a generation. They are comparatively new, and to some extent defective. At the beginning of my paper, I wish to remind you that we are not to abandon methods of testing because they are defective until we have found other methods that are less defective; but I think it important to recognise their shortcomings.

#### TESTS FOR CARBONIC ACID GAS.

To discover the degree of impurity of air in occupied rooms it is usual to determine the proportion of carbonic acid gas. The excess of this gas over that which is normal to outside air in a clean locality is taken as showing the degree of impurity. For two reasons this test is only approximate. In the first place, carbonic acid gas is not the only, nor the worst, poison discharged into the air of an occupied room. An eminent authority states that "a man of average weight throws off through the skin during the 24 hours about 18oz. of water, 300gr. of solid matter, and 400gr. of carbonic acid gas." This is nearly 3lb. of poisonous matter discharged into the surrounding air by every vigorous adult in each 24 hours. But less than one-third of this is carbonic acid gas. It is well known that the solid matter of excretion in an occupied room is a most deadly poison. We have no accurate means of testing its volume, except by laborious processes in the laboratory not available or practicable for general use. A well-regulated nose is the only instrument in general use which will detect the presence of this poison. We should always remember that the well-known odour of air vitiated by a crowd does not come from carbonic acid gas, but from the crowd poison, which is represented by organic and decaying matter exhaled from the bodies of occupants. We exhale filth through every pore of the skin, and this discharge is quite as offensive and as poisonous as any other discharge from the human body. You have often remarked the pallid face, the dulled and flattened eye of a prisoner in many of our gables—and I might also say prisoners in some of our schools. This is not so much the result of the excess of carbonic acid gas as of that other form of crowd poison. You may take a crowded school-room, with an ample supply of pure air through an overhead register. Now lower a window from the top. The circulation of pure air will be ample through the room, but it will be almost entirely overhead. The children sitting just below this flowing current of pure air are discharging from the lungs carbonic acid gas, while both from lungs and skin they are discharging organic matter. Much of the carbonic acid gas is discharged upon the air at a temperature of about 92°. The organic matter—most of it—is not so warm. It is also heavier. Impelled by the breath, the carbonic-acid gas will at first ascend because warmer than the stratum of air into which it is breathed. Most of it will be caught in the outgoing currents above the heads of the children, and thus be carried away through the open window, while most of the other form of crowd poison—and the deadlier form—will, because cooler and heavier, remain in the lower and occupied stratum of air. Now let the experimenter come into this room and test that stratum of air in which the children are sitting. He will find it comparatively free from excess of carbonic-acid gas. If he is unwise, he will announce the conclusion that the air which the children are breathing is comparatively pure. But it will be a mistake. I have often heard it remarked that men who work with carbonic acid gas (as it is used in some

of the arts) do not show the ill effects which we would suppose. The reason is that an excess of carbonic acid gas is not the most deadly poison of vitiated air. Yet I concede that the test for carbonic acid gas in vitiated air is, under carefully-guarded circumstances, approximately correct, and, if rightly used, is of great value. This is true, because an excess of carbonic acid gas is ordinarily a close companion of all other forms of crowd poison. Its presence indicates the presence of its ally. *The Lime-Water Test.*—This test aims to determine the presence of carbonic acid gas. It does not, except by inference, determine the presence of other forms of crowd poison. It is not necessary that I attempt to describe the lime-water test other than in a general way. It depends upon the fact that carbonic acid gas passed into and through lime water will precipitate the lime in the water, making the water, which was at first absolutely clear, to be more or less clouded and dense with chalky matter. The amount of carbonic acid gas discharged through the water determines the degree of density. With the Wolpert air-tester, for example, you are to determine the volume of carbonic acid gas that is passed through the water by the number of times you have discharged a bulb full of contaminated air through the lime-water before the water becomes so dense that a black spot at the bottom is obscured. Now, it is evident that the experimenter may, or may not, exhaust the bulb, or air-pump, to the last degree at each filling. He may, or may not, inadvertently fill the bulb from that limited area of air immediately surrounding his own head, and into which he has just that instant discharged the contents of his own heated lungs. Again, to determine when the black spot can no longer be seen through the lime-water is a question of vision. It might be obscured to me, while you, with better eyes, can still see it. Everyone who has made use of this test knows how difficult it is to be quite sure when the vanishing point is reached.

#### THE ANEMOMETER.

The anemometer is the most useful instrument in determining the results of ventilation. It should be delicately adjusted, and carefully kept so. We should remember that ventilation is, more than anything else, dilution, and so, after all, the best test of adequate ventilation is the anemometer test. And yet the anemometer, even if a good one, in the hands of an inexperienced or injudicious person, is an unscrupulous liar. Let me illustrate. You may take a box or room, through which you shall flow a given volume of air. We will suppose that the air is being discharged at the rate of 400c.ft. per minute. Now, if the exhaust—at the floor, for example—be 14in. long and only 1in. high, and if the air is flowing at a velocity of 400ft. per minute, you will maintain the conditions of our problem. We will suppose that the air-meter has a wheel 3in. in diameter. You may set this anemometer in this shallow current and it will not serve to measure the outflowing air, simply because the current is not deep enough to attack the screw and impel the wheel. If, now, without otherwise changing your box, or room, you shall close up the long shallow opening and make another opening 12in. high and 12in. wide, the area at the discharge will still be maintained. The former velocity being also maintained, the discharge will again be 400c.ft. per minute. Now, put your anemometer in this current and (making the proper correction for friction) it will register with fidelity. The case I have supposed is an extreme one, yet we many times approach such conditions, or similar conditions, in actual work. So we come again to the fact that the results of even this best instrument we know—the air meter—may be only approximate, and it is clear that in the hands of an inexperienced person it may be of little value. I conclude as I began: We must continue to use tests which we recognise as in some measure defective. We continue to use them because they are the best known. We shall be careful, however, to make these tests with a full knowledge of their shortcomings, and a disposition to carefully watch for every affecting circumstance. In the mean time we will urge invention to find better instruments for our purpose.

In the discussion of the paper Mr. W. McMannis stated that he depended upon the anemometer to determine the degree of ventilation obtained in the New York schools.

Mr. S. A. Jellett spoke of the unreliability of



anemometers, and said that even at the best the results obtained from them were only an approximation.

#### BUILDING TUNNELS.

**A**N ingenious mode of tunnel construction is given in an American engineering journal. The lower section of the tunnel is built of rubble stonework in one-third Portland cement mortar. On the top of this section a wooden form was placed, having its profile adapted with the inside curve of tunnel, and at the end of each form pieces were extended upon which were laid the outer planking. The space formed between the inside and outside line was filled in with concrete. These forms were made in 16ft. lengths, each form being in two sections, so as to be easily removed after the concrete set. The forms were then moved on to the next section, and the process of filling continued. Before the concrete was filled in, the forms were connected by tie-rods at bottom and top. The bottom tie was in the form of three links, so that when the middle link was unhooked the end pieces could be drawn into the tunnel. These forms may be described as a frame or bracket of timber outside the upper section of tunnel, the inner line agreeing with the curve.

#### THE MONUMENT TO THE DUKE OF CLARENCE.

**T**HE monument to the Duke of Clarence in the Albert Chapel at Windsor, though not yet completed in all its details, is in its place. The site of the tomb is the exact place where Cardinal Wolsey was permitted by his master to place the sarcophagus in which he himself intended ultimately to be laid. No exact record remains of what this Wolsey tomb as a whole was like; but it was designed by Torrigiani, and round the sarcophagus were railings and candelabra of gilt metal. The sarcophagus itself remained till the beginning of the present century, when it was removed to the crypt of St. Paul's, with the intention that it should receive the body of Nelson. For this it was found too small, and, as a matter of fact, the hero's body rests below it. On the spot where it stood for nearly three centuries there now stands the sarcophagus which contains the body of the Duke of Clarence and Avondale; a sarcophagus of Mexican onyx, with the recumbent effigy above, and around it the grille. The cover of the sarcophagus is of bronze planned so as to afford a natural resting-place for the effigy, in itself the most important part of the monument, though at some distance above the eye, so that not all the details can be fully seen. The young Prince, clothed in his uniform as an officer of the 10th Hussars, over which are the robes of the Garter, is lying asleep; at his feet there will ultimately be (though it is not yet in place) a little angel holding a broken wedding-wreath, in allusion to the marriage which was to have been, but was prevented by death. At his head is the bowed figure of a larger angel, who holds the crown of eternal glory which the Prince is to receive in exchange for the earthly crown; and this crown is interwoven with a wreath of olive, the emblem of peace. These angels are of aluminium, a metal which Mr. Gilbert is almost the earliest of our sculptors to employ, and although they have been now cast for some years, they have not changed colour. Mr. Gilbert's habit of using several different materials in close conjunction finds full scope in the effigy, as it does in the enrichments of the monument. The face and hands, for instance, are of one material, the dress of another, while of the robes of the Order of the Garter the outside is of bronze, the inside of aluminium. The distinguishing feature of the monument is the high grille, or railing, which surrounds it. Measuring perhaps 14ft. by 7ft., this grille is raised a little from the ground by a pedestal of marble, the pale colour of which lightens the appearance of the whole structure. The note of the design is given by the 12 figures of saints, to which all the rest serves as a support. On either side there are four, at each end two. At present only the St. George is there, having been placed by the Queen herself a few weeks ago in a position which is not to be its permanent one, but which will permit the public to see it on days when the chapel is open. Ultimately the places at the foot of the tomb will be occupied

by the Virgin and St. George. At the head will be St. Edward the Confessor and St. Edmund King and Martyr—the "name saints" of the Prince; to the south will be St. Elizabeth of Hungary—suggested by the Queen as representing the Hungarian ancestry of the late Prince Consort—St. Michael, "the angel of good counsel, and guardian of the spirits of the dead"; St. Margaret for Scotland, and St. Patrick for Ireland. Of these St. Michael and St. Patrick have also a reference to two of the Prince's orders. To the north will be St. Nicholas, St. Etheldreda (for Cambridge and the eastern counties, whence the title of Clarence was taken), St. Hubert, and St. Barbara, representing Fortitude. St. George is radiant in his almost white armour, of the new metal which Mr. Gilbert loves; St. Elizabeth, on the other hand, will be of many colours richly enamelled, and ivory has been freely used for the heads and hands. The stand on which each saint is placed is the conventional rendering of a town; and this in turn is supported by two angels, lovely figures in flowing draperies of bronze and silver, with wings whose fanciful pattern is wrought into a number of curves. Between the saints are columns of bronze.

#### TORONTO CITY BUILDINGS.

##### CAPPING THE TOWER.

**A** UNIQUE ceremony took place at the top of the Toronto New City Buildings on July 14. The means of ascent was the strong box in which the contractor has been accustomed to send up bricks and stone; but for this occasion it had been draped in flags and seats provided. A cheer was sent up as, in obedience to the signal, the box slowly rose from the ground. "I guess I'll get all I ask of the board now I have them on this trip," yelled the architect, as the box swung slowly around about 10ft. in the air. It took fifteen minutes exactly to make the trip to the top of the tower. Several other loads were carried up, and when the ceremony commenced there were about fifty people on top of the tower, from which a magnificent view of the surrounding country was obtained. The sensations as the box swung around some 240ft. in the air, with nothing but a  $\frac{1}{2}$ in. cable to hold it aloft, were lost in admiration of the magnificent panorama which spread out beneath.

##### AN ELEVATED GATHERING.

Among those who were present on the top when the ceremony of laying the stones commenced were: Architect Lennox, contractors Dinis, Arthur Dinis, clerk of works Somers, caretaker Moffat, and Alex. Marshall, forman of the stonework.

The chairman of the property committee, Ald. Dunn, laid the closing stone, and Ald. Leslie, as vice-chairman of the board of control, declared it well and truly laid. Mrs. Shaw then laid the finishing stone in the south-west corner of the tower, and Mayor Shaw declared it well and truly laid.

The Mayor, after performing the ceremony, standing upon the platform beside the stone, proposed the health of the architect. He said: We have laid the top stone of this splendid tower of this magnificent building, and it is only due to the architect to say how much we admire the ability and genius which has erected this grand building.

Architect Lennox, in reply, preferred to let his work speak for him, and assured the Mayor that his aim had been to carry on the work in accordance with what he believed to be his duty to the city. He contrasted the *décor* of the occasion of laying the corner-stone, when the mayor and aldermen came to the building in a drag drawn by white horses. Now, when the mayor came with Mrs. Shaw to lay the top stone, exactly 240ft. above that corner-stone, they all came up in a brick-box. The tower is probably one of the most substantial and best erected towers to be found in the world. It stands 240ft. high, and will be capped with a spire 45ft. high. It spreads out on a concrete foundation of 72ft. square, which carries on it about 14,000 tons of weight. It has stood without any settlement whatever.

The first section of the restoration works on the north wall of Crowland Abbey is nearly complete, and the work of raising a further portion of the wall will be begun almost immediately.

#### THREE-HINGED MASONRY ARCHES; LONG SPANS ESPECIALLY CONSIDERED.\*

By DAVID A. MOLITOR, M.Am.Soc.C.E.

##### INTRODUCTORY.

**T**HE advantages which well-designed masonry arches offer, as compared with the less durable structures of iron and steel, have been adequately demonstrated by modern experience. The cost and maintenance of iron and steel bridges, together with their more or less limited lasting qualities, are sometimes offset by the ease, simplicity, and accuracy of design and erection to which they are susceptible. The time allowable for construction may also, in many cases, weigh strongly in their favour. However, the many masonry arches built centuries ago—a few antedating written history—are indisputable evidences of permanency. Few of these arches have required any repairs, and their cost of maintenance has amounted to almost nothing—a fact not to be realised in metal bridges. The purpose of this paper is to demonstrate that masonry arches may be constructed on any good foundation, such as hard clay, and that they will admit of an accuracy and simplicity of design quite equal to that attainable for similar structures of iron or steel. In many instances concrete arches are even cheaper in first cost than metal bridges. Besides, the former possess the additional advantages of permanency and low cost of maintenance. Recent progress, achieved through the earnest labours of German, French, and Austrian engineers, has destined the masonry arch to become the successful competitor of iron and steel bridges, whenever the natural conditions of foundations and length of span do not offer unsurmountable difficulties. The great advances accomplished in the manufacture of cements during the past ten years, the elaborate arch tests made by the Austrian Society of Engineers and Architects from 1890 to 1895, and the construction of a few three-hinged masonry and concrete arches, venturing the adoption of high-unit stresses, low factors of safety, and long spans; these mark the arrival of a new era in masonry bridge construction. However, many difficulties are encountered in the construction of fixed masonry arches, owing particularly to insufficient elasticity in the masonry. The natural deformations in the arch, caused by shrinkage of the masonry, setting of mortar, stress and temperature, usually cause cracks which, while rarely of a serious character, are reasons for discouragement to the engineer, who has probably applied every known precaution to prevent their occurrence. According to the recommendations of the Austrian Society of Engineers and Architects, as a result of their elaborate tests, a fixed masonry arch should be constructed only when the following conditions can be realised:

1. The abutments must be absolutely rigid.
2. The falsework must retain its form during the construction of the arch ring.
3. The material (stone and mortar) must be of the best quality.
4. The construction of the arch ring must be most carefully conducted.
5. The falsework must not be released until the mortar has thoroughly set.
6. When the falsework is released it must be done gradually and uniformly.

These conditions, except the two first named, can always be fulfilled, though the lack of rigidity of abutments and falsework are the two great obstacles in the way of long-span masonry arches without hinges. In matters pertaining to the design of fixed masonry arches, it is safe to say that the method based on the theory of elasticity is the only one entitled to full confidence and permitting of an analysis corresponding in accuracy with the knowable properties of the material. All other methods are too approximate to admit of close designing, such as the modern status of engineering science would generally demand. This modern and most exact method, however, is not free from criticism. While the fundamental principles of the theory are almost axiomatic, their final application to the solution of stresses is extremely complicated—so much so that few engineers can be credited with the patience and earnest endurance to master either the method or the solution of a problem to which it is applied. Therefore, unless the masonry arch can be so treated as to combine clearness, simplicity, un-

\* Read before the American Society of Civil Engineers.



doubted accuracy and economy in design with faultless construction, the field of usefulness of this class of structure will remain restricted, and such monuments as the Cabin John Bridge will continue to remain curiosities of rare production. This is not what the masonry arch deserves, in view of its practically everlasting life, nominal cost of maintenance, and naturally aesthetic form, which latter should be a prime factor, though rarely given much consideration, in the choice of a bridge. Essentially all the harassing features of fixed masonry arches are overcome by the introduction of hinges at the crown and abutments, thus permitting a rigid analytical treatment and affording almost absolute safety against cracks, even though small settlements may take place in the abutments. The idea was introduced by Koepke, of Dresden, in 1880, by providing open joints at crown and haunches. Karl v. Leibbrand, Stuttgart, in 1885, substituted sheet lead for the open joints, and in 1893 applied cast-iron hinged bearings. The author, as early as 1898, while engaged on the construction of the strategical railway Weizen-Immendingen, Baden, Germany, advocated metal hinges for masonry arches, but prejudice and custom prevented a practical application being made at that time. Some of the noteworthy bridges which have been constructed with hinges or hinge-like joints are briefly described in the following:—

1. Bridges on the railroads of Saxony, built in 1880, by Koepke. The largest was of sandstone, 13m. span, 3m. rise, thickness of arch ring 0.50m. to 0.60m. Hinges consisted of a convex surface of sandstone, radius = 0.977m., rolling in a concave surface, radius  $\times 1.105$ m. The maximum unit stress was 12.87atm. Several arches of this type were constructed—some with only two hinges, and some of concrete. All gave excellent satisfaction.

2. Sandstone bridge over the Enz River near Hoesen, Germany, built by Leibbrand, in 1885. Span, 28m.; rise, 2.8m.; maximum stress, 24atm. Hinge-like joints of sheet lead. Several other bridges of this type were built in 1886 to 1890. The unit stresses were successively increased until 56.4atm. were attained on the Forbach Bridge, in Biersbronn, using sandstone of 563atm. breaking strength.

3. Concrete arch over the Danube River, near Munderkingen, Wurtemberg, built by K. v. Leibbrand, in 1893. Span, 50m.; rise, 5m.; thickness of arch, 1m. at crown, 1.4m. at quarter points, and 1.1m. at abutments. This arch was constructed as a three-hinged arch, and was the first masonry arch with actual hinged joints. The maximum compression in the arch was 34.6atm. and 57atm. adjacent to the steel hinges. The concrete was composed of 1 part Portland cement to  $2\frac{1}{2}$  parts sand and 5 parts broken limestone, showing an ultimate compressive strength of 254atm. in 28 days and 520atm. in 2 years and 7 months. The settlement at the crown, from the time of closing the arch ring to the entire completion, was 13.1cm. One abutment is founded on rock, the other has a pile foundation.

4. Concrete bridge over the Danube near Rechtenstein, Wurtemberg, built in 1893 by Engineer Braun. This bridge is made up of two arches, each of 23m. span and 2.5m. rise; the thickness of the arch is 0.65m. at the crown and 0.9m. at the haunches. Concrete for arch ring was composed of 1 part Portland cement to  $2\frac{1}{2}$  parts sand to 5 parts gravel and  $\frac{1}{2}$  part quarry stone. The hinges are 18cm. and 20cm. lead strips for the crown and abutments respectively. The highest stress in the arch ring was 18atm., and the settlements at the crowns of the two spans were 4cm. and 3cm. One abutment was founded on piles, the other on gravel and boulder strata, and the middle pier on solid rock.

5. Bridge de la Coulouvrenière, over the Rhône river, in Geneva, Switzerland, built in 1895 by Engineer Buttiaz. This bridge was made of concrete, and consists of two main arches spanning 40m. each, with a rise of 5.55m. each, separated by a small span of 14m., and a 12m. arch adjoining the abutment of one of the main arches. The large spans were patterned after the arch at Munderkingen, and the small spans were supplied with lead joints, as the bridge at Rechtenstein.

6. Concrete bridge over the Danube, near Inzighofen, Wurtemberg, built in 1896, by Max Leibbrand. Span 43m.; rise 4.46m. hinged at crown and abutments with cast-iron hinged pedestals. Thickness of arch ring, 0.7m. at

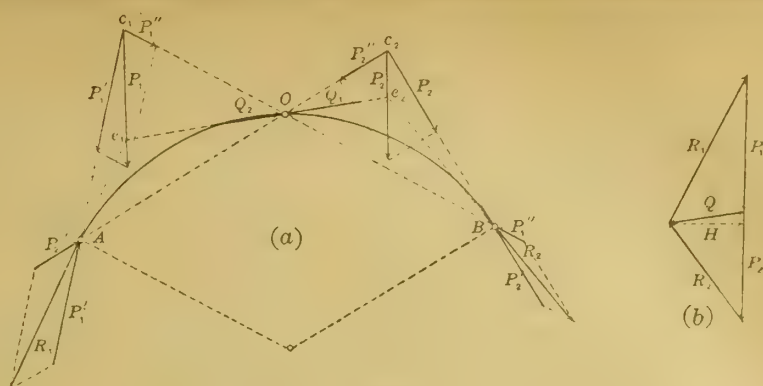


FIG. 1.

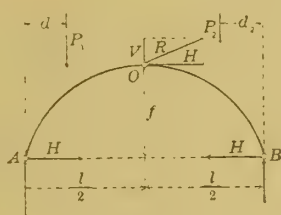


FIG. 2.

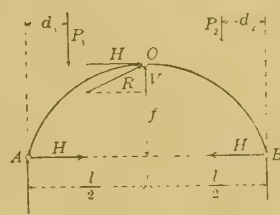


FIG. 3.

crown, 1.1m. at quarter points, and 0.78m. at abutments. Maximum stress, 36.5atm. in compression, and 1atm. in tension. Concrete for arch ring was composed of 1 part Portland cement to  $2\frac{1}{2}$  parts sand to 4 parts crushed limestone with  $\frac{1}{2}$  part limestone screenings. Settlement of arch during construction (four months) was 8cm. All the above-mentioned hinged and semi-hinged arches, besides others which could not be enumerated here, have given excellent satisfaction and have developed no cracks, even though some were founded on piles, and others on clay foundations. Age will undoubtedly be beneficial rather than detrimental, which has never been said for iron or steel bridges. The oldest concrete bridge seems to have been built in Switzerland near Aarau, in 1840, using Roman cement. This bridge has a span of 7.2m., and a rise of 3m. Even this cement, which is not as good as most natural cements, has stood the test of time. With the adoption of three hinges and the evidence just submitted, it will be possible to construct a masonry arch on almost any moderately good foundation and with reasonable assurance against cracks, both during and after construction, all of which should be regarded as a welcome step in advance. This feature also makes it possible to determine the stresses for any system of loading with accuracy and certainty, also to stress the material from one-tenth to one-sixth its ultimate strength as obtained from test samples. All these advantages combined in the three-hinged masonry arch place it on a high plane of engineering perfection. It is hoped that this paper may be the means of introducing this form of arch construction into the United States. In the following, all dimensions are given in the metric system simply for convenience in computations, but the formulas are equally applicable to any other system of units. The abbreviations used are:—

1 mètre	= 1m.	= 3.2809ft.
1 square mètre	= 1m. <sup>2</sup>	= 10.7641sq.ft.
1 cubic mètre	= 1m. <sup>3</sup>	= 35.3156cu.ft.
1 centimètre	= 1cm.	= 0.3937in.
1 kilogram	= 1kl.	= 2.2046lb. avoird.
1 atmosphere	= 1atm.	= 0.9492 English atm.
	= 1kl. per cm. <sup>2</sup>	= 14.223lb. per square inch.

#### THEORETICAL DEDUCTIONS.

I.—General equations for the three-hinged arch.—(a) *Applied Forces and Reactions.*—Given the arch, Fig. 1, with hinged joints at A, B, and O, acted upon by the forces  $P_1$  and  $P_2$ , assumed to represent the resultants of all vertical loads applied respectively to the left and right of the crown O. Required to find the reactions at the hinges A, B, and O. The thrust produced by  $P_1$  on the segment OB must pass through the hinge O, the only point of contact between the segments AO and OB. This thrust must also pass through the hinge B, otherwise the segment OB would rotate about B. Also, the intersection of OB with the force  $P_1$  must be a point on the

line of the reaction produced by  $P_1$  in A. The reactions in A and B, produced by  $P_1$  are, therefore,  $P_1'$  and  $P_1''$ , respectively, determined by the resolution of  $P_1$  in the parallelogram indicated. In like manner the reactions produced by  $P_2$  are found to be  $P_2'$  and  $P_2''$ , acting in A and B respectively. The resultant reactions in A and B are then  $R_1$  and  $R_2$ , respectively,  $R_1$  being the resultant of  $P_1'$  and  $P_2'$  and  $R_2$  the resultant of  $P_1''$  and  $P_2''$ . If the forces  $R_1$ ,  $R_2$ ,  $P_1$ , and  $P_2$  are combined in a force polygon, Fig. 1 b, and the equilibrium polygon  $A e_1 O e_2 B$  is drawn, it will be seen that the reactions  $Q$  are equal and opposite, and that the line of action of  $e_1 O e_2$  is a straight line passing through the hinge O. This equilibrium polygon is called the line of thrust for the given forces. The horizontal components of  $Q_1$ ,  $Q_2$ ,  $R_1$ , and  $R_2$  are all equal to  $H$  (see Fig. 1 b), which is called the horizontal thrust, and is constant for any point of the arch. The vertical components of  $R_1$  and  $R_2$  are the vertical reactions in A and B respectively, and the vertical component  $V$  of  $Q$  represents the shear at the crown O. Only these horizontal and vertical components of the reactions in A, O, and B will be considered in the following, and will be called "the reactions." The general expressions for the reactions of a three-hinged arch will now be found. Assume, in Fig. 2, the segment OB removed and a force  $R_1$  resolved into components  $H$  (horizontal) and  $V$  (vertical), replacing the action of OB on O. The moment equation about A is—

$$P_1 d_1 - Hf + \frac{Vl}{2} = 0 \dots\dots\dots (1)$$

Similarly assume, in Fig. 3, the segment OA removed, and the equilibrium of segment OB preserved by the force  $R_2$  (equal and opposite to  $R_1$  in Fig. 2) resolved into components  $H$  and  $V$  as before. The moment equation about B is—

$$-P_2 d_2 + Hf + \frac{Vl}{2} = 0 \dots\dots\dots (2)$$

evaluating  $H$  and  $V$  from (1) and (2)—

$$H = \frac{1}{2f} (P_2 d_2 + P_1 d_1) \dots\dots\dots (3)$$

$$\text{and—} \quad V = \frac{1}{l} (P_2 d_2 - P_1 d_1) \dots\dots\dots (4)$$

The vertical reactions are obtained as follows from the equations for shear. With reference to Figs. 2 and 3—

$$A = P_1 + V = P_1 + \frac{1}{l} (P_2 d_2 - P_1 d_1) = \frac{P_1 (l - d_1) + P_2 d_2}{l} \dots\dots (5)$$

$$B = P_2 - V = P_2 - \frac{1}{l} (P_2 d_2 - P_1 d_1) = \frac{P_2 (l - d_2) + P_1 d_1}{l} \dots\dots (6)$$

From (5) and (6) it will be seen that the reactions A and B are identical with the reactions of a



simple beam supported at A and B. The value of R obtained from either Fig. 2 or Fig. 3 is—

$$R = \sqrt{H^2 + V^2} = \sqrt{H^2 + S^2} \dots (7)$$

which expression holds good for the resultant thrust at any point of the line of thrust, S being the shear at the point in question. It follows from (3) that all forces acting on the arch, at points between A and B, affect H positively, while this is not true of the reactions A, B, and V.

(b) *Reactions Resulting from a Train of Concentrated Loads, Coming on the Span from the Right-hand Abutment.*—The laws indicated by equations (3), (4), (5), and (6) are applied in deducing the expressions for the general case of loading, Fig. 4, as follows—

$$H = \frac{1}{2f} \left[ \sum_0^B P d + \sum_0^A P (l - d) \right] \dots (8)$$

$$V = \frac{1}{l} \left[ \sum_0^B P d - \sum_0^A P (l - d) \right] \dots (9)$$

$$A = \frac{1}{l} \sum_0^B P d \dots (10)$$

$$B = \frac{1}{l} \sum_0^A P (l - d) \dots (11)$$

Also, the shear at any point *m* distant *a* from the crown O is found as for a beam of span AB = *l*, and is—

$$S = A - \sum_m^A P = \frac{1}{l} \sum_0^B P d - \sum_m^A P \dots (12)$$

In the above equations the expressions  $\sum_0^B P d$  is used to indicate the sum of the products *Pd* for all loads acting between the points O and B. (Other expressions of summations are to be interpreted accordingly.)

(c) *Reactions Resulting from a Uniform Live Load per Unit of Length, Coming on the Span from the Right-hand Abutment and Extending over the Span to a Distance *e* to the Left of the Crown O.*—The following equations are obtained analogous to equations, (8), (9), (10), and (11)—

$$H = \frac{1}{2f} \left[ \frac{p l^2}{2} + \frac{p e (l - e)}{2} \right] \dots (13)$$

$$V = \frac{1}{l} \left[ \frac{p l^2}{8} - \frac{p e (l - e)}{2} \right] \dots (14)$$

$$A = \frac{p}{2l} \left( \frac{l}{2} + e \right)^2 \dots (15)$$

$$B = p \left( \frac{l}{2} + e \right) - A \\ = \frac{p}{2l} \left( \frac{3l^2}{4} + e l - e^2 \right) \dots (16)$$

(d) *Symmetrical Loading.*—For equal loads placed symmetrically with respect to the crown, or for symmetrical loading, equations (3), (4), (5), and (6), also equations (8), (9), (10), and (11), give the following special values:—

$$H = \frac{\sum_0^A P d}{f}, \quad V = 0 \text{ and } A = B = \sum_0^A P.$$

For uniformly distributed load over the entire span,  $e = \frac{l}{2}$  and equations (13), (14), (15), and (16), give—

$$H = \frac{p l^2}{8}, \quad V = 0 \text{ and } A = B = \frac{p l}{2}.$$

As only symmetrically shaped arches are to be treated in the following, the analysis will be confined to only the half-span.

#### II.—POSITION OF A MOVING LOAD FOR MAXIMUM STRESSES.

For any arch of centre line A O B and hinged at A, O, and B, Fig. 5, the reaction at B, resulting from any load *P* to the left of O, will have the direction C O B, and the reaction at A will pass through A and C. The reaction A will then produce a moment about any point *m'* of the arch centre line, which will be negative or positive accordingly as this point *m'* is above or below the line A C, and this moment will become zero for a point *m* on the line A C. Hence the vertical through C is the dividing line of loads or load divide for positive and negative influences on the moment about *m*, which point is the intersection of the line A C with the centre line A O B, though more properly the line of thrust. Hence a system of loads covering the span from the right abutment B up to C, will produce maximum compression in the fibres of the intrados and maximum tension (if any) in the fibres of the extrados for the arch section at *m*.

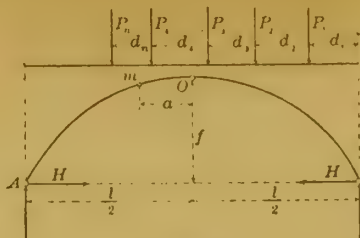


FIG. 4.

Also, a system of loads covering the span from the abutment at A up to C will produce maximum compression in the fibres of the extrados and maximum tension (if any) in the fibres of the intrados for this same arch section at *m*. Since the resultant thrust in masonry arches is usually confined to the middle third of the arch ring (see Section IV.) and accordingly this line of thrust is very nearly normal to the voussoir joints or *radii vectori*, it follows that the shear component of this thrust is necessarily small, and any discussion with regard to loading for maximum and minimum shears is considered superfluous, especially as the unit stresses are somewhat liberally chosen, owing to the rather uncertain properties of masonry.

#### III.—COMBINED ACTION OF DEAD AND LIVE LOADS.

(a) *Uniformly Distributed Live Load and Symmetrical Dead Load.*—1. Case of loading for maximum compression in the intrados for any point *m* of the left half of span. (This case of loading will also give the minimum stress in the extrados at *m*.) In accordance with the preceding, the live load must in this case cover the span from the right-hand abutment at D up to the load divide C for the point *m*, Fig. 6. The

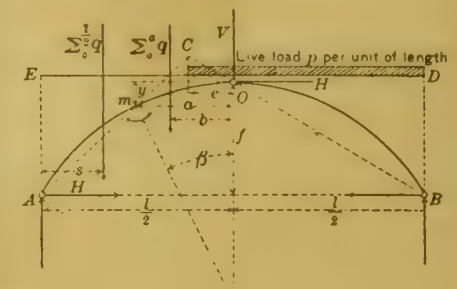


FIG. 6.

following definitions of terms will be adopted and retained throughout this work:—Let *m* be the point of application of the resultant thrust R of the external forces on any voussoir joint or radial section *mn* under consideration. Let *y* and *a* be the co-ordinates of the point *m*, referred to the rectangular axes O E and O n with origin at O.

$\sum_0^a q$  = resultant dead load of that portion of the span between O and *m*.

*b* = distance from O to line of action of  $\sum_0^a q$ .

$\sum_0^l q$  = resultant dead load for the half-span O A.

*s* = distance from A to the line of action of  $\sum_0^l q$ .

*p* = live load per unit of length, covering the span from D to C.

*e* = distance from crown O to the load divide C to the left of O.

H = horizontal thrust from total dead load A to B and live load from D to C.

V = shear at O due to live load D to C. The dead load being symmetrical does not affect V.

S = total shear at *m* from dead and live loads as assumed for H.

R = resultant thrust at *m* = resultant of H and S. This resultant passes through *m* and hence its moment about *m* must be zero; likewise the sum of the moments of the external forces about *m* must be zero.

Since the dead load is not uniformly distributed in the case of an arch, the quantities  $\sum_0^a q$  for successive positions of *m* are not proportional and must be obtained by summing the *q*'s. The entire arch is divided into vertical segments and the weight *q* of each is determined, as is also the

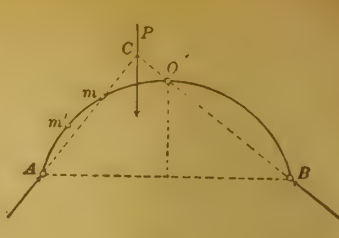


FIG. 5.

distance *r* from the crown O to the centre of gravity of each *q*. The distances *b* are obtained by dividing the sums of the moments *q r* by the

sums of the corresponding *q*'s, thus  $b = \frac{\sum_0^a q r}{\sum_0^a q}$ .

The moment of equation external forces about *m* is—

$$(a - b) \sum_0^a q + a V + e p \left( a - \frac{e}{2} \right) - H y = 0,$$

which when solved for *y* gives—

$$y = \frac{(a - b) \sum_0^a q + a V + e p \left( a - \frac{e}{2} \right)}{H}$$

wherein, from equations (13) and (14)—

$$V = \frac{1}{l} \left[ \frac{p l^2}{8} - p e \left( \frac{l - e}{2} \right) \right] \dots (17)$$

and—

$$H = \frac{1}{2f} \left[ \frac{p l^2}{2} + \frac{p e (l - e)}{2} \right]$$

Also, by analogy, with equations (12) and (15)—

$$S = A - \sum_0^l q = \frac{p}{2l} \left( \frac{l}{2} + e \right)^2 + \sum_0^l q - \sum_0^l q \\ = \frac{p}{2l} \left( \frac{l}{2} + e \right)^2 + \sum_0^l q \dots (18)$$

Now, since for any point, *m*, whose abscissa, *a*, is known or assumed, the ordinate *y* can be found from (17), the locus of *m*, for all points from A to O, is fully determined and can be drawn. This locus represents the extreme positions of all possible lines of thrust resulting from the combined action of dead load and moving live load. The loci of maximum and minimum effects give at once the data for obtaining the thickness of arching for every assumed point, *m* (see Section IV.)

(To be continued.)

#### OBITUARY.

MR. PETER M'KISSOCK, a well-known Glasgow contractor, died suddenly at his house at West Kilbride on Saturday. Deceased was concerned in the erection of many important buildings in Glasgow, among them being Queen Margaret College, Anderson's College, the new Northern Police Office, the addition to the post office in George-square, the Prince of Wales Bridge over the River Kelvin, the offices of the Fairfield Shipbuilding and Engineering Yard, and the addition to the High School. His firm are the contractors for the new Art Galleries at present being erected at Kelvin-grove. Deceased was a native of Ballantrae, and was in his 69th year.

Messrs. Douglas Young and Co., auctioneers, of 51, Coleman-street, have been instructed by the trustees of Mr. Ernest Terah Hooley to sell the famous Ashburton estates (some 11,000 acres in extent). The auction is announced to take place early in September.

The order for the new illuminated turret quarter clock for Leeds parish church has been given by Mr. H. R. Chorley, architect, on behalf of the vicar, churchwardens, and committee, to Messrs. Wm. Potts and Sons, of Leeds and Newcastle. Mr. Robert Potts, grandfather of the present head of the firm, made and fixed the present old clock.

The trustees of the National Gallery have purchased, under a special grant of money from the Treasury, two pictures by Rembrandt, the property of Lady De Saumarez, entitled "The Burgomaster" and the "Burgomaster's Wife," being portraits of an elderly man and an old lady not at present identified. These pictures will be hung in the principal Dutch Room. The "Virgin of the Rocks" has been transferred from the Florentine Room to the Milanese Room, where it is now hung between the two wings by Ambrogio de Predis recently purchased.



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ILLUSTRATIONS.

BROCKLEBANK MEMORIAL CHAPEL, HESWORTH CHURCH, CHESHIRE.—TROWBRIDGE TECHNICAL SCHOOL: FIRST AND SECOND PREMIATED DESIGNS.—THEATRE ROYAL, CHATHAM.—MUNICIPAL DWELLINGS FOR ARTISANS AT WEST HAM.

Our Illustrations.

BROCKLEBANK CHAPEL, HESWORTH CHURCH.

THIS building was the gift of Mr. Thomas Brocklebank and Mary Petrena, his wife, in memory of their father Ralph Brocklebank. It has been executed from the designs of Mr. J. Francis Doyle, architect, and the work carried out by Messrs. J. Thomas and Sons, contractors, Oxtou, Cheshire. The picture in the reredos is one of Our Saviour by an old Italian master. The parish church of Heswall was rebuilt in 1879 from the design of Mr. J. Francis Doyle.

TROWBRIDGE TECHNICAL SCHOOL: SELECTED DESIGN.

THE drawings here illustrated were prepared in accordance with the competition conditions, the construction and internal fittings being of the usual character. Externally, the building was proposed to be carried out in red sand-faced brick, and Bath stone, with red tile roofing, the window frames throughout being of wood, painted white. THOMAS DAVISON.

PROPOSED TECHNICAL SCHOOL, TROWBRIDGE: SECOND PREMIATED DESIGN.

THE design illustrated herewith was placed second in the recent competition by the assessor, Mr. E. W. Mountford, F.R.I.B.A. The architects are Messrs. Briggs and Wolstenholme, of Blackburn and Liverpool. Sixty-seven sets of drawings were submitted. The chief points aimed at in the plan were—top light to the weaving shed in basement, north light to the art rooms on second floor, and the laundry sufficiently isolated to prevent the steam, &c., proving an annoyance in other parts of the building. The cost of the building not having to exceed £5,500, a simple treatment was adopted for the elevations, and it was suggested, in order to keep within this sum, that red pressed bricks with buff terracotta dressings be utilised for the fronts. At the same time, however, it was felt that a stone treatment was more suitable for the locality.

THEATRE ROYAL, CHATHAM.

For description and further sketches see p. 168.

MUNICIPAL DWELLINGS FOR ARTISANS AT WEST HAM.

THE council's proposal is to erect 29 houses in a new road facing the Recreation Ground, Hermit-road, Canning Town. The plots have a

frontage of 16ft. and are 70ft. deep. Each house will contain two tenements—one occupying the ground floor and one the first floor, and approached by different entrances both at front and back. The accommodation provided consists of living-room, scullery, pantry, coal cupboard, water-closet, and two bedrooms, the ground at the rear being equally divided between the two tenements. The elevations are to be faced with best picked stocks, having red brick oversailing courses. The porch is to have Portland stone dressing. Plinths 3ft. high to be of Staffordshire blue bricks. The forecourts are to be paved with granolithic, and inclosed with wrought-iron railings. The plans and designs are by Mr. Lewis Angell, M.Inst.C.E., the borough engineer of West Ham.

COMPETITIONS.

BANGOUR.—The Edinburgh and District Lunacy Board met last week, and after considering the reports by Mr. W. H. Robertson, of H.M. Board of Works, architectural assessor in the competition, and Dr. Robertson, of Murthly, of the Perth District Asylum, medical expert on plans, and Messrs. Peter Lawrence and Co., ordained surveyors, appointed Mr. Hippolyte J. Blanc, R.S.A., to be architect for the new asylum, and awarded the following premiums:—First premium (£250), Messrs. M'Arthy and Watson, Edinburgh; second premium (£200), Mr. William Eaglesham, Ayr; third premium (£150), Messrs. Thomson and Sandilands, Glasgow; fourth premium (£100), Messrs. M'Gibbon and Ross, Edinburgh.

WIGAN.—On Thursday week a meeting of the building committee of the proposed Technical College for Wigan and district, convened by the chairman, Mr. Alfred Hewlett, was held at the Mining School. The chairman stated that there had been some delay in their movements, as they were unable to proceed until the Wigan Corporation had obtained Parliamentary powers with regard to the proposed site. He understood from Alderman Lamb, who was present, that the Bill embodying these powers now simply awaited the Royal assent, which was expected in a few days. This cleared the ground, and enabled the building committee, if they thought fit, to commence operations. The financial position was that, exclusive of the available site, and including the subscriptions paid and promised, and funds in hand previous to the appeal, the committee had available approximately £20,000. That was a good deal short of what they made it, and of what they would acquire; but, in his opinion, they would be justifiable in obtaining designs. Some time ago a resolution had been adopted authorising the building committee to arrange as to the site, and to obtain designs by competition, and, to assist them in this work, they had appointed as provisional architectural assessor Mr. Henry Hartley, F.R.I.B.A., of Liverpool. Documents had been distributed to the committee before the meeting embodying particulars, prepared by Mr. Percy, setting out the accommodation required, and, subject to the approval by the committee of those particulars, he should be glad to move that Mr. Percy, with the town clerk and the borough engineer, and their provisional architectural assessor, prepare the conditions of competition and instructions to architects, together with the needful site-plans, to be submitted to the committee at a meeting which he would call in about a fortnight. The suggestions of the chairman were unanimously approved.

Mr. John Tuck, builder, Morchard Bishop, committed suicide last week by hanging himself in a secluded part of Morchard Wood. Deceased had been in poor health for several months; had tried medical remedies and change of air, but without improvement.

The *Strand Magazine* for August contains an illustrated article by Mr. Harry Turner Hems upon "Making a Life Mask." He and his elder brother, Mr. Greville Hems, were the operators, and the subject whose mask was taken is Mr. Archibald V. Morgan, a member of the staff of Messrs. Harry Hems and Sons, who, it will be remembered, gallantly saved young Walter Roberts, an apprentice of the firm, from drowning at Weymouth last summer. The article describes the mode of operation in taking a life mask, and is illustrated with photographs of the various stages of the process. The photos were taken specially for the *Magazine* in Messrs. Harry Hems and Sons' studio in Longbrook-street, Exeter.

Engineering Notes.

ELECTRICAL TRAMWAYS AT BRADFORD.—The use of electricity as a means for the propulsion of tramcars for practical purposes was formally introduced in Bradford last Friday. The line extends from the General Post-office to Bolton, a distance of some two miles, and it touches Peel Park about midway. As the result of the traffic facilities, building operations will be encouraged, for the land along the route offers very eligible sites for residential property. The construction of the line and accessory features is upon the most approved principles, and the equipment generally complete in its effectiveness, adequate to all traffic demands, and affording comfort in travelling which is bound to be highly appreciated in a district which has been somewhat neglected up to the present time. At the outset a fifteen-minutes' service has been organised. The line was officially inspected by Sir Francis Marindin, of the Board of Trade, last Friday morning, and was pronounced satisfactory. Ald. Joseph Cowgill, chairman of the Tramways Committee, formally opened the line in the afternoon.

PROFESSIONAL AND TRADE SOCIETIES.

THE ARCHITECTURAL ASSOCIATION.—The fifth summer visit, to Arno's Grove, a very fine Queen Anne and Georgian mansion. The visit has been arranged by the courtesy of Mr. W. White, F.S.A., who will conduct the party over the mansion. The train leaves the local station (G.N.R.), King's Cross, at 2.31 for Palmer's Green. Members to meet at the booking-office in same at 2.15 p.m., when tickets at the reduced rate of 11d. each will be issued. Return train leaves Palmer's Green at 7.50 p.m. Names and addresses only to be sent to Mr. H. Dymoke-Wilkinson, 34, Granville-square, W.C., or to Mr. F. D. Clapham, Fryern House, Eltham, on or before Wednesday, August 17th.

CHIPS.

The execution of the Martyrs' Memorial, which is to be erected at Canterbury, has been intrusted to Messrs. J. Whitehead and Sons, Ltd., Westminster and Aberdeen. This firm is also executing the Martyrs' Memorial which is to be erected at Lewes.

On Wednesday, a largely attended meeting of townsmen was held in the Council Chamber, Bridgewater, to consider the desirability of erecting a memorial in Bridgewater in memory of Admiral Robert Blake, who was born in the borough. Mr. A. B. Cottam, architect, suggested the statue should be of bronze, and erected on the Cornhill. He estimated the cost at between £500 and £600. The meeting unanimously adopted a resolution that it was desirable to erect a statue on the Cornhill in memory of Admiral Blake. A representative committee was appointed to carry out the resolution.

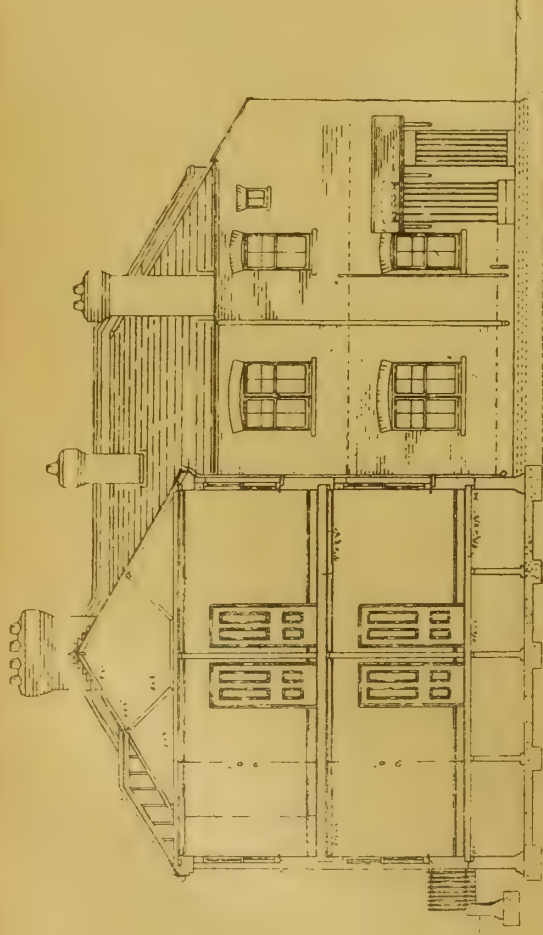
The Barry Castle Building Company, Limited (58,323), was registered July 23rd with a capital of £3,200, in £200 shares, to acquire, develop, and turn to account any land and other property in Glamorganshire or elsewhere. The number of directors is not to be less than three nor more than seven; the first are C. P. Bell, C. Ward, and H. J. Thomas; qualification, one share; remuneration as fixed by the company.

The Warwick's Revolving Towers Company have completed arrangements with the Great Central Railway Company for the erection of an observation tower on the promenade, to the west of the railway station at Cleethorpe. The tower is to be 155ft. high, and will have a car revolving around it adapted for seating 200 passengers. A pavilion is to be built at the base. The work will be commenced in October, and completed by the following Easter.

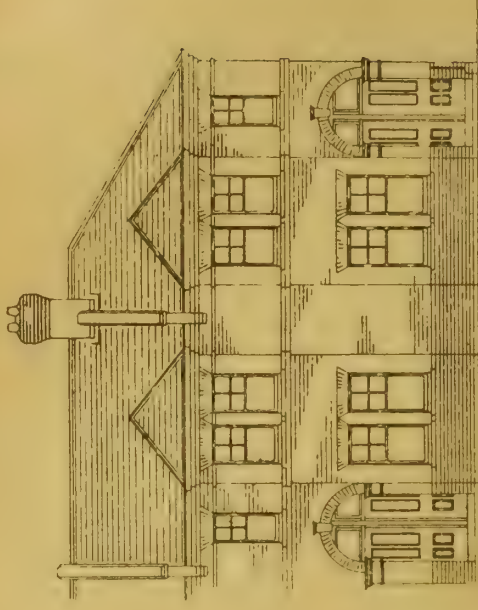
In February the Town Council of Canterbury decided to buy two houses in Guildford-street and also two in High-street, immediately adjoining the present Guildhall, for the purpose of obtaining an enlarged site for the erection of a new Guildhall and municipal building. Since then an adjoining property in the High-street (now occupied by Messrs. Clarke and Theobald) has been offered for £3,000, and at a special meeting last week the town council decided to purchase the property.

Messrs. DeDonald and Abernethy, the engineers for Heysham Harbour, report that good progress has been made with this work during the past half-year. The outer sea embankments have been formed for rather more than half their total length, for which purpose about 200,000 cubic yards of material has been excavated from the adjoining cliffs.

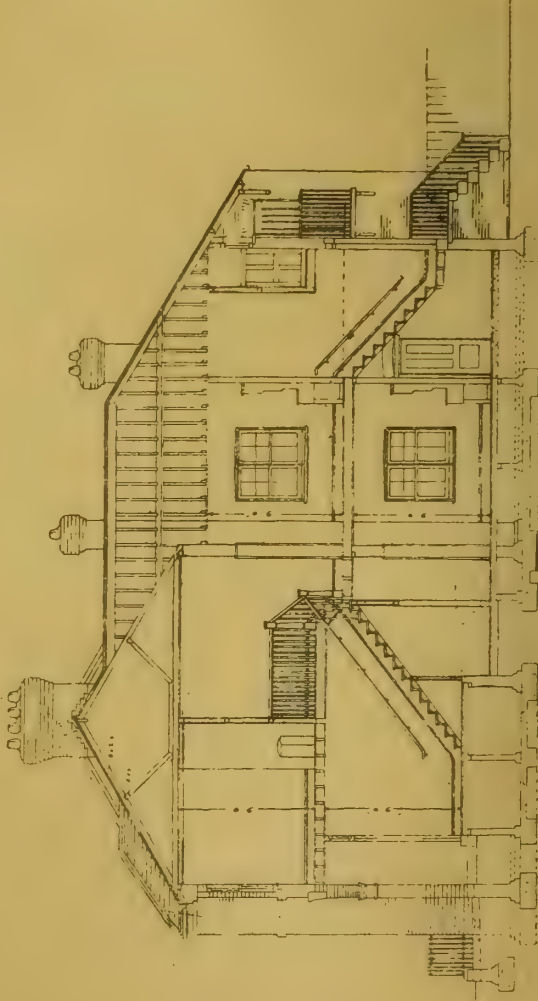




—Section C.D.—



—Front Elevation (End View)—



—Section A.B.—



—Elevation—

—Stair—









E

D

C

B

A

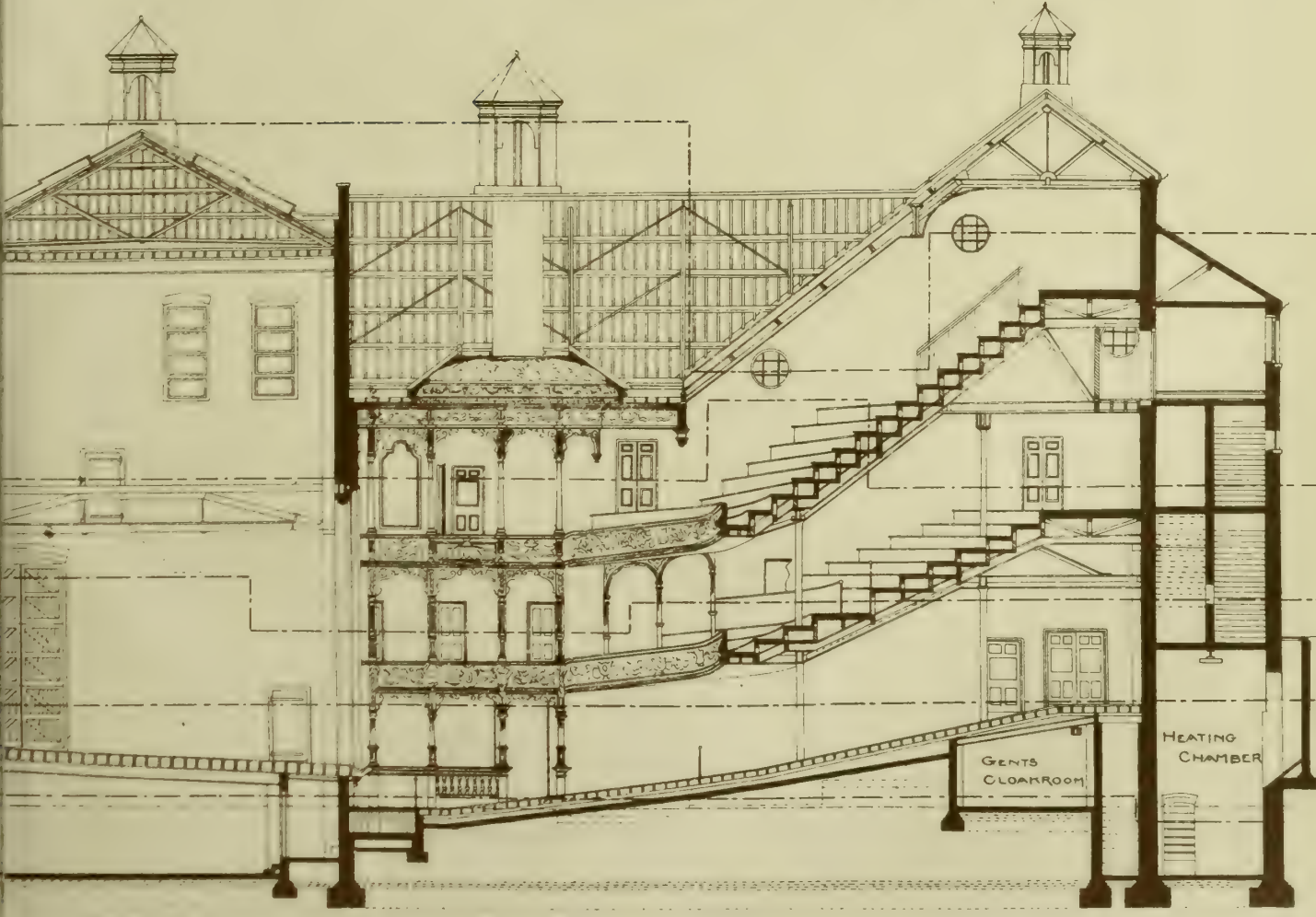
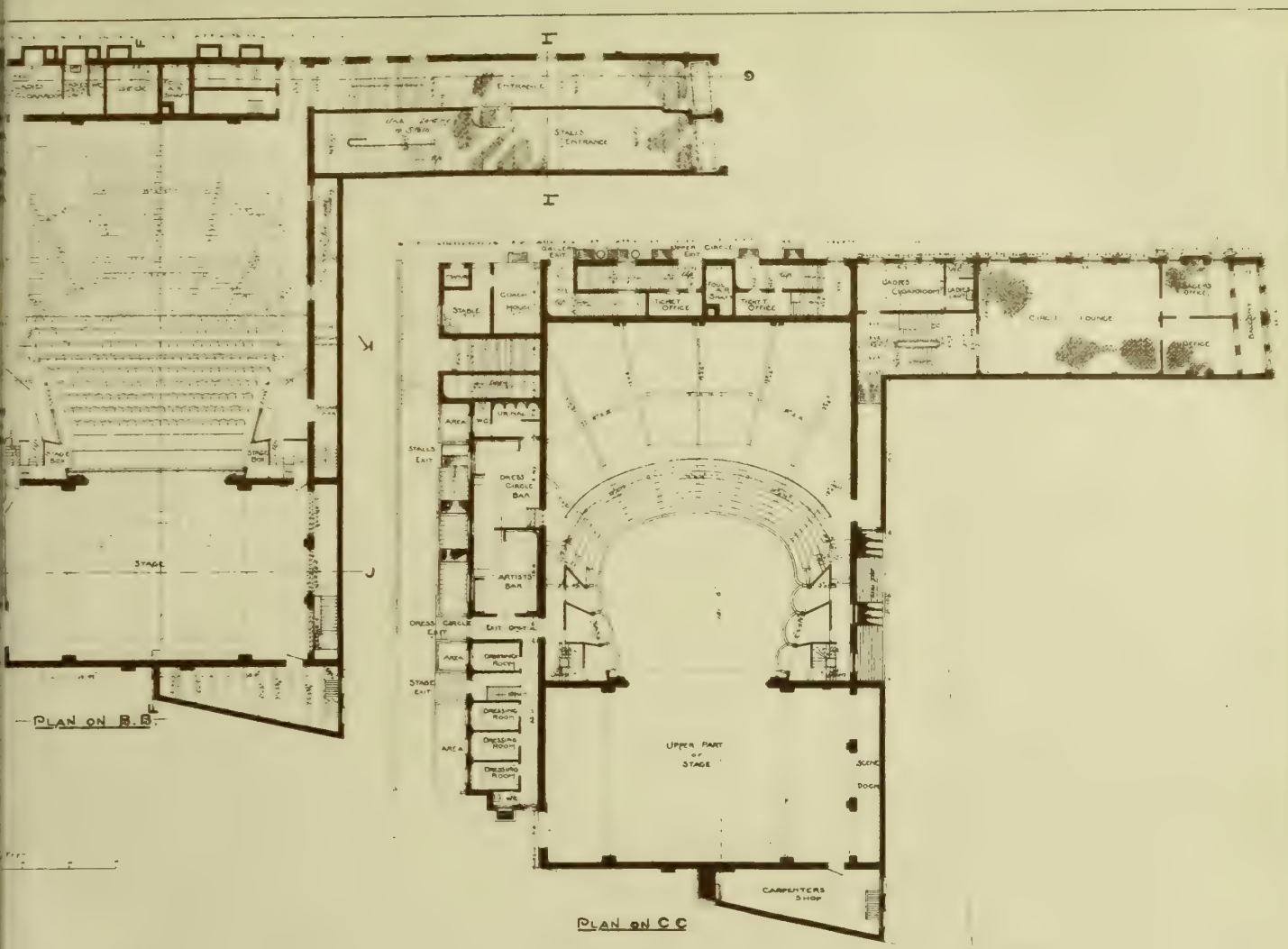
G. E. Bond  
Architect  
Rochester

THEATRE

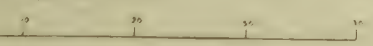
ROYAL

CHATHAM





SCALE OF FEET















BROCKLEBANK MEMORIAL CHAPEL

J. FRANCIS D.



s. Aug. 5, 1898.

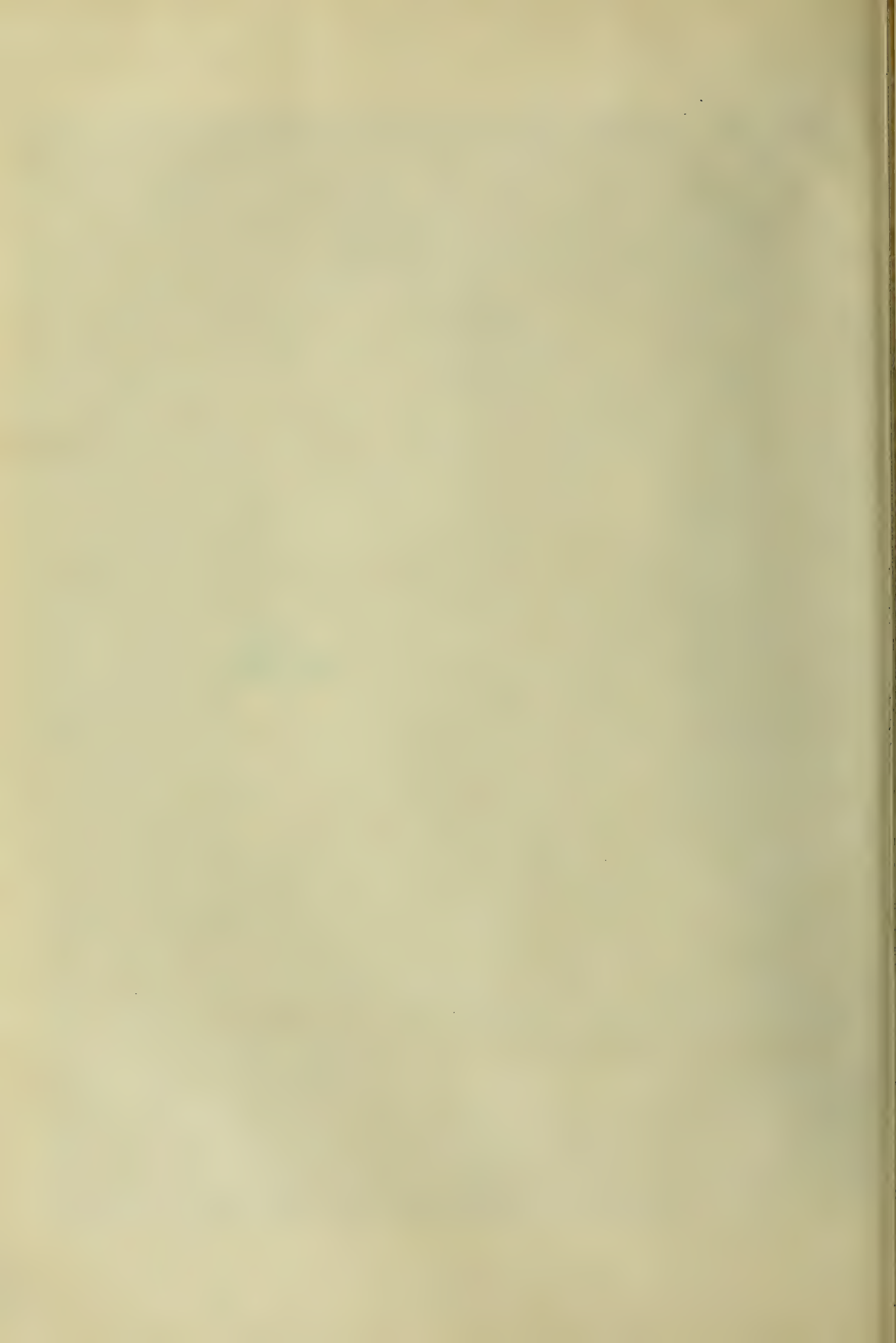


"PHOTO-TINT" by James Akerman. (Queer Square London W.)

MESWALL CHURCH, CHESHIRE.

ARCHITECT

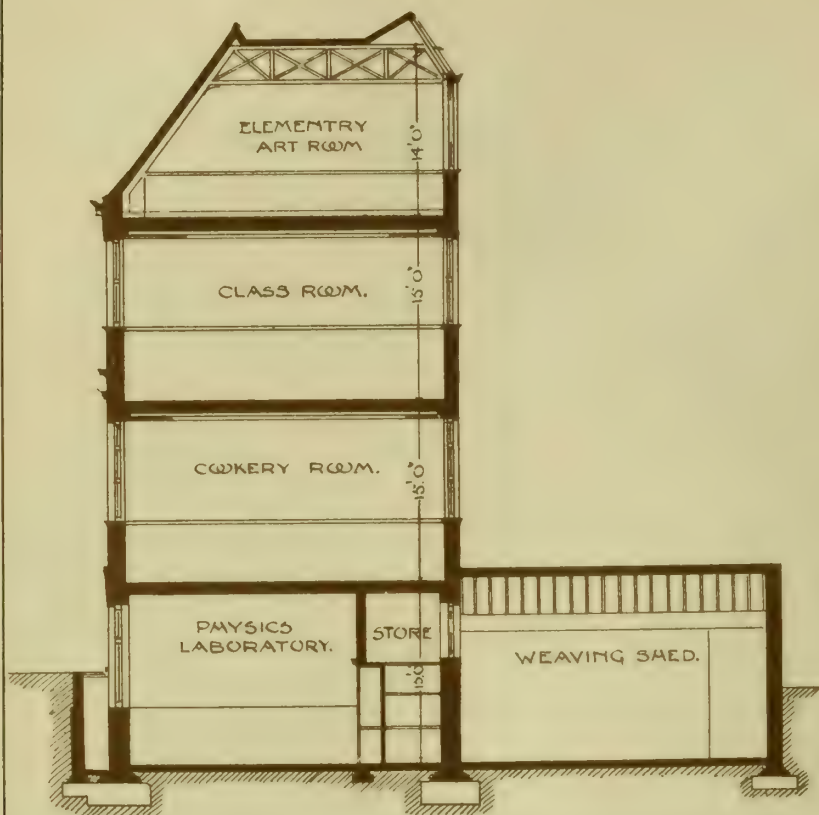








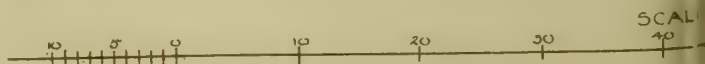
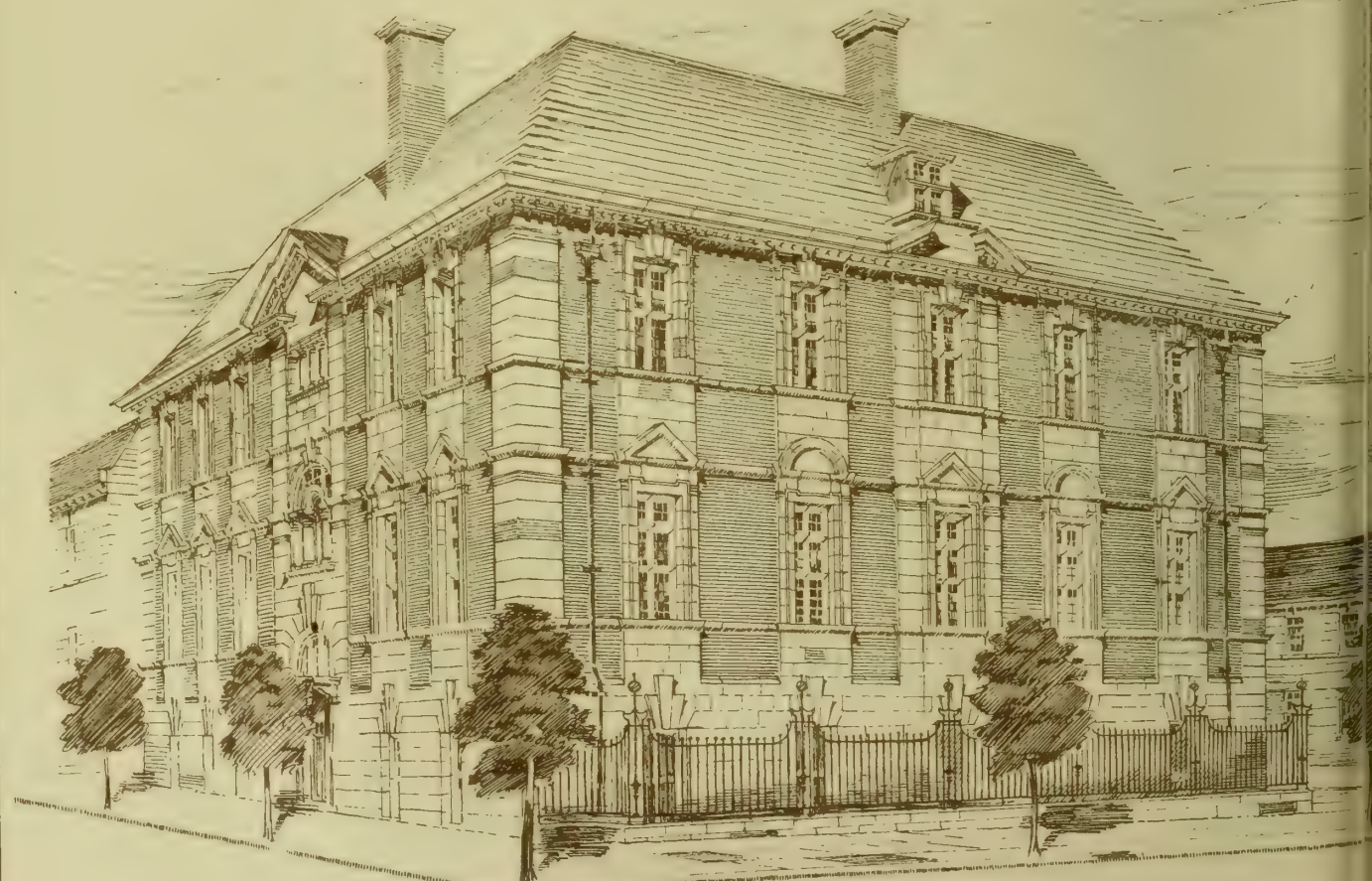




SECTION ON LINE AB.

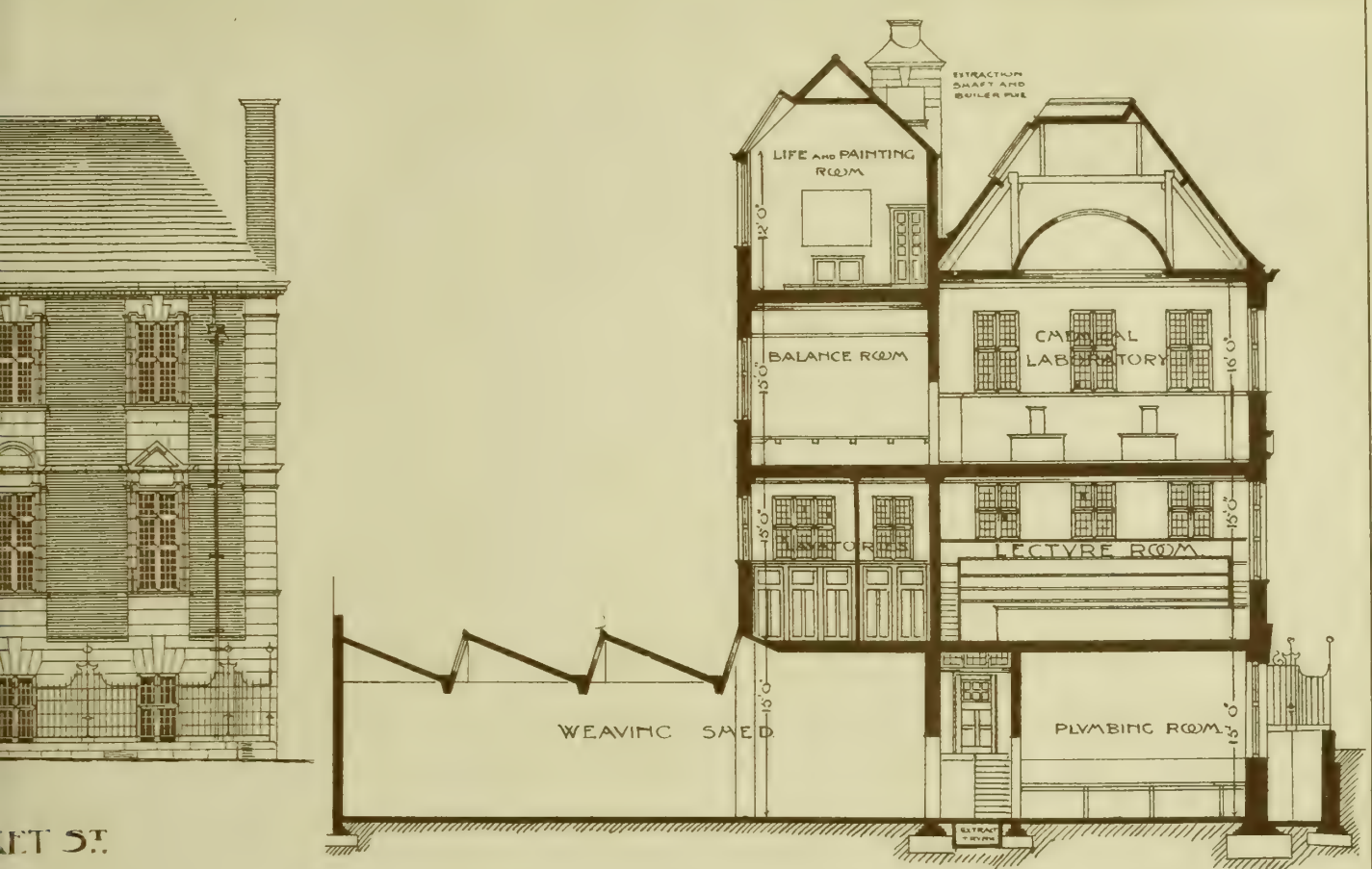


ELEVATION TO N.W.



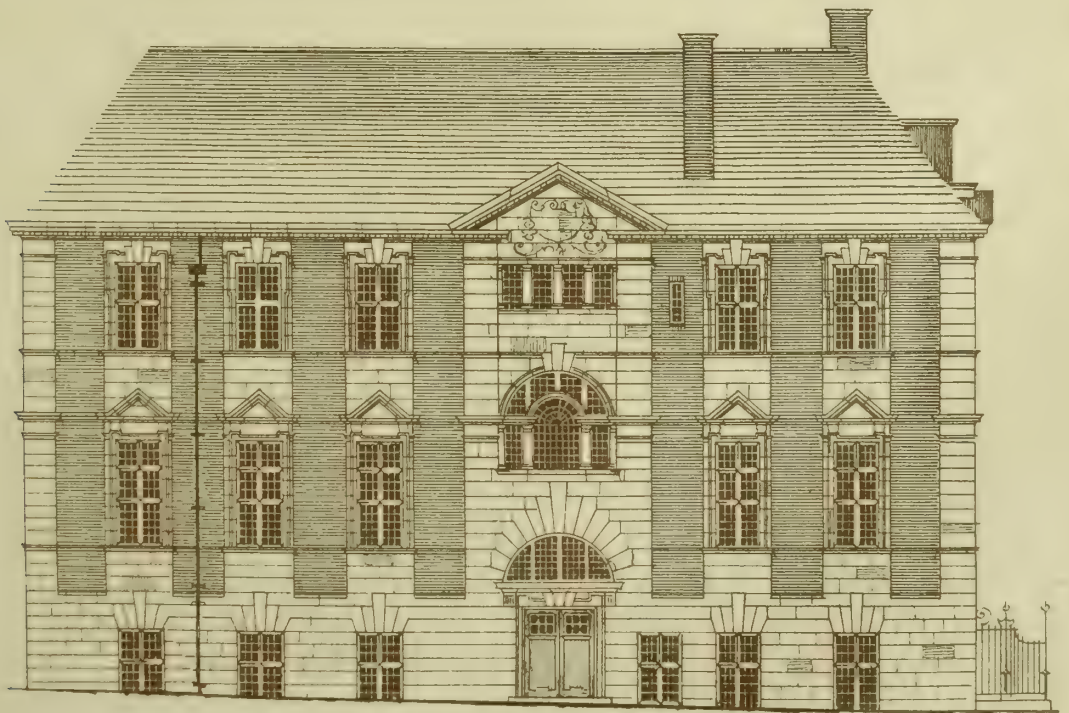


8 AUG. 5, 1898.



SECTION ON LINE CD.

# PROPOSED TECHNICAL SCHOOL, TROWBRIDGE.



ELEVATION TO CASTLE ST.

FEET  
50 60 70 80 90 100



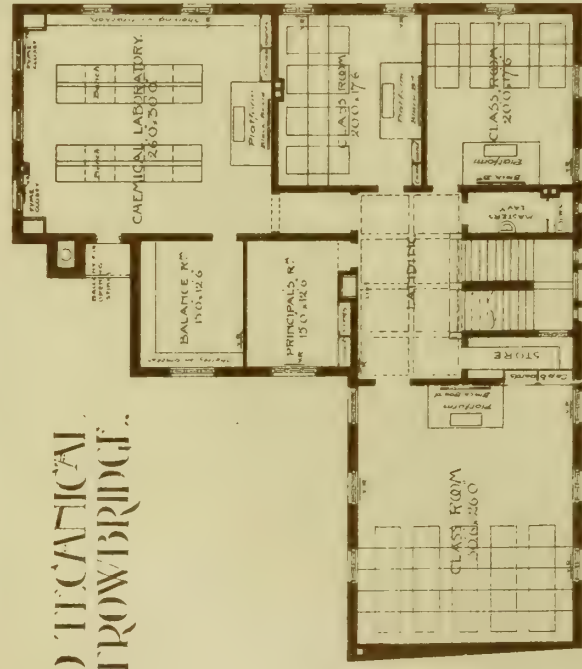




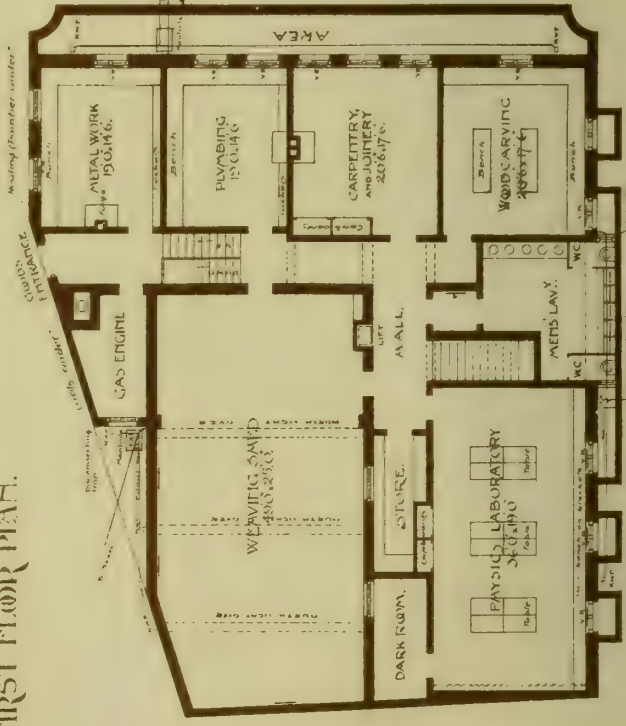




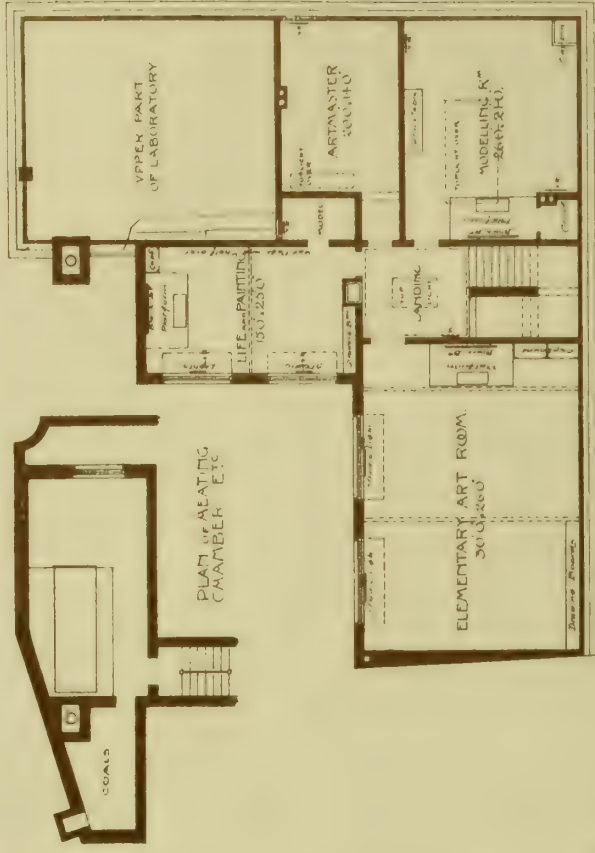
# PROPOSED TITANIC SCAOL, TROWBRIDGE



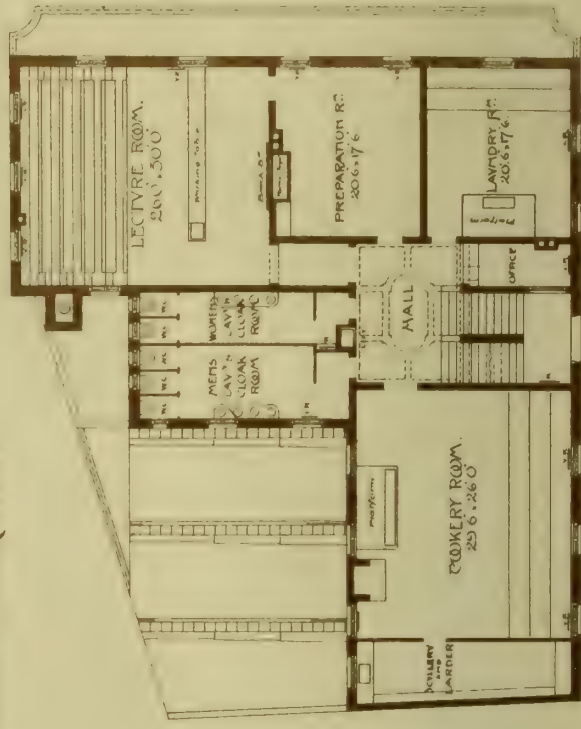
THE FLOPPY DISK.



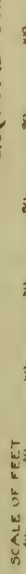
BASENICH PLANT.



## SECOND FLOOR PLAN.

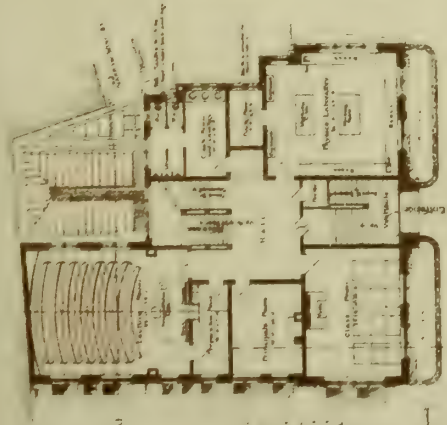


GROWTH FLOOR PLAN.

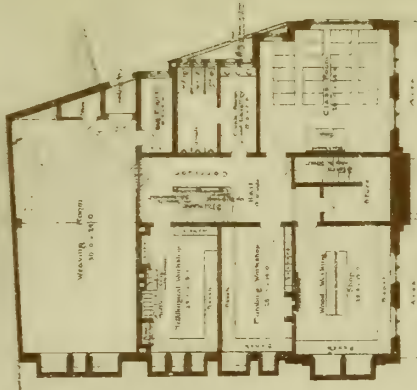




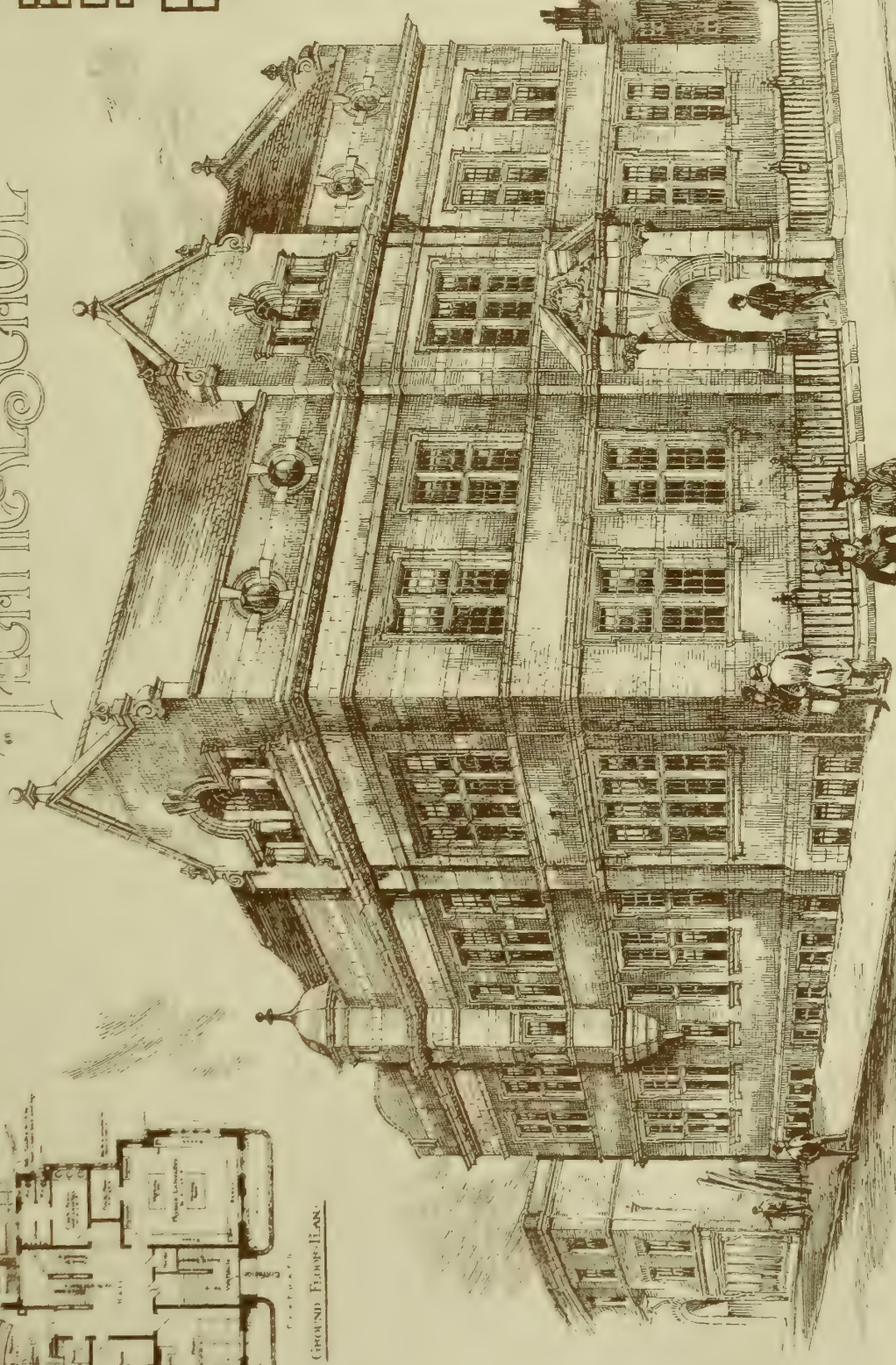
# TOWBRIDGE TECHNICAL SCHOOL



GROUND FLOOR PLAN.



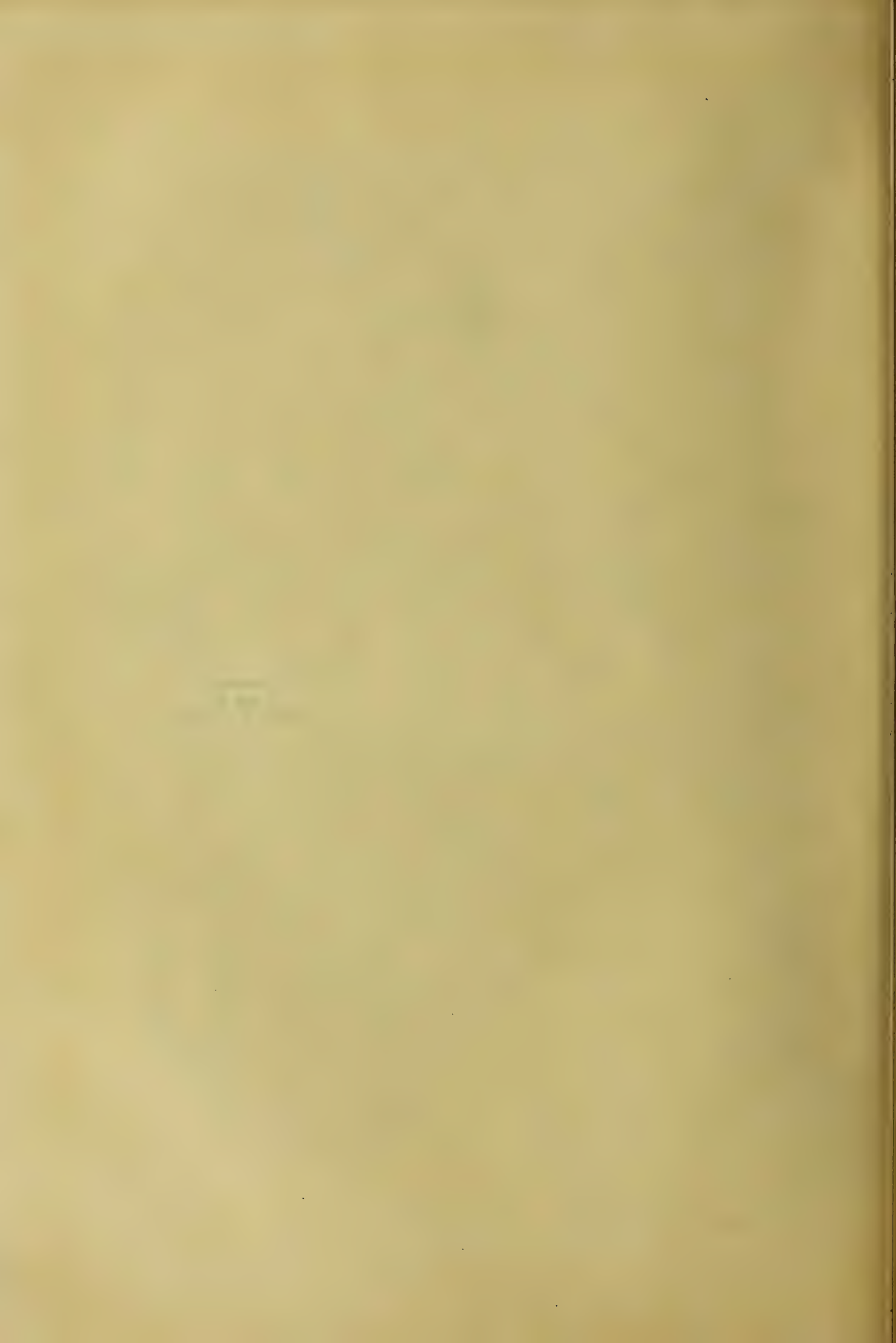
FIRST FLOOR PLAN.



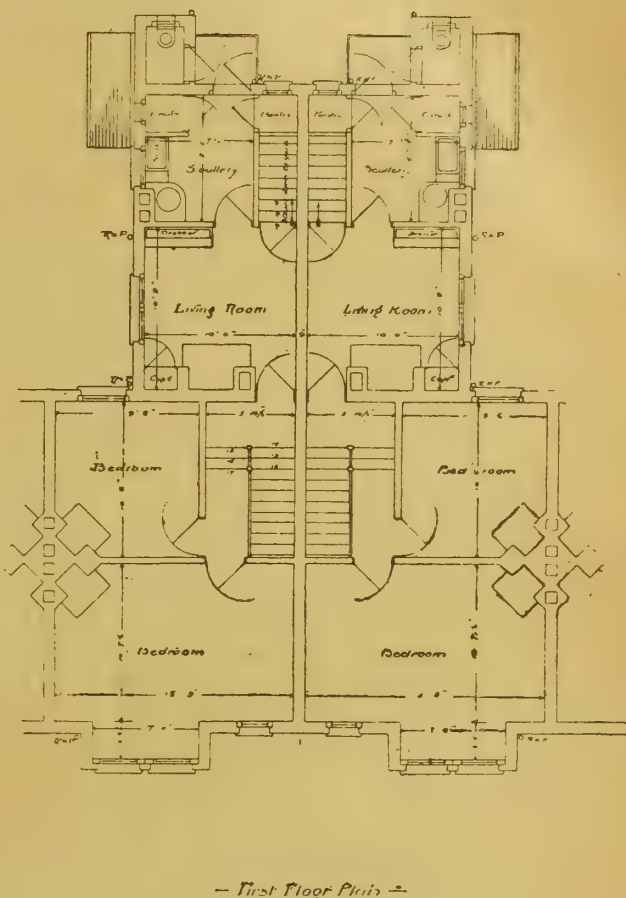
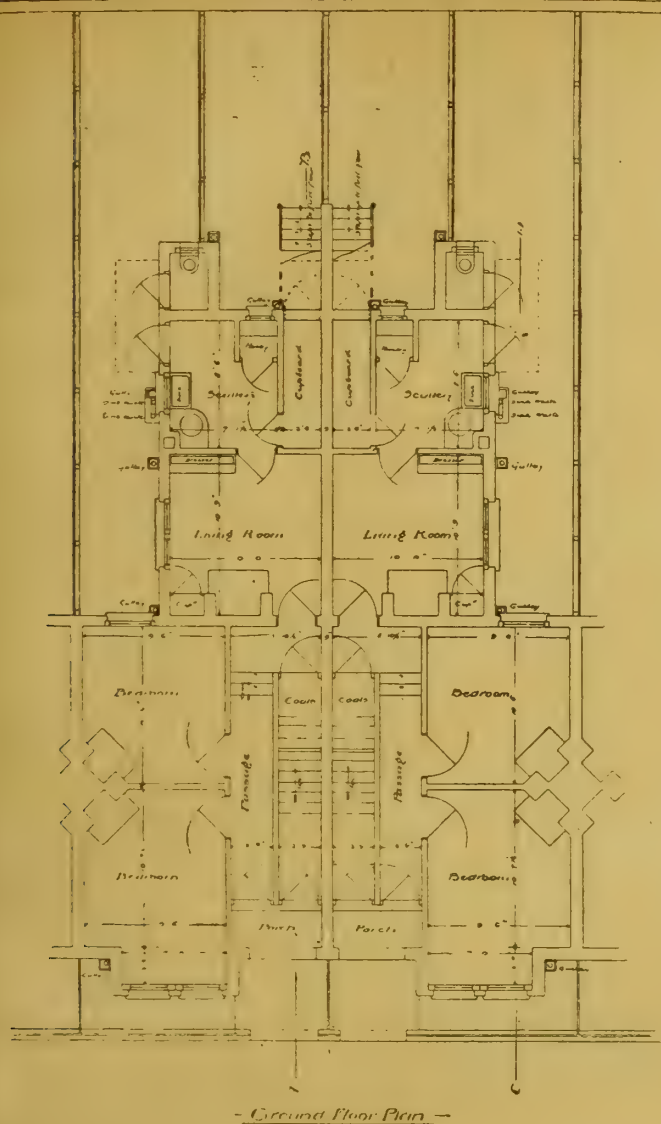
SECOND PREPARED DESIGN.

BRIGGS AND WOLSTENHOLME, ARCHITECTS  
BLACKBURN AND LIVERPOOL









# MUNICIPAL DWELLINGS FOR ARTISANS AT WEST HAM.

## WATER SUPPLY FROM SAND DUNES IN THE NETHERLANDS.

THE U.S. Consul, G. J. Corey, of Amsterdam, transmits memoranda regarding the water supply of that city, as collected from the sand dunes bordering the sea. The dunes consist of sand blown up from the seashore. Their basis consists of sand also, although this is mixed with peat at some points, and at the sea-level layers of compressed peat are frequently found. It is noticeable that these peat layers are never found on the sides of the dunes next the sea. The rainfall in the dunes percolates through the sand and flows landward and seaward. The surface is therefore a cone whose apex is the summit of the dune, which, sloping both ways, forms a continuous watershed. In the dunes near Haarlem, where they have a width of about 4 kilometres (nearly 2½ miles), the summits are 20ft. to 23ft. above sea-level. Not only is the dune water fresh above sea-level, but it is perfectly fresh to a depth of 20 metres (66·6ft.) below sea-level. This fresh water being found at such depth under the dunes, while the water at the same depth in the immediate neighbourhood is salt, goes to prove that either the subsoil must be based on fresh water, the hydraulic pressure of the dune water preventing sea impregnation, or that the water, originally salt, has become freshened by this dune-water pressure. In any case, this dune water is a vast reservoir of fresh water. The quantity of rain-water percolating through these dunes, and contributing to the ground-water streams, is estimated at 0·30 metre (1·191in.) per annum. From a range of dunes 2½ miles in width the quantity of water thus percolating is estimated at 240,000,000gals. per kilometre (0·62137 mile)

in length of dunes. This quantity, however, cannot be drawn off, as a certain amount must be permitted to flow inward and outward to counteract the pressure of the salt water from the sea and the land.

For the Amsterdam waterworks the water is collected in open canals, which are never excavated below sea-level. For the Hague waterworks it is collected in stoneware pipes, in a bed of shells, laid at a depth of 13ft. below sea-level. In Haarlem, on the other hand, the water will be collected in wells of 50ft. to 66ft. below sea-level (these works are not yet completed). The water contains much iron in solution, and for this reason, as well as for other reasons, it is filtered at the three places mentioned before being pumped into the mains. When the water is collected in wells or in pipes, it must be aerated before being filtered. The question of securing a permanent supply of fresh water from below sea-level is not, it appears to me, infallibly settled. Cases which have come within my personal cognisance would seem to cast a doubt upon this low supply. I have known wells 10 to 40 metres (32·8ft. to 131·2ft.) to supply perfectly fresh water for a time; but after a certain period of pumping the water became so salt as to render it unfit for use. Whether these cases are exceptions remains to be proven by time, the deep drainage system having been in operation only a comparatively short period.

theory of its author being that lime foods—those which contain lime—should be avoided after a certain age. Arterial degeneration is asserted to be the chief cause of premature old age and premature death, and the avoidance of this condition was the main object of Sir Isaac Holden's care. He avoided food and water in which earthy or limy matter is found, which affect the arteries by causing them to become thickened and coated with earthy deposits, thus reducing their size and supply of blood to the brain. In this manner degeneration takes place, the arteries become ossified, and disposed to aneurismal dilatations, to rupture, and to apoplexy and paralysis. Sir Isaac Holden was guarded in his diet: he avoided, as we have said, certain kinds of food, and fruits and vegetables were largely partaken of, which are rich in potash and mild salts. These tend to dissolve the deposits when well cooked, as in the form of Scotch broth or soup. The white of eggs should also be avoided. Valuable hints are given on diet, vegetables and fruit food, pure water, the cooking of vegetables. The book will be found interesting, and should be read by all, especially those affected by rheumatism.

The Duke of Westminster has presented two stained-glass windows to St. Paul's Cathedral. They are designed by Sir W. B. Richmond. One, placed in the south transept, represents the kings of the Saxon Heptarchy, in whose time, as we read, Christianity was introduced or restored after a lapse. In the north transept the other window is not quite complete. It will represent the archbishops or bishops under whom the new faith was introduced or restored.

## BOOKS RECEIVED.

Sir Isaac Holden, Bart.: *his Theory of Healthy Long Life*, by JOSEPH CONSTANTINE (Manchester: John Heywood), is an instructive book, the main



## Building Intelligence.

**BIRMINGHAM.**—Visitors to the Birmingham Theatre Royal on Monday were delighted with the improvements that have been made. Mr. Frank J. Bill, of London, is the architect, and the work of carrying out his designs has been intrusted to Mr. John Taylor. The seating has been re-upholstered in the circles and stalls. The old papering of the circles, which had grown somewhat dingy with the lapse of time, has been replaced with a pleasing turquoise blue. The private boxes have been hung with curtains of gold silk brocade and draperies, and the orchestra rail covered with old gold plush. A heavy figured velvet curtain droops from the rail to the floor, protecting the public from draughts. The stalls are carpeted, as is also the vestibule, with rich Wilton-pile carpet. Then the painting of the ceiling has been revived and cleaned; the moulding of the circle fronts has been picked out with gold, and the old papering at the back of the pit has given place to a rich and seemly vermilion.

**LOW FELL.**—New buildings have been erected at Low Fell by the Provincial Laundries, Ltd. In the main front of the building is the public entrance, giving access to the clerks' offices, adjoining which is the private office of the manageress. On the right-hand side of the offices is the sorting-room, where all the goods to be dealt with are received and classified. Immediately behind this is the van-dock and the large hall, where customers' baskets can be stored. Beyond this is the washhouse, fitted with all the latest appliances in the way of washing machinery. Beyond the washhouse are the engine-room and drying-room, the latter being fitted with two powerful fans. Parallel with the washhouse is the large ironing-room, and coming back towards the office is the packing-room. The various departments are so grouped round the offices that the maximum amount of supervision can be obtained. On the first floor, over the front block, there are a mess-room for the people employed and a large store-room and a large spare-room for the extension of any of the branches of work taken by the laundry. Outside the main block are the boiler-house, carpet-beating room, stabling for six horses, harness-room and hay-loft, a large covered van-shed, and two commodious cottages for the engineer and vanman. The buildings have been carried out with Birtley bricks, with pressed brick mouldings and arches, the upper part of the walls being rough-cast. The contractor for the building was Mr. J. C. Hope, and Mr. Mackay acted as inspector, and the whole of the works have been carried out from the designs and under the superintendence of Messrs. Oliver and Leeson, architects, of Newcastle-on-Tyne.

**MARGATE.**—Mr. Morell's and Mr. Mouillot's new "Grand" Theatre at Margate was opened on Monday night. The Grand is situated in Cecil-square and Cecil-street, the principal entrance being in the latter. Sitting accommodation has been provided for 1,800 persons, and on Monday night all seats were occupied. The decorations are in gold and light blue, and the mosaic ceiling is similarly ornamented. From all parts an uninterrupted view of the stage, which is 60ft. wide by 40ft. deep, can be obtained. The dressing-room accommodation is very large, and the fire appliances, which have been tested by the superintendent of the Margate Fire Brigade, are of the most complete description. Mr. Hope was the architect, and Mr. Davidson the contractor.

**WEST HAM.**—The foundation-stone of an asylum for the county borough of West Ham, population about 260,000, was laid by the mayor of West Ham, Alderman Ivey, at Chadwell Heath, Essex, on the 3rd inst. The buildings, which cover more than 10 acres, with 90 acres of surrounding land, will accommodate 800 patients and staff. The total cost when finished will be about £300,000. The architect is Mr. Lewis Angell, F.R.I.B.A., of West Ham. The contractors for the foundations were Messrs. Gregar and Son, of Stratford, the cost being about £16,000; and Messrs. Leslie and Co., of Kensington-square, for the superstructure, at £210,000. The site is at Chadwell Heath, Essex, and the asylum is designed for the reception of patients in various blocks. The administration block is placed centrally, the front portion being occupied on the ground floor by the chief medical officer's,

steward's, and clerk's offices, board-room, dispensary, library, &c., the museum and laboratories and assistant medical officer's rooms being on the first floor. At the back are the waiting-room, matron's apartments, recreation hall, rooms for male and female attendants, kitchen, bakery, general stores, laundry, boiler, engine-house and workshops, &c. The main buildings will be two stories in height, and will occupy an area of about 10 acres, with 90 acres of surrounding land. In addition to the main buildings, there will be a medical officer's residence; also steward's, chief attendant's and married attendants' houses, isolation block, mortuary, lodges, and a chapel to accommodate 550 adults. The total cost, when finished, will be about £300,000.

### STAINED GLASS.

**HANDSWORTH.**—A memorial window to the late Mrs. H. S. Richards, in the chancel of the Asbury Memorial Church, Handsworth, was unveiled on Sunday. The subject of the Transfiguration occupies the three centre lights, and the figure of Jesus as the Good Shepherd and the True Vine the outermost lights, under canopies of 16th century treatment, to harmonise with the stonework. The window was designed and executed by Mr. T. W. Camm, of The Studio, Smethwick. The chancel is being decorated from Mr. Camm's design.

**KENTON.**—The parish church of Kenton, near Exeter, has been enriched by the decoration of the chancel and east walls. The decoration on the latter consists of kneeling groups of angels in the attitude of adoration beneath the Paschal Lamb, whilst on the north and south walls of the chancel are the figures of the Four Evangelists and St. Peter and Paul, in life size, beneath conventional canopies, and standing upon bases illuminated with their emblems and texts applicable to each figure. The remainder of the work consists of highly-ornamental conventional details, among which a continually recurring series of heraldic badges of the Courtenay family is prominent. The work was executed by Messrs. F. Drake and Sons, Exeter, from designs by Mr. Bligh Bond, of Bristol.

### CHIPS.

A fire broke out on Saturday in Devizes on the premises of Mr. Thomas Stone, carpenter and builder, Northgate-street. The outbreak originated in a carpenter's shop. The damage is estimated roughly at between £200 and £300.

At 30, Parliament-street, the Art Memorial Society has on view a bust of Mr. Gladstone, the work of Mr. H. C. Fehr, whose "St. George and the Rescued Maiden" is a prominent feature amongst the works of sculpture in the central hall at the Royal Academy. Mr. Fehr's bust, which is in scale rather larger than life size, represents the statesman in the later, though not quite at the latest, stage of his career. The shoulders are draped with his doctor's gown, and the head is full of animation and spirit.

At a meeting of Aberdeen Town Council, on Monday, the Finance Committee reported that if the fish market wharf were extended into the waterway along Market Quay for the extension of the market the additional cost would be about £6,850. The committee again recommended the adoption of the Market-street site as the most suitable. The matter was remitted back to the committee.

Hampstead is threatened again. Plans for developing a fine site in the rear of the Hampstead Vestry Hall for high-class property having been thrown out by the London County Council on Tuesday week, a scheme is now on foot for covering it with a colony of artisans' dwellings.

The new line of electric railway between Laxey and Ramsey was opened on Tuesday by the Lieutenant-Governor of the Isle of Man, Lord Henniker. The first car conveyed a distinguished company from Douglas to Ramsey, a distance of 18 miles, in one hour and a quarter.

The parish church of St. Mary, Staines, was reopened by the Bishop of London on Sunday, after extensive internal alterations, consisting mainly of the substitution of an open-timber roof for the old plaster ceiling, a new tile floor for stone flags, and open seats for the old-fashioned high pews. A new stained-glass window has also been provided at the east end of the nave above the chancel arch.

The contracts for the extension of the Keighley and District Hospital have been let as follows:—Masonry, Mr. M. Booth, Clayton; joinery, Messrs. Foster and Fortune, Ingrow; plumbing, Mr. Jos. Harrison, Keighley; plastering, Mr. Jos. King, Keighley; painting, Mr. F. Petty, Keighley. These contracts represent a total of a little over £14,000, and it is expected that heating will represent £2,000 more.

## Correspondence.

### ARCHITECTURAL SWEATING.

#### To the Editor of the Building News.

SIR,—I should like to place before your readers a fine example of architectural "sweating," culled from the *Kentish Express* of July 30:—

**THE** Joint Board of Church School Managers for the School District of Cheriton are about to BUILD a NEW SCHOOL, to accommodate 250 Boys, with MASTER'S HOUSE, and they invite plans and estimates for such Schools.

A premium of five guineas will be paid for the best Set of Plans prepared in accordance with the regulations of the Education Department.

Particulars may be obtained from the Rev. F. D. Honeson, Cheriton Rectory, Shorncliffe Camp, to whom the Plans must be sent on or before SEPTEMBER 1st, 1898.

Comment is needless.—I am, &c.,

EDGAR F. WILLSON.

5, Bellevue-terrace, Cheriton, Folkestone,  
August 2.

## Intercommunication.

### QUESTIONS.

[11995].—**Ownership of Plans.**—On completion of a building do the plans belong to the architect or the client? Have any decisions been given in the Law Courts respecting the same? If so, where are the reports to be found?—W. AND T.

[11996].—**Estate Clerks of Works.**—How can I become a member of the Society of Estate Clerks of Works, and what are the conditions and fees? Would it assist me much in procuring an appointment on an estate? Any information will much oblige.—ARCHITECT'S ASSISTANT.

[11997].—**Decaying Stone.**—I shall be glad if some of your numerous readers could tell me what is the best method and material to be used in preserving the face of a decaying freestone front. In a work that I have in hand, many of the stones are not set on their natural bed, and although a modern building, the face of the stone is decayed. As there are several liquids which claim to stop decay, I shall be glad if anyone can say which is the best from experience.—X. Y.  
[Szereclmey's is the best.—Ed. "B. N."]

[11998].—**Foundations for High Buildings.**—Have their on beam foundations adopted in New York and Chicago been found effectual? Can anyone tell me if inverted arches are used? The detached raft foundations with steel beams and platforms appear to be largely used. Are they successful? A thick bed of concrete is, I believe, laid first. Any particulars will oblige.—CONSTANT READER.

[11999].—**Iron Ties for Cupolas.**—I want a good form of chain bond of wrought iron, and shall be obliged to any correspondent for hints how the joints are formed, screws, &c.—A. B.

[12000].—**Curved Timbers.**—I should be pleased to know if there are any published examples of old curved rib-work, showing the modes of joining and fixing to the roof timbers.—R. O.

### REPLIES.

[11987].—**Elizabethan Lantern Slides.**—"Inquirer" will probably find some difficulty should he wish to hire lantern slides illustrative of Elizabethan architecture. A number of suitable slides for the purpose will be found in the various "lecture sets" of slides in the catalogue of any good lanternist. These will not be sufficient; but most of the good examples of Elizabethan buildings have been photographed by one or other of the principal photographers, such as Valentines, Wilson, &c., and they will make, at the usual price of 1s. each, slides of any of the negatives they have. "Inquirer" may be fortunate enough to meet with a lanternist who will lend him the slides he requires from the various lecture sets; but most refuse to break the set. Other slides he would have to purchase.—F. E. L.

[11983].—**Old Timber Construction.**—Round oak pins projecting from the framing join, or so are commonly met with in old work as well as new. I do not think their projection is to be accounted for by the shrinkage of the timbers; but that the idea of leaving the pins for tightening up occurred. Their artistic value might also be urged.—G. H. G.

[11991].—**Fireproof Floors.**—Write for information to such firms as Measures Brothers, Limited; Homan and Rodgers; Lindsay, Neal, and Co., Limited, Paddington; B. Ward and Co., Great George-street, Westminster; Phenix Fireproof Flooring Co., Manchester, who will give you all you want, and the cost.—G. H.

[11994].—**Preservation of Stone.**—I believe a description of the methods used at the Houses of Parliament has been published in a Blue Book. Gwilt's contains a reference to it. I think I am right in saying that Szereclmey's stone liquid has been tried and found successful as a preservative, as it waterproofs the pores of the stone. The Company will supply "A. B. C." with particulars, if he writes to their address, Rotherhithe New-road, S.E. (2) The first coating given to the Houses of Parliament was a few years after its completion. (3) One or more coats may be given. No doubt a coat after say, eight or ten years' interval, would be necessary. (4) As to the treatment of carved projections and features, the condition of the stonework must be considered. A coating all over the carving, if it shows signs of decay, would be desirable; but if the decay is only in the upper projecting members, they only might be done.—G.



LEGAL INTELLIGENCE.

**JOINT DRAINS.**—At Lambeth, last week, a point of some interest to property owners was decided upon a summons taken out by Miss B. Drake, the owner of a house in Adys-road, East Dulwich, against Mrs. Holton, the owner of an adjoining house, to recover a proportion of the cost of repairing the joint drain of the two houses, and a proportion of legal expenses incurred in some proceedings instituted by the Camberwell Vestry in respect of the drain. The summons was taken out under section 120 of the Public Health (London) Act, 1891. The houses in question and a third house are drained by a system of combined drainage, the outlet into the sewer passing through Miss Drake's house. The drain got out of order, and the Camberwell Vestry instituted proceedings against Miss Drake under the Public Health Act to secure an abatement of the nuisance. Miss Drake unsuccessfully defended the proceedings, and incurred legal expenses amounting to £6 13s. 6d. The main drain was afterwards repaired at a total cost of £30, and Miss Drake now sought to obtain an order against Mrs. Holton, as the owner of one of the houses served by the combined drain, for a proportion of the costs incurred. Mr. Hopkins decided that each of the owners of the three houses served by the combined drain were liable, and made an order requiring Mrs. Holton to pay £10 in respect of the cost of the repairs, £2 4s. 6d. as a proportion of the legal expenses incurred by Miss Drake, and £3 3s. of the costs of the present proceedings.

**PLYMOUTH BUILDERS IN THE COURT OF APPEAL.**—**PETHICK v. DORSET COUNTY COUNCIL.**—Lords Justices A. L. Smith, Rigby, and Vaughan Williams sitting in the Court of Appeal last week, resumed the hearing of the case of Pethick Bros. v. the County Council of Dorset on the appeal of the County Council from the decision of a Divisional Court of the Queen's Bench, consisting of Justices Day and Laurance. The matter came before the Court in the form of a special case stated by the justices of Dorset, the question being whether Messrs. Pethick Bros., builders and contractors, of Plymouth (respondents to the present appeal), were liable for £261, the amount of damage done to certain roads in the neighbourhood of Charminster, by reason of extraordinary traffic and heavy weights having passed over them in connection with the building of additions to the asylum for pauper lunatics at Charminster during the years 1892 and 1893. The contract which Messrs. Pethick Bros. entered into with the visiting committee of the lunatic asylum contained a covenant by which Messrs. Pethick agreed to keep harmless the visiting committee from any claims by reason of (inter alia) extraordinary traffic or heavy weights passing over the roads in question. Messrs. Pethick made a contract with a man named Trenchard to convey the materials from the railway-station to the asylum, and the goods and materials were so carried by him. The Justices held that Messrs. Pethick were liable for the damage; but the Divisional Court overruled this decision, and held that they were not: hence the present appeal by the County Council. Mr. Clabell Salter, in the absence of Mr. Joseph Walton, read the judgment of the Divisional Court, from which it appeared that Mr. Justice Day held that the materials carried over the roads were not necessarily "extraordinary traffic" at all, and that it would not have been "extraordinary" if carried carefully. His Lordship said that the agreement entered into by Messrs. Pethick with Trenchard contained a stipulation that the latter was not to convey excessive weights over the roads, and held that the proceedings in question ought to have been taken, not against the general contractors, but against the cartage contractor. Mr. Salter said that the question was not whether orders were in fact given by Messrs. Pethick to Trenchard, but whether the relations between the parties were such that there was a power to give orders. In the first place, he claimed not that an order was in fact given, but that there was a power to give orders. The learned counsel pointed out that the contract between Messrs. Pethick Bros. and Trenchard provided that "the contractor shall from time to time, until this contract is determined, at the times and in manner required by any written or verbal order on behalf of Pethick Bros., deliver at the contractor's office . . . and supply and provide for any purposes required by Pethick Bros. such and so many carts, waggons, trolleys, trucks, &c., for the carting or hauling of plant or materials from the station to the works." Lord Justice Smith: It is admitted that Messrs. Pethick gave no orders? Mr. Salter: I do not think it is. Lord Justice Smith: I think it was so stated in your facts? Mr. Salter: I think not. Lord Justice Smith: You have not got a finding that Messrs. Pethick gave orders? Mr. Salter: No; the finding is that the work was done in pursuance of the contract. If your Lordships find on the contract that Messrs. Pethick had power to give orders to Trenchard, I do not think it would be an unreasonable inference to find that they did give orders. My contention in a word is that where work is done by A for B, in pursuance of a contract which gives B the right to control the work, that then the work is

done by the order of B within the meaning of the section. Lord Justice Smith: Why did not the County Council take proceedings against Trenchard? Mr. Salter replied that Trenchard went bankrupt. Mr. C. A. Russell, Q.C. (appearing with Mr. Duke for respondents), contended that the Divisional Court had come to a proper decision upon the authorities, and that Messrs. Pethick Bros. ought not to be held liable for the damage done in the circumstances. Mr. Joseph Walton, in reply, said it was clear that by the contract between Messrs. Pethick Bros. and Trenchard, Messrs. Pethick Bros. had control of the kind of vehicles to be used by Trenchard, and that they fixed the total quantity of material to be carried over the roads. That was an important element in the present case, as it really caused the difficulty in traffic of that kind. Lord Justice Smith, in giving judgment, having stated the facts, said that section 23 of the Highways and Locomotives Amendment Act of 1878, on which the case turned, had given rise to a great deal of litigation. The material part of the section ran "By reason of any damage caused by excessive weight passing along the same, or extraordinary traffic thereon, such authority (being the local authority) may recover in a summary manner from any person by whose order such weight of traffic has been conducted," and so on. The question was "by whose order" was the traffic conducted along the roads in question? In his Lordship's opinion the power to give orders did not come within the meaning of the words of the section "by whose order." He could not find that there was any order given within the meaning of the section by Messrs. Pethick Bros. to Trenchard, and on that he based his judgment that the claim by the Council against Messrs. Pethick Bros. failed, and on that ground that the judgment of the Divisional Court should be upheld. Lords Justices Rigby and Vaughan Williams concurred in the result, and the appeal was accordingly dismissed with costs.

**A BOLTON BUILDING DISPUTE.**—**TIPPINGE v. SMITH.**—The plaintiffs in this action were Messrs. Tippinge, executors of an estate in Bolton, the defendant being Thomas E. Smith, architect and surveyor, of the town named. The action had been brought to recover possession of property there, and the forfeiture for non-fulfilment of the terms of an agreement. The defendant denied that there had been any forfeiture. Mr. Pickford, Q.C., and Mr. Horridge (instructed by Garrard, James, and Wolfe) were the plaintiffs' counsel; Mr. Sutton (instructed by Mr. W. Russell) representing the defendant. The defendant, it appeared, had taken from plaintiff by agreement a portion of the Bolton estate, upon which he was to erect a number of dwellings. These, according to plaintiff, had not been erected in a satisfactory manner. It appeared from the evidence that the defendant had sublet the contract. His Lordship, having perused the contract, found that there was no question for the jury; he wished, however, to hear counsel as to the forfeiture. Mr. Pickford, addressing his lordship after an adjournment, said that terms had been agreed upon, and they asked his lordship to give judgment for the plaintiffs for possession, which was not to be enforced if the terms agreed upon were performed. His lordship entered judgment accordingly.

**THE LIABILITY OF EMPLOYERS.**—**C. E. REYNOLDS AND OTHERS v. H. L. HOLLOWAY.**—This was an appeal by the plaintiffs asking that the verdict and judgment entered for them by a county-court judge, which a Divisional Court had set aside, might be restored. The action was brought by a widow on behalf of herself and three children to recover compensation for the loss of her husband, whose death was caused by the falling-in of a roof while he was engaged in pulling down a building in accordance with orders he had received from a superior workman in the employment of the defendant. The action was heard in the Greenwich County-court, and his Honour Judge Addison left the question of alleged negligence to the jury, who found for the plaintiffs, with £90 for the widow and £10 for each of the children. The defendant appealed, contending that there was no evidence of negligence to go to the jury. The man in charge of the work had given the deceased man merely a general order to pull down the house. If he had set about doing so in a proper way no accident could have happened to him, and, therefore, the accident could not be said to be the direct result of carrying out the order. The Divisional Court (Justices Day and Laurance) took that view of the case, and set aside the verdict and judgment of the county-court and entered judgment for the defendant. Hence the plaintiffs' appeal. Mr. Rentoul, Q.C., and Mr. Watt appeared for the plaintiffs; Mr. Jelf, Q.C., and Mr. Lynn for the defendant. Lord Justice Smith said the question was whether the facts brought the case within the provisions of the Employers' Liability Act, 1880. By Section 1 it was enacted that where personal injury was caused to a workman by reason of the negligence of any person in the service of the employer, to whose orders and directions the workman, at the time of the injury, was bound to conform and did conform,

and where such injury resulted from his having carried them out, the workman or, in the case of his death, his personal legal representatives, should have a cause of action against the employer. The workman in the present case was told to pull down his house by a foreman, whose orders he was bound to conform to. The foreman who gave that order admitted that he had not examined the state of the premises, and did not know, therefore, whether the workman ought to be warned to take special precautions or not. But it was said that if the deceased man had not begun by taking down partitions that supported the roof first, no accident could have resulted—in other words, that his own acts had caused the accident, and not his compliance with the foreman's orders. He took a different view of the evidence, and he thought that the deceased man had been told to take down these partitions first—at any rate, he was told to preserve them, and there was evidence that when a man was told to preserve any particular fittings or things in a house he was ordered to pull down, in the absence of instructions to the contrary, he would, as a matter of course, take away the things in question before he began demolishing the building. There was, therefore, at least, some evidence that the foreman had been negligent, and that the orders he gave were the cause of the accident. That evidence had, in his opinion, properly been left for the jury to consider. The judges of the Divisional Court, he thought, had been in error, and the appeal must be allowed. Consequently, the judgment of the Divisional Court would be set aside, and that of the learned County-court judge restored. The plaintiffs, therefore, would have the costs of this appeal and in the court below. Lords Justices Rigby and Vaughan Williams concurred, and the appeal was accordingly allowed.

**THE DRAINAGE OF ISLINGTON.**—**REGINA v. VESTRY OF ST. MARY, ISLINGTON (EX PARTE WILLIAMS).**—In this matter, which came before the Court of Appeal on Tuesday, the Divisional Court had made an order that a mandamus should issue requiring the vestry of St. Mary, Islington, to prepare a scheme of such sewers or such diversions or alterations of sewers and works as might be necessary to construct for effectually draining their parish and district, and to submit the scheme to the London County Council. The rule was obtained by Mr. Williams, on behalf of the Midland Railway, the Great Eastern Railway, and the Tottenham and Hampstead Joint Railway Companies. From the decision of the Divisional Court the vestry now appealed, and contended that they had provided for the effectual draining of the district, and otherwise performed all their statutory duties. They alleged that the reason why the line of railway used jointly by these railway companies flooded when there was a storm or any unusually heavy rainfall at a part where it passed through a cutting some half a mile long between Hornsey Railway Station and Crouch-hill Station was partly because the companies had failed to make proper connections, but chiefly because the Hornsey District Council had wrongfully drained into the same main sewer, which, but for that additional sewage, would have been amply sufficient to carry off all surface-water. This additional sewage from the Hornsey district entered the main sewer at a place below where the railway surface-water drained in, and the sewer being thus full, the surface-water was backed up, and so caused the line to flood. The railway companies relied on the fact that some six years ago, when they first moved in the matter, the vestry submitted a plan to the London County Council which was not, however, sanctioned, and no steps had since been taken by the vestry to submit an amended plan. They contended, therefore, that the vestry had not complied with the Act, and that the mandamus had rightly gone. At the conclusion of the arguments, the Lords Justices delivered judgment, allowing the appeal of the vestry, with costs.

The work of constructing the branch line of the Midland Railway from New Mills to Heaton Mersey has been commenced at Disley and High Lane by the sub-contractors, Messrs. Walter Scott and Co., Newcastle-on-Tyne.

At last week's meeting of the Stoke-on-Trent School Board, the sites and building committee reported that they had decided that the erection of an infants' school was absolutely necessary, and should be at once proceeded with. After consultation with the architect, they instructed him to prepare plans for a school for 300, with provision for enlargement to 480 when necessity should arise for the extension. The report was adopted.—Mr. E. E. Scrivener laid before the Board plans for the proposed new infants' school at Heron Cross, and also plans for the enlargement of Harpfield and Bucknall Schools by the erection of buildings for the accommodation of cookery classes. The question of the extension at Bucknall school was deferred for further consideration. The other plans were adopted and ordered to be submitted to the Education Department for their approval.



### PARLIAMENTARY NOTES.

**THE SCIENCE AND ART DEPARTMENT.**—The Select Committee of the House of Commons appointed to inquire into the administration of the Museums of the Science and Art Department at South Kensington has concluded its work, and its report was, last Friday, formally presented to the House. It is proposed that there shall be an Education Minister of Cabinet rank, having a seat in the Legislature; that the Secretary for the Science and Art Departments should have an office in Whitehall; that there should be advisers or visitors, who would assist the department by suggestions or information on matters affecting the museum; that one of the Parliamentary heads should visit the museums at least weekly; that larger discretion should be given to the directors of the Science and Art Museums as to purchases; that the higher staff at South Kensington should be increased; that the grant for purchases should be increased; that there should be free admissions to all museums, and that the Science Museum should be placed on the west side of Exhibition-road. The document is marked by the severe stringency of some of its recommendations. Out of some 740 officials, 300 are traced to relationship. The Committee dwell in suggestive terms upon the management of the museums, which has not, it is affirmed, been for the interest of the department itself, or of the public. Sir John Gorst, in one division, was beaten by 7 votes to 3.

**SOUTH KENSINGTON MUSEUM BUILDINGS.**—Captain Grice-Hutchinson, on Tuesday, asked the First Commissioner of Works whether, when the plans for the erection of the museum buildings at South Kensington were approved, due care would be taken to preserve the trees and the open space at the corner of Exhibition-road? Mr. Akers-Douglas: I am afraid that, whatever plans are adopted for buildings at South Kensington, this open space will have to be built upon and the trees removed.

### WATER SUPPLY AND SANITARY MATTERS.

**BARTON-ON-HUMBER.**—On Wednesday week the Barton Waterworks Company turned on the water for public consumption for the first time. Under the supervision of Mr. G. Perry, A.M.I.C.E., all the work necessary has been carried out, and consists of a well 120ft. deep, with a bore which goes to a further depth of 25ft. There is a set of double pumps capable of pumping 12,000 gallons per hour, and the softening tank has a capacity of 23,000 gallons. The storage tank, which has been newly concreted by Mr. J. W. Briggs, contractor, of Barton, is capable of holding 120,000 gallons. All the works have been inspected and pronounced satisfactory by Mr. E. T. Hildred, A.M.I.C.E. The hardness of the water as it issues from the well is 23.6, and at the first test of softening this was reduced to 9.00.

**LEICESTER.**—The Leicester Corporation, at a private meeting, have determined to promote a Bill in Parliament next Session for a great water scheme, involving an outlay of £3,000,000. It is proposed to combine with the authorities at Derby, Belper, Nottingham, and probably Sheffield, to secure the whole of the waters of the Upper Derwent, with the vast area of collecting grounds, and convey the water to Leicester, a distance of sixty-six miles. The scheme at present is for Leicester to go to Parliament, either alone or with partners, to acquire the whole of the rights, which will secure a minimum supply of 14,000,000 gallons of water daily. The water has been tested and found most satisfactory. It is expected that by the combination of all the authorities interested, there will be little difficulty in carrying the scheme through successfully. It is not yet known whether Sheffield will put forward any definite claim for consideration, but preliminary arrangements are being rapidly matured. Only recently the Leicester Corporation opened a new reservoir at Swithland, but the population is growing so rapidly that the authorities have determined, if possible, to secure legislative sanction for this great project which, it is stated, will, when carried into effect, give, together with the existing sources, an ample water supply to all the adjacent towns. The proposals placed before the Leicestershire Corporation were unanimously adopted. The whole of the scheme is to be matured as speedily as possible, and the land surveyed.

A scheme for the alteration and improvement of the interior of St. Paul's Church, West Smethwick, has been adopted, including the erection of a baptistery, the reseating of the church, and the removal of the galleries. The cost of the work is estimated at about £600.

The Scarborough Corporation some time ago submitted to the Scarborough Harbour Commissioners plans, prepared by their engineer, Mr. H. W. Smith, for the proposed approach road along the sand side to the new Marine Drive round the base of the Castle Hill. The plans show a road 80ft. wide,

### Our Office Table.

On Tuesday evening there was a gathering of R.A.'s at Burlington House for the purpose of electing a keeper in the place of the late Mr. Calderon, who died the very day of the Academy banquet. Twenty-six R.A.'s put in an appearance. In many quarters it was both hoped and expected that Mr. H. W. B. Davis would prove to be Mr. Calderon's successor; "he is made for the post," was the remark one heard more than once. This, however, was not destined to be. After a brief sojourn in the assembly-room, it became known that Mr. Ernest Crofts was the successful candidate. Mr. Crofts won his membership no longer ago than 1896. A Yorkshireman by birth, he is fifty-one years old, and is best known as the painter of spirited military canvases, such as "The Capture of the French Battery by the 52nd Regiment at Waterloo," and his presentment of the attack on the gatehouse of the Chateau de Hougomont, seen last year.

At the recent sale of sketches and drawings by the late Sir E. Burne-Jones the British Museum secured the set of designs in chalks for the series known as the Works of Mercy. These drawings were specially selected for the national collection because both in beauty of design and in depth of feeling they fully conform to the general idea which has guided the administration of the Department of Prints and Drawings since its formation, that so far as concerns the acquisition of drawings and sketches by native hands the department should contain one characteristic example or more of every artist who has left a name, and so furnish the student and the curious with something like a complete illustrated record in this form of the history of British art. In addition to the drawings above mentioned, the department has been further enriched by an extremely beautiful sketch of a female playing a harp, drawn in gold on a purple ground, it being one of a very few examples of this style which Burne-Jones produced during a late period of his life. All these drawings are now to be seen in the Print-room.

The Loan Collection at the Ecclesiastical Art Exhibition in connection with the Church Congress will, as usual, embrace every kind of gold, silver, and art metalwork, tapestry, art needlework, carvings in wood and ivory, old Church furniture, MSS., paintings, and articles of archaeological interest. Loans of church plate and embroidery are sought by the Manager, Mr. John Hart, Arundel-street, Strand. The Clergy and Artists' Association will hold its third Church Congress Exhibition in the Bradford Art Gallery during Congress week. It is hoped to include in the Exhibition examples of Sir W. B. Richmond, of Mr. G. F. Watts, and Mr. Holman Hunt, and other representative artists and craftsmen working in churches. Artists desiring to submit examples of their work may do so by communicating with the Secretary, 6, Millbank-street, Westminster.

The ornaments recently placed in the church of St. John the Baptist, Kingston Vale, to the memory of the Duchess of Teck, were dedicated by the Bishop of Rochester on Saturday afternoon. A brass tablet is placed on the left pier of the chancel arch, near the accustomed seat of the late Duchess, bearing a memorial inscription. The new reredos has been designed by Mr. G. F. Bodley, A.R.A., and worked in pure white alabaster sparsely gilded. The central figure is that of the Saviour with hands uplifted in blessing. The four windows of the apse have been slightly enlarged and refilled with stained glass representing St. George, St. David, St. Andrew, and St. Patrick, the patrons of England, Wales, Scotland, and Ireland. In addition to these gifts, the Duke and Duchess of York, the Prince and Princess Adolphus of Teck, and Prince Francis and Prince Alexander of Teck have furnished the altar with a gilt Gothic cross and candlesticks.

GREAT disappointment has been expressed that for the decoration and fitting up of the new and magnificent wing of the New Imperial Palace at Vienna, the authorities should have thought fit to enter into contracts with foreign firms. The order for lifts, for instance, for the Palace as well as for the Belvedere, which is being prepared as the future residence of the Heir Apparent, has been given to an Italian firm, though it is claimed that they could have been supplied just

as well and as cheaply by Vienna houses. The twenty niches in the parterre of the hemicycle were intended originally to contain statues of Austrian Rulers. The project was abandoned as unsuitable, however, and the Emperor gave his consent to their being filled by the figures of typical personalities connected with the great periods of Austrian history. The work has been entrusted to leading Vienna sculptors. The chief feature of the new wing, a portion of which will be ready for the Jubilee celebrations in December, will be the Maria Theresa Hall, the ceiling decorations of which, divided into four allegorical pictures, will be of a most elaborate kind. They are to be the work of Herren Eduard Veith, Charles Wilda, and Schmidt, who received the highest awards for their designs in an open competition.

**NEWGATE PRISON,** the centre of so many memories connected with the romance and brutalities of crime, has been of late standing in its gaunt and grim massiveness with its fate hanging uncertain over it. One portion of it has at last been sold by the Government to the City Corporation, who will at once proceed to erect upon the site the large new Sessions House, which will supersede the famous Old Bailey. Various architects of eminence will be invited to send in plans for the new structure, which will cost the City a quarter of a million, for which a special rate will be levied. The loss of the Newgate wing to the prison accommodation of the metropolis will lead to building schemes elsewhere by way of enlarging some of its existing prisons. But the building of the new Sessions House in the City cannot be begun until the Government has provided additional accommodation for the prisoners whom the scheme will displace.

At Glasgow Dean of Guild Court last week, authority was granted for the erection of an eight-story building, about a hundred feet in height, in Waterloo-street. When the plans came before the Court a few weeks ago the Dean of Guild referred to the great height of the building, and to the risk to the public and adjacent buildings in the event of fire, as the Master of Works pointed out that the water supply would not rise to such a height. Subsequently the neighbouring proprietors lodged objections to the plans on the ground that the titles provided that the buildings on the site should not exceed four stories above the street, and that the walls, so far as fronting Waterloo-street, should not be more than 52ft. in height. At the Court, yesterday, the Dean of Guild decided that he could not uphold the objections, and that he had no alternative but to grant the application.

THE finest morgue in the world will be opened this month in New York, where it has been built at a cost of £10,000 (50,000dols.). It is situated in the grounds of Bellevue Hospital, on East Twenty-sixth-street, near the river, and is a magnificent building, all previous ideas regarding such constructions having been discarded in the somewhat incongruous endeavour to make it as bright and pleasant as possible. The building is 100ft. square, standing on piles, and its skeleton is of steel covered with corrugated iron. The exterior is of Classic design, and is surmounted with a dome, the lantern on the top having ventilating holes. On one side of the hall is the waiting-room, and on the other the mortuary chapel; while in the centre of the building is a large rotunda, along two sides of which are cabinets or vaults of iron, 64 on one side and 44 on the other, for the accommodation of the bodies, and there is a separate place for the coffins of babies. A separate room is furnished for bodies found in the water, which are known at the Morgue as "floaters." No ice is to be used there, but only cold air.

JUDGE BACON, of the Bloomsbury County-court, is always shrewd and sensible. One wishes he and his colleagues had more power sometimes. On Wednesday, at the Bloomsbury County-court, during the hearing of the case of "Killingbeck v. Rhodes," which was a claim for £10, being one quarter's rent of a house, 22, Grafton-street, Kentish Town, the defendant, in reply to the judge, said he had not paid the rent "because he (the landlord) allowed me £5 when he sold the house, to hold my noise because the drains was so bad." Judge Bacon: "So you did hold your noise, did you? I am not sure you could claim the £5, as it is a corrupt conspiracy between you and your landlord, and



is against the public policy. Where is your agreement?" Defendant: "I have it here, but there is no stamp upon it." Judge Bacon: "Then I shall not look at it. The law does not allow me to. Judgment for plaintiff, £1 a month." Defendant: "There was 28 rats and fever and everything in the house!" Judge Bacon: "That comes of your 'holding your noise.' You should perhaps be glad you're alive."

It will probably be recollected that the West of England and South Wales Federation of Building Trades Employers adopted a resolution last year to the effect that, in order to meet the risk and expenses incurred by contractors through the operation of the Workmen's Compensation Act, a sum to cover the premium of insurance should be specified in bills of quantities, and should be paid by the employer instead of the contractor. It is worthy of note that the first contract containing this condition has been inserted by the Bristol docks engineer. The resolution referred to was forwarded to the Architects' Society in Bristol, and has received the assent of that body.

MR. WILLIAM DOIG, of Ealing, writes to *London*:—"An inquiry has been made as to a simple test for the presence of sewage in water. All drinking water should be tested in town or country frequently, as there are other impurities besides sewage which are quite as deadly, and every cistern of water is liable to be a source of blood-poisoning—mice, rats, and other pests must have water, and many a case of typhoid is set up by such as these falling into the cistern and remaining there for months in a decomposed state. To detect this impure condition is very simple and unfeeling. Draw a tumbler of water from the tap at night, put a piece of white lump sugar into it, and place it on the kitchen mantelshelf, or anywhere that the temperature will not be under 60° Fahr. In the morning the water, if pure, will be perfectly clear; if contaminated by sewage or other impurities, the water will be milky. This is a simple and safe test, well known in chemistry and one I frequently apply.

THERE is likely to be some discussion as to the best way of marking, for the information of posterity, the birthplace of William Morris. An estate known as The Winns has been given to the district Council of Walthamstow for the purposes of a public park for the use of Walthamstow, and in that estate stands the fine old house in which the author of "The Earthly Paradise" first saw the light. It is hoped that the house may be preserved and permanently associated in some way with the name of William Morris; but in what way it can be made most useful and most interesting to the people is a matter for careful consideration.

The Guild of Handicraft have purchased from the trustees of the late Mr. William Morris the plant and presses of the Kelmscott Press, and have made arrangements with different members of Mr. Morris's staff for permanent employment at Essex House, with a view to their ultimate election into the guild. It is the hope of the guild by this means to continue in some measure the tradition of good printing and fine workmanship which William Morris revived. The first issue will be Mr. Ashbee's translation of the "Treatises of Benvenuto Cellini on Metal Work and Sculpture," which is now nearly completed. Other books to be issued from the Essex House Press will, it is hoped, be as follows: Sir Thomas Hoby's "Translation (Elizabethan) of Baldassare Castiglione's 'Courtier,'" Bunyan's "Pilgrim's Progress," Froissart's "Chronicles," "The Poems of Burns," "An Illustrated Account of the Work of the Guild of Handicraft," "The Monographs on Famous London Buildings," to be issued from time to time for the Committee for the Survey of the Memorials of Greater London; "Womburne Wodhouse, Wolverhampton," the record of an ancient house.

Alterations are being made to the Wesleyan Chapel, Poplar, E., and special consideration has been given to the ventilation, which will be carried out on the Boyle system.

Mr. Doney, of St. Austell, is the sculptor and designer of a drinking fountain, unveiled at Torpoint, erected to the memory of James B. Ellis, late of H.M.S. *Cambridge*, drowned in saving the lives of two lads. It consists of a drinking fountain, 15ft. high, surmounted by a shaft and cross, the basin resting on a plinth, approached by steps on three sides, composed of Cornish granite and serpentine, bearing appropriate inscriptions and devices.

## Trade News.

### WAGES MOVEMENTS.

THE BUILDING DISPUTE IN BRISTOL.—At a friendly conference held last Friday between the representatives of the Master Builders' Association and the Bricklayers' Society, with reference to appointing a mediator to dispose of the points at issue, a long discussion ensued, and eventually it was mutually agreed to invite his Honour Judge Austin to officiate in that capacity. On Saturday morning the Bristol Master Builders' Association and the Operative Bricklayers' Society met at the office of the Bristol Chamber of Commerce, under the presidency of Judge Austin, as mediator. The former body was represented by Messrs. A. Krauss (president), George Humphreys (treasurer), W. Church, G. Wilkins, G. Downs, E. Walters, and Henry J. Spear (secretary), and the Bricklayers' Society by Messrs. W. H. Roe, C. Sprague, Walter Bool, H. Prigg, and E. Stock (secretary). Mr. Stock, on behalf of the bricklayers, submitted his case as to why his society contended they should be entitled to 4d. per hour extra on the 1st of September, and 4d. per hour on the 30th March next. It was mainly in consequence of their exposure and the loss of time owing to the severity of the weather during the winter months. Mr. A. Krauss replied to the points raised, and a general discussion ensued. The question of walking time (Rule 8) was fully considered, and Mr. George Humphreys made a statement affecting this question from the masters' standpoint. He said that this rule had had a very full consideration by the Master Builders' Association in the many meetings between the employers and operatives, and was very fully discussed by the federated societies before the arbitrator appointed by the Board of Trade. The decision arrived at was agreed to by both employers and operatives without appealing to the arbitrator for his decision, and he was of opinion this rule did not press at all hardly on any branch of the operatives. The latter clause which the Bricklayers' Society wished to delete, if such were done, would be manifestly unfair to the employer living outside the two-mile radius, inasmuch as some of them would actually have to pay walking time for the men to come to work at their places of business, although the men might have to pass their shop to get to other shops which might be several miles further on, and within the two-mile radius. The employer living outside the two-mile radius would thus be handicapped in contracting for work inside the boundary. On the other hand, it would also be manifestly unfair to contractors inside the city boundary, inasmuch as work of any magnitude put up for competition near the city would enable a contractor from a distance to employ men on the works, when contractors inside the city would have to pay walking time, and thus allow the contractor at a distance a distinct advantage over a local contractor. Mr. Humphreys said he had been in business some forty years, and had never had a dispute with any of his men on this rule. He always found men seek employment nearest their homes, and had had men leave him frequently to do so. If a contractor had work outside the boundary, away in residential suburbs, he had to then offer some inducement to get the men to apply for work on the jobs, and he, therefore, was of opinion that this clause should stand as at present arranged with the other branches of the trade—viz., masons, carpenters, plasterers, painters, labourers, &c. The operatives replied that the masters' requirements were very prejudicial to the bricklayers. His Honour remarked that he was pleased at the good humour that existed between the two parties during the progress of the inquiry, and stated that he would consider the various points raised, and give a reply in writing on Monday. On Tuesday, Judge Austin gave his reply as follows:—"Two points of difference exist between the masters and men. (1) The masters are willing to raise the men's wages from 8d. to 8½d. per hour, such rise to take effect from the 1st of September next. The men contend that having regard to the conditions of their work they ought to have an immediate rise of wages to 8½d. per hour, followed by a further rise to 9d. on March 1, 1899. (2) The masters are willing to allow 'walking time' at the rate of three miles an hour outside the agreed boundary of Bristol, but they contend that the men should be bound by a limitation of this rule, which limitation was settled by Mr. Hudson, and agreed to by the federated trades—viz., the masons, labourers, carpenters, joiners, plasterers, painters, and plumbers. This limitation is in the following words:—'This rule applies only to men sent from the shop inside such boundary, and not to men engaged and paid at the job.' In my opinion it is most unfortunate that the Bricklayers' Union did not see their way to join effectively in the reference held before Mr. Hudson. If they had had the advantage of a discussion before a gentleman so experienced in building matters as Mr. Hudson is, I feel confident that the present friction would have been avoided. After careful

consideration I have come to the conclusion that the men will be well advised if they agree to the rules settled by Mr. Hudson, and approved by the federated trades. It is clear from the rules themselves that Mr. Hudson intended (at first, at all events) that the rules should apply to the bricklayers as well as to the other trades. In my opinion, the men ought to agree to these rules in their own interests, in the interests of the labourers whose work is dependent upon them, and in the interest of the trade generally. I will shortly give my reasons. As to point 1:—It is no doubt true that the bricklayers suffer from loss of time during bad weather; but they have failed to convince me that their loss in this respect is in any substantial degree greater than that of the masons and carpenters. It is to some extent greater, but, as against this difference, the bricklayers ought to consider the greater expense of tools in the other trades. As to point 2, it appears to me to be impossible to make any arrangements which will not be open to some objection, because the relative position of the works and of the men's residences must vary in the case of each job undertaken. On the whole, I have come to the conclusion that the objections raised by the masters to the rule as it stands, without the limitation, are graver and of more weight than those raised by the men to the limitation settled by Mr. Hudson. Moreover, the men have failed to convince me that, as bricklayers, they are prejudiced by the limitation to any greater extent than are the members of the federated trades who have accepted Mr. Hudson's view. In conclusion, I should like to say why, in my opinion, the men may properly accept Mr. Hudson's rules. In the first place, they will get, under those rules, prompt and substantial rise in wages. Possibly the masters may see their way to make that rise to take effect immediately instead of postponing it until Sept. 1. In the next place, it is, of course, better for the men and for everyone else that trade disputes should not be frequently recurring. If the bricklayers were to succeed in gaining those advantages for which they are now contending, the result would probably be to create amongst the skilled workmen in the federated trades a feeling of jealousy, which would be most prejudicial to the chances of a useful and enduring settlement." A specially-summoned meeting of the Bristol branch of the Operative Bricklayers' Society was held on Tuesday night, and was largely attended. Judge Austin's decision was considered at some length, and eventually the following resolution was adopted:—"That we do not accept the decision of Judge Austin, as we consider our position to be just and right, and that we continue the struggle till our demands are conceded."

BLACKBURN.—After being in progress upwards of three months, an amicable arrangement has been arrived at in regard to a strike of masons at Blackburn. The men, who asked for 4d. per hour increase, are to receive 4d. advance now, and another 4d. next July. The masters have been granted by the men certain concessions in regard to sawn and hand-dressed stone, which matter formed the origin of the strike.

INVERNESS.—The slaters in Inverness came out on strike on Monday for an increase of wages. At present they receive 7½d. per hour in town, and want the sum raised to 8d. per hour. In employment in the country, the men receive 8d. per hour, and they now request an increase to 8½d. The employers have offered 8d. per hour in town and country; but this offer the men declined.

NOTTINGHAM.—Representatives of the bricklayers' labourers now on strike met the committee of the masters on Friday night for the purpose of presenting proposals for a settlement of the dispute. After lengthy consideration the parties were unable to agree, the committee refusing to entertain the terms offered by the men. It appears, however, that the committee afterwards considered the matter, and a communication was received by the men's representatives on Saturday morning intimating that it had been decided to call a meeting of the masters to-day and lay the proposals before them, with a recommendation that they be accepted. It is probable, therefore, that in the course of a few days the strike will be over, and building operations which have been so long standing will be resumed. It is stated that the full demand of the men is to be conceded.

Applications for space, for the Paris Exhibition of 1900, should be sent to the secretary of the Royal Commission, St. Stephen's House, Westminster, not later than the 20th August, 1898.

A builder was charged, last week, at the Westminster Police-court, with assaulting a boy whom he had caught up one of his ladders. Another lad had escaped him. Defendant said he was greatly annoyed by the boys of the neighbourhood, and he was powerless against them. Mr. De Rutzen, in imposing a fine because the defendant had acted with too great severity, observed that boys of the present day were masters of the situation.



## LIST OF COMPETITIONS OPEN.

Glasgow—Exhibition Buildings (£60,000 limit).....	£210 (merged), £156 10s., £105.....	H. A. Hedley, Secretary, 141, Buchanan-street, Glasgow .....	Aug. 15
Pendlebury—Three Chapels, Offices, Lodge, Entrance Gates, and Boundary Wall, at proposed Cemetery .....	£50 (and 5 per cent. com.), £30, £20	Samuel Brown, Town Clerk, Town Hall, Salford .....	16
Pontywaan—County School (£2,000 limit) .....	£5 (merged) .....	Newton Wade, Clerk to Managers, 39, Dock-street, Newport, Mon. ....	17
Glasgow—City Improvements between King-street, City, and the N.W. Wynd .....	£100, £50, £25 .....	J. D. Marwick, Town Clerk, City Chambers, Glasgow .....	31
Stockholm—City Railway Stations and Junctions .....	£856, £438, £219 .....	Consulate General, 27, Great Winchester-street, E.C. ....	31
St. Pancras—New Baths .....	Vestry .....	C. H. J. Barrett, Vestry Clerk, Vestry Hall, Pancras-road, N.W. ....	25
Wivenhoe—Water Supply and Drainage Schemes .....	£250 .....	C. W. Denton, Clerk, 8, East Stockwell-street, Colchester .....	29
Plymouth—Shops and Dwelling-Houses, Tavistock-road .....	50gns., 20gns. ....	J. H. Ellis, Town Clerk, Plymouth .....	Sept. 24
Liverpool—New Buildings for Royal Institution .....	£3 3s. ....	Harold Waterhouse, Hon. Sec., 3, Cook-street, Liverpool .....	Oct. 3
Godalming—Football Stand (150 seats—£150 limit) .....	100gns. (merged), 50gns. ....	Secretary, Recreation Club, Godalming .....	—
Leamington—Free Library and Technical Institute .....	—	H. Consett Passman, Town Clerk, Leamington .....	—
Rotherham—Extension Baptist Schoolroom (£600 limit) .....	—	A. Crowcroft, Clifton Crescent, South Rotherham, Yorks. ....	—

## LIST OF TENDERS OPEN.

## BUILDINGS.

Clacton-on-Sea—Cottage Hospital .....	Committee .....	J. W. Martin, Architect, Station Chambers, Clacton-on-Sea .....	Aug. 6
Halifax—Groundman's House .....	Cricket and Football Club .....	Medley Hall, Architect, 29, Northgate, Halifax .....	7
Corton—Five Houses .....	Guardians .....	Arthur S. Hewitt, Architect, 15, King-street, Yarmouth .....	6
Omagh—Repairs to Chimney at Workhouse .....	Commissioners .....	William Cathcart, Clerk, Poor Law Office, Omagh .....	6
Tobermory—Slaughter-House at Glachnacardach .....	Gillingham Urban District Council .....	John MacLachlan, Town Clerk, Tobermory .....	6
Great Horton—Eleven Through Houses, Newburn-road .....	Mrs. M'Kinley .....	S. Spencer, Architect, Great Horton-road, Great Horton .....	6
New Brompton—Additions to Technical Institute, Green-street .....	Provident Industrial Society, Ltd. ....	F. Smith, Architect, Bank Chambers, High-street, New Brompton ..	6
Buncrana—Dwelling House .....	Gloucestershire Standing Committee .....	T. Johnston, 11, East-wall, Londonderry .....	6
Ashwater—Repairs to House and Buildings at Fords Farm .....	Guardians .....	Thompson and Co., F.I.A., Surveyors, 24, Gandy-street, Exeter .....	6
Bradford—Store and Five Houses, Gilpin-street .....	John Mather .....	Ryecraft and Firch, Archts., Bank Bldgs, Manchester-rd., Bradford ..	6
Staple Hill—Police Station .....	T. W. Rowe .....	M. H. Medland, County Architect, 15, Clarence-street, Gloucester ..	6
Kendal—Two Blocks of Villas, Windsor-terrace .....	A. Thory .....	Stephen Shaw, F.R.I.B.A., 45, Highgate, Kendal .....	6
Sheffield—Alterations at 12 and 14, Upperthorpe .....	Guardians .....	Edward Winder, jun., Architect, Corn Exchange Chambers, Sheffield ..	6
Whitley—Business Premises .....	Rochdale School Board .....	Hope and Maxwell, 87, Saville-street, North Shields .....	6
Chester-le-Street—Alterations to Premises, &c., in Front-street .....	W. A. Rigg .....	H. T. Gradon, Architect, Market-place, Durham .....	6
Stoke Damereel—Rectory House .....	Guardians .....	W. D. Caroe, 8a, Whitehall-place, London, S.W. ....	6
Whittlesea—Villa .....	Guardians .....	J. G. Stallebrass, Architect, North-street, Peterborough .....	6
Andover—Alterations to Boiler-House at Workhouse .....	Handsworth School Board .....	Alfred Purkess, 16, Junction-road, Andover .....	6
Cronkysbaw—Classroom Accommodation at Board School .....	Industrial Co-operative Soc., Ltd. ....	G. H. Wheeler, Clerk, School Board Office, Rochdale .....	6
Hanley—Drill Hall and Headquarters, Victoria-road .....	Great Western Railway Co. ....	R. Scrivener and Sons, Architects, Hanley .....	6
Martham—Three Houses and Bake-office .....	School Board .....	Chas. G. Baker, Architect, Town Hall Chambers, Great Yarmouth ..	6
Shipston-on-Stour—New Laundry, &c., at Workhouse .....	Dunngrove .....	J. Eden Hiron, Clerk, Shipston-on-Stour .....	6
Udny—Barn at Tillyfar .....	W. Goodridge .....	Jenkins and Marr, Architects, 16, Bridge-street, Aberdeen .....	6
Boole—Additions to Property in Mount-street .....	Dewsbury Pioneers' Indust. Soc. Ltd. ....	E. J. Wilkins, Secretary, Free Library Buildings, Poole .....	6
Warboys—Additions and Reerecting Strict Baptist Chapel .....	Preston Union Guardians .....	Samuel Fyson, Stoneleigh, Warboys, Hunts .....	6
Brynmawr—Block of Shops .....	Handsworth School Board .....	J. E. Williams, Railway Hotel, Brynmawr .....	6
Wrexton—Infants' School .....	Industrial Co-operative Soc., Ltd. ....	Ed. Bowman, Archt., County Chambers, Westgate-road, Newcastle ..	6
Worsborough—Converting Engine House into a Dwelling House .....	Great Western Railway Co. ....	J. Whitaker, Surveyor, Worsborough Bridge .....	6
Northcote—Rebuilding Edinburgh Castle, High-street .....	School Board .....	G. Saltmarsh, Manager, Brewery Offices, Northfleet, Kent .....	6
Dartmouth—Villas at Ford Hill .....	W. Goodridge .....	J. A. Brand, Architect, 3, Victoria-road, Dartmouth .....	6
Batley Carr—Branch Store, Warwick-road .....	Dewsbury Pioneers' Indust. Soc. Ltd. ....	Holtom and Fox, Architects, Northgate, Dewsbury .....	6
Alnwick—Cottage at Bog Mill Homestead .....	Preston Union Guardians .....	Wm. Robson Hindmarsh, Jun., Architect, Alnwick .....	6
Preston—Additions to Fulwood Workhouse .....	Handsworth School Board .....	James Clarke, Clerk, Union Offices, Preston .....	6
Tullybeagles—Additions to Shooting Lodge .....	Industrial Co-operative Soc., Ltd. ....	David Smart, Architect, Perth .....	6
Woodhouse—Schools .....	Great Western Railway Co. ....	John D. Webster, Architect, 19, St. James's-street, Sheffield .....	6
Kingsuise—Warehouse at Spenside Distillery .....	School Board .....	Alexander Mackenzie, Architect, Kinross .....	6
Heckmondwike—Engine House, Chimney, &c., Central Stores .....	Great Western Railway Company .....	Arthur A. Stott, Architect, Heckmondwike .....	6
Ilkley—Three Villas .....	Ceramo Syndicate, Limited .....	Isitt, Adkin, and Hill, Architects, Prudential Buildings, Bradford ..	6
Taunton—Stores .....	Bilston Urban District Council .....	G. K. Mills, Secretary, Paddington Station, London .....	6
Sturry—Repairing National School .....	Urban District School Board .....	J. Goble, Ivy House, Sturry, Kent .....	6
Frindsbury—Additions and Alterations to Waincott Schools .....	Manchester Guardians .....	G. E. Bond, Architect, High-street, Rochester .....	6
Dunngrove—Coastguard Station .....	B. Sykes .....	Office of Public Works, Dublin .....	6
Llantrisant—Goods-Shed, Engine-Shed, &c. ....	School Board .....	G. K. Mills, Secretary, Paddington Station, London, W. ....	6
Knaresborough—Alterations to Parnassus Mount .....	Guardians .....	T. A. Buttery and S. B. Birds, Architects, Queen-street, Morley .....	6
Castleford—Glass Factory (about 180ft. long), Ryebread-lane .....	J. Kieran, Clerk, Comerford .....	R. M. McDowall, Architect, Carlton-street, Castleford .....	6
Stotton—Stable Buildings, &c., at Fox and Hounds Inn .....	J. F. Fuller, F.S.A., Brunswick Chambers, Brunswick-st., Dublin ..	T. A. Buttery and S. B. Birds, Architects .....	6
Manchester—New Whitworth Hall, Owens College .....	Wade and Turner, Architects, 10, Pitt-street, Barnsley .....	A. Waterhouse & Son, Archts., 20, New Cavendish-st., London, W. ....	6
Wombourne—Superintendent Engineer's House at Bratch .....	Medley Hall, Architect, 29, Northgate, Halifax .....	—	6
Waterworks .....	Robert P. Woodside, Hon. Secretary, Ballycastle .....	—	6
Sandwich—Additions to Schools .....	H. J. Woodhams, Clerk, Alfriston, Berwick Station, Sussex .....	—	6
Lakeside—Caretaker's House to Jubilee Institute .....	Henry Dearden, A.M.I.C.E., Town Hall, Dewsbury .....	—	6
Swinton—Alterations at Schools .....	J. Holliday, Ewanrigg Hall, near Maryport .....	—	6
Halifax—House, Shop, and Offices, West Vale .....	A. S. Coates .....	—	6
Batley—Five Shops and Houses .....	Guardians .....	—	6
Paisley—Reconstruction of Oakshaw Public School .....	Vestry .....	—	6
Kilkeny—Dormitory Annexe at Workhouse .....	Loyal St. Mary's Lodge, M.U. ....	—	6
Dublin—Sundry Works at Training College, Marlborough-st., and at 33, 34, and 35, North Great George's-street .....	Urban District Council .....	—	6
Barnsley—Dwelling Houses, Longear-lane .....	David Haigh .....	—	6
Halifax—Alterations and Additions to Pioneer Tool Works .....	Tramway Committee .....	—	6
Ballycastle—O'Connor Memorial Fountain .....	Corporation .....	—	6
Wilmington—School .....	Pembroke Township Commissioners .....	—	6
Dewsbury—Excavating Work at Gasworks .....	Guardians .....	—	6
Ewanrigg—Additions to Farm Buildings .....	School Board .....	—	6
Consett—Shop and Dwelling House in Middle-street .....	Governors .....	—	6
Burnley—Imbecile Wards at Workhouse .....	Co-operative Building Soc., Ltd. ....	—	6
Shoreditch—Battery-Room, Boiler-House, and Offices at Electric Supply Station, Coronet-street .....	Guardians .....	—	6
Ecclesfield—Seven Cottages at The Cross .....	Urban District Council .....	—	6
Penistone—Masonry Piers and Wing Walls of Bridge, &c. ....	Guardians .....	—	6
Wincobank—Fifteen Cottages, Johnson-street and Wood-grove .....	Corporation .....	—	6
Tinsley—Extension of Car Sheds, &c. ....	Guardians .....	—	6
Over—Infectious Diseases Hospital .....	Urban District Council .....	—	6
Ball's Bridge—Buildings and Foundations at Electric Lighting Works .....	Guardians .....	—	6
Easingwold—Vagrant Cells, &c., at Workhouse .....	Corporation .....	—	6
Swansea—Manselton School .....	Technical Institute .....	—	6
Winchester—Peter Symonds School .....	Government of Ecuador .....	—	6
Grangemouth—Block of Dwelling-Houses, Forth-street .....	School Board .....	—	6
Blackburn—Probation Homes for Pauper Children and Superintendent's House near Workhouse .....	Municipal Authority .....	—	6
Walthamstow—Public Baths .....	Larbert School Board .....	—	6
Blackburn—Two Homes in Cherry-street, and Two Homes in Poplar-street .....	J. R. Spink .....	—	6
Sunderland—Technical College at Green-terrace .....	Corporation .....	—	6
Auchindor—Byres and Stables, Farm of Auchmillan .....	—	—	6
Consett—Institute Buildings, Park-road .....	—	—	6
Guayquil—Custom House .....	—	—	6
Swansea—Manselton School .....	—	—	6
Belem—Cattle Pens, Abattoir, and Two Markets .....	—	—	6
Carron—School .....	—	—	6
Brentwood—Additions, Congregational Sunday-school .....	—	—	6
Gledhow—House and Shop .....	—	—	6
Leicester—Isolation Hospital .....	—	—	6



# THE BUILDING NEWS

## AND ENGINEERING JOURNAL.

VOL. LXXV.—No. 2275.

FRIDAY, AUGUST 12, 1898.

### FACTS AND FICTIONS.

A SEARCH for the picturesque has been one of the most prominent "notes" of modern architecture. From the parapet to the gable is a great step. Soon after the reign of Classic monotony and dulness, a reaction set in in favour of more irregular features. Many have attributed the change to the era of the modern novel. To Sir Walter Scott has been attributed a taste for the romantic and sentimental in architecture. Other authors stirred up a feeling for the picturesque in gardening and architecture. The Mediæval styles, or as we generally call them the Gothic, at once re-echoed the sentiment and satisfied the craving, but in a manner that left much to be desired. A fictitious taste arose for the castellated style—for crenellated parapets, barbicans, turrets, and the like. Then followed a *rêchauffé* of scraps, odds and ends from France, Belgium, and other countries; gables (broken and plain), turrets, oriels, dormers on high roofs; the old town-hall and chateau were made to play a conspicuous part in our modern buildings, till gradually the taste veered round once more to English modes of building—to the domestic buildings of the last three centuries. Thus different notes of the same feeling have been successively struck, all in the direction of seeking something a little more piquant or out of the common way. Gower-street or Baker-street typify the art of building when her Majesty ascended the throne, and fairly represent the taste of the day in literature and art. It has been well said that at that epoch the newspaper and the novel were comparatively unknown; now everybody reads them. The people "live not in history, but in fiction." Greek philosophers and Roman emperors are indeed figures that have died out for the people of to-day; they made up a great deal of the history and romance of the early part of the century, but they have given place to the imaginary creations of the novelist—to those of the kind Jane Austen, George Eliot, or Victor Hugo have put before us. The exchange has not, perhaps, been characterised by any solidity of thought; but the fact remains that human sympathies and sentiment are more real for us than pagan gods and goddesses, or the victories of emperors and kings. Our architecture has reflected the change. The gabled roof and mullioned window, the ingle fire-place, and the quaint details and accessories of a modern house designed in the style of the day, are witnesses. After all, the sentiment expressed in these things is more real and English than ideas represented by features like Classic porticos and parapets. What we have substituted are at least realities of building for historic fictions. We are not contented now with reproductions of temples, palaces, and Palladian villas which had no real facts to synchronise or correspond with them. Our picturesqueness, if a little romantic, is gradually becoming more of a reality.

Our modern streets, meagre and ill-planned as they are, comprise more of the real elements and facts of building construction than the streets of the early Victorian era. We no longer put a gable on our houses to conceal a flat roof behind, or introduce pointed windows for mere picturesqueness. We build our chimneys visibly to carry off smoke; our roofs are framed upon constructive principles; we employ columns and girders from very different motives than

we did thirty years ago: they are designed and calculated to carry loads, unsatisfactory as they sometimes are; and if we have added the picturesque, it is not because we have affected it; but rather that we have handled our facts more naturally. We no longer try to make them what they are not. Our forefathers fell under the snare of constructing architecture, making it the means instead of the end of building—of fitting an architectural shell to a building. We can compare with satisfaction our floors and roofs and supports with those of a period not long past, when they were all covered up and made to represent stone or marble slabs or monoliths. In avoiding the ideal, the modern architect, like the keen purveyor of novels, tries to put before the public something unlike the humdrum and dull. People do not care to read about people of their own sort or among whom they spend their lives; they want something a little exciting, removed from the monotony of everyday life. Hence the realist who succeeds is he who deals in exaggeration—extreme vice or virtue. So it is with the architectural realist: his building must be of an uncommon type. It does not matter where he goes for inspiration, so long as he avoids the dull and commonplace; he designs his villa like a farmhouse, he builds his gables in the plainest brickwork and the quaintest fashion, his windows are divided by mullions and transoms, and filled with leaded lights. Instead of troubling to disguise a blank wall by pilasters or niches, or other arrangements, it is left plain and bare. It is exceedingly picturesque and quaint, but it truthfully expresses the plan. The love of quaint arrangements and features has something that appeals to our sympathies and homely life. The danger is, however, that we can carry this irregularity and picturesqueness to an extreme. We can leave the honest artist to avoid this; but there are those who mistake the leading impulses of the art—men who cannot draw the distinction between facts as they present themselves in one situation and in certain circumstances and in totally different ones. What A does as a genuine embodiment of conditions and the tastes and habits of his employer, B thinks he can follow, notwithstanding there is nothing common between them; C follows suit. The particular design is transplanted from the country to a new town street, and thus what in the first place was a real and honest expression of fact, is turned into a meaningless fiction. There are many just now enjoying the picturesque buildings of Warwickshire, the half-timbered moated manor-houses and farmhouses and stone buildings of Warwick, Baddesley Clinton, Knowle, Kenilworth, and these annual excursions to picturesque parts of England and the Continent prove that the taste for this kind of architecture extends, and appears to be an antidote to the sterner realities of town practice. But a great deal more is necessary to rescue our large new building estates from the clutches of speculative builders. The little that architects are doing and have done to reform our dull building is more than counterbalanced by the acres of sordid houses and mean-looking streets which are extending in every direction out of London. It is the country life and its surroundings that is wanted to be infused into the great towns. The conventional and commonplace lives of our people need some of the picturesque elements of the country, and even if we can give them in a few half-timbered gables in the suburban street, or in the red brick and tiled roof set off by green shrubberies and trees, it is better than the dull and conventional villadom, with its lines of straight streets and sordid surroundings.

The finance committee of the Lancashire County Council have decided to build a new sessions court at Preston, at an estimated cost of £60,000.

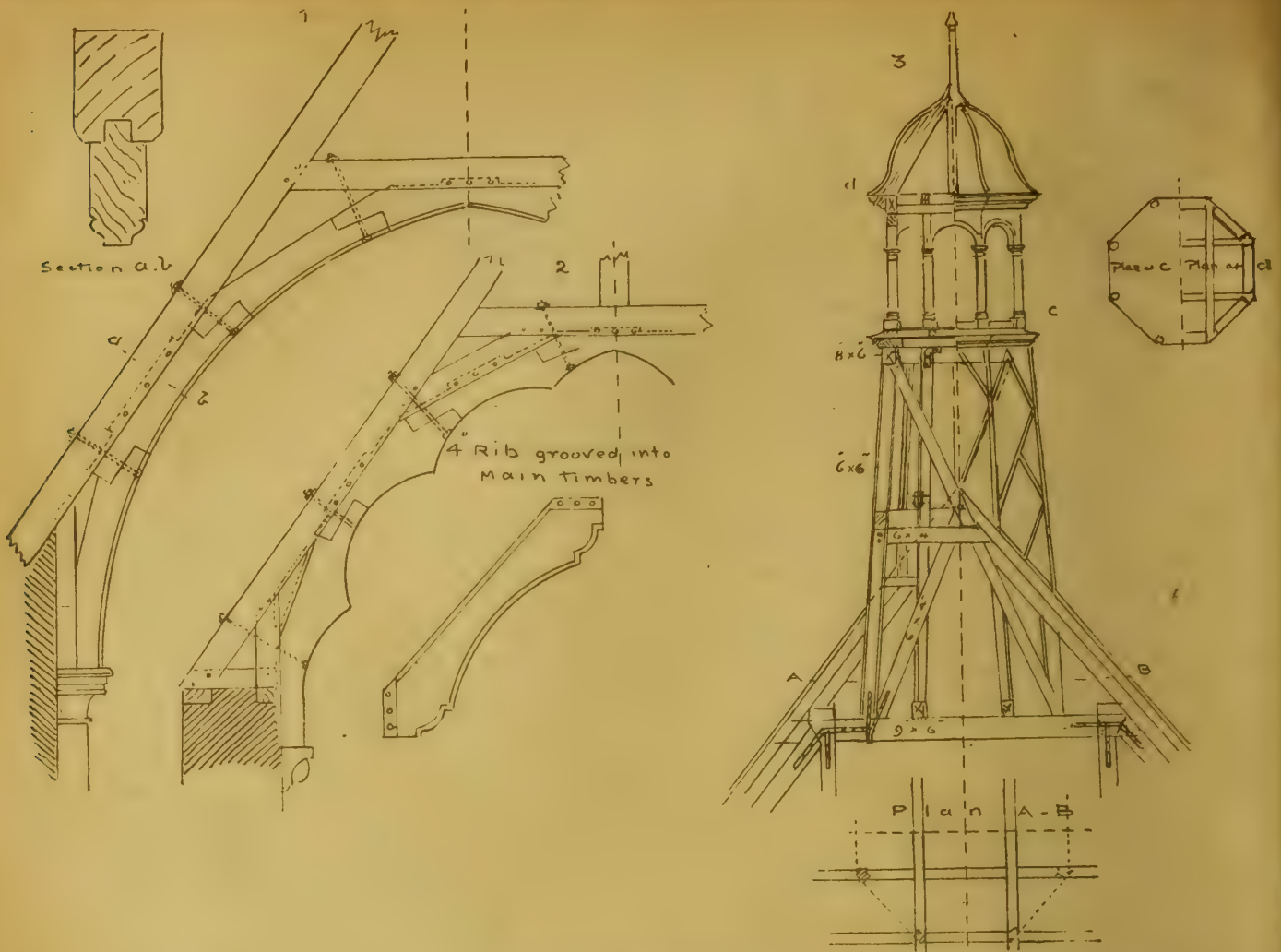
### LIABILITY OF EMPLOYERS.

IN the erection and demolition of buildings great vigilance is necessary on the part of builders and foremen before giving instructions to their workmen, as a recent appeal case we reported last week establishes, in which the judgment of the Divisional Court was set aside. The appellants—a widow and her three children—claimed compensation for the loss of her husband through the fall of a roof, and recovered. The facts, as reported, are worth attention, and the case shows the importance of careful instruction. It was hard for workmen under the common law, when injuries were sustained by them owing to the negligence of foremen or superintendents in the employer's service, to have to complain against a superior such as a foreman of works, whatever they might have done in this way towards a workman in the same position as themselves. Men are employed who are often made superintendents of a building or a trade. The Employers' Liability Act, 1880, was passed to obviate this hardship. Under it the master was held responsible for the loss caused to a workman by any personal injuries he had received through the negligence of persons in the service of the employer who held the position of foremen. But there were certain flaws. The Act only conferred benefits on a "workman," and, therefore, if a plaintiff could not prove that he was a workman within the meaning of the Act, he could not claim under this Act: also, if the employer could show that the workman had agreed not to avail himself of the benefits conferred by the Act, or had "contracted out" of the Act, he could not recover. A great many obstacles were encountered by a workman who sought to recover: there were technical points which had to be mastered before he could prove that he had a right of action against his employer. A plaintiff, in order to prove he is a workman, must show that he has entered into a contract of service with his employer under this Act; but here, again, the difficulty arises as to who is, in fact, the employer. If the workman should be sent with a machine to take part in an operation conducted by some other person than the man who actually pays him, the question has been raised whether he is not at the time of accident in the service of the person to whom he has been sent instead of the person who owns the machine.

The Workmen's Compensation Act, 1897, which came into operation in July last, has removed some of these obstacles, and is more favourable to the workman. Previously, the burden of bearing the loss caused by personal injury was thrown on the injured man. The negligence of fellow-workmen is often a common occurrence in building operations, as, for instance, in neglecting to shore, carelessness in erecting scaffolding and in placing planks. The new Act applies only to a few employments; but whenever the injury is owing to the personal negligence of the employer, or of someone in his employ, and for whose default he can be held responsible, the workman so injured has the remedies at law open to him which he had before the new Act came into force.

Last week we reported a case in our "Legal Intelligence" which bears on the subject. The action was brought by a widow on behalf of herself and children to recover compensation for the loss of her husband, whose death was caused by the falling of a roof while he was engaged in pulling down a building in accordance with orders he had received from a superior workman in the defendant's employ. The Greenwich County-court first heard the case, and the jury found for the plaintiffs, with £90 for the widow and £10 for each of the children. The defendant appealed on the ground of no evidence of negligence; the man in charge had only given a general order to pull down, and if the deceased had set to work in a proper





way, it was alleged, the accident could not have happened. The County Court verdict was set aside by the Divisional Court. The plaintiff appealed, and the point was whether the facts were within the provisions of the Employers' Liability Act, Sec. I., which enacted that where personal injury was caused to a workman by reason of the negligence of any person in the service of the employer to whose orders the workman at the time of the injury was bound to conform, and when the injury resulted from his having carried them out, the workman, or, in case of his death, his personal legal representatives, should have a cause of action against the employer. The foreman who gave the orders admitted that he had not examined the state of the premises, and therefore did not warn the workmen to take precautions. In this case it was said that the deceased first took down partitions that supported the roof, and that if he had not done so no accident would have occurred; in other words, it was alleged his own act had caused the accident, and not his compliance with the foreman's orders. The judge took the view that the deceased had been told to take down the partitions first, and that he had been told to preserve them, and he carried out this instruction before demolishing the building; therefore he thought the foreman had been negligent. Held, that the judges of the Divisional Court were in error, and the appeal was allowed, and that of the County Court judge restored. In this instance the instructions given to preserve the partitions formed the chief evidence.

It is stated that the Ecclesiastical Commissioners have decided to build a new residence at Canterbury for the Archbishop, and that it will be on the site of the houses in Palace-street, near the junior department of the King's School.

#### MODEL SPECIFICATIONS.—XXV.

##### ROOFS AND TURRETS—JOINER.

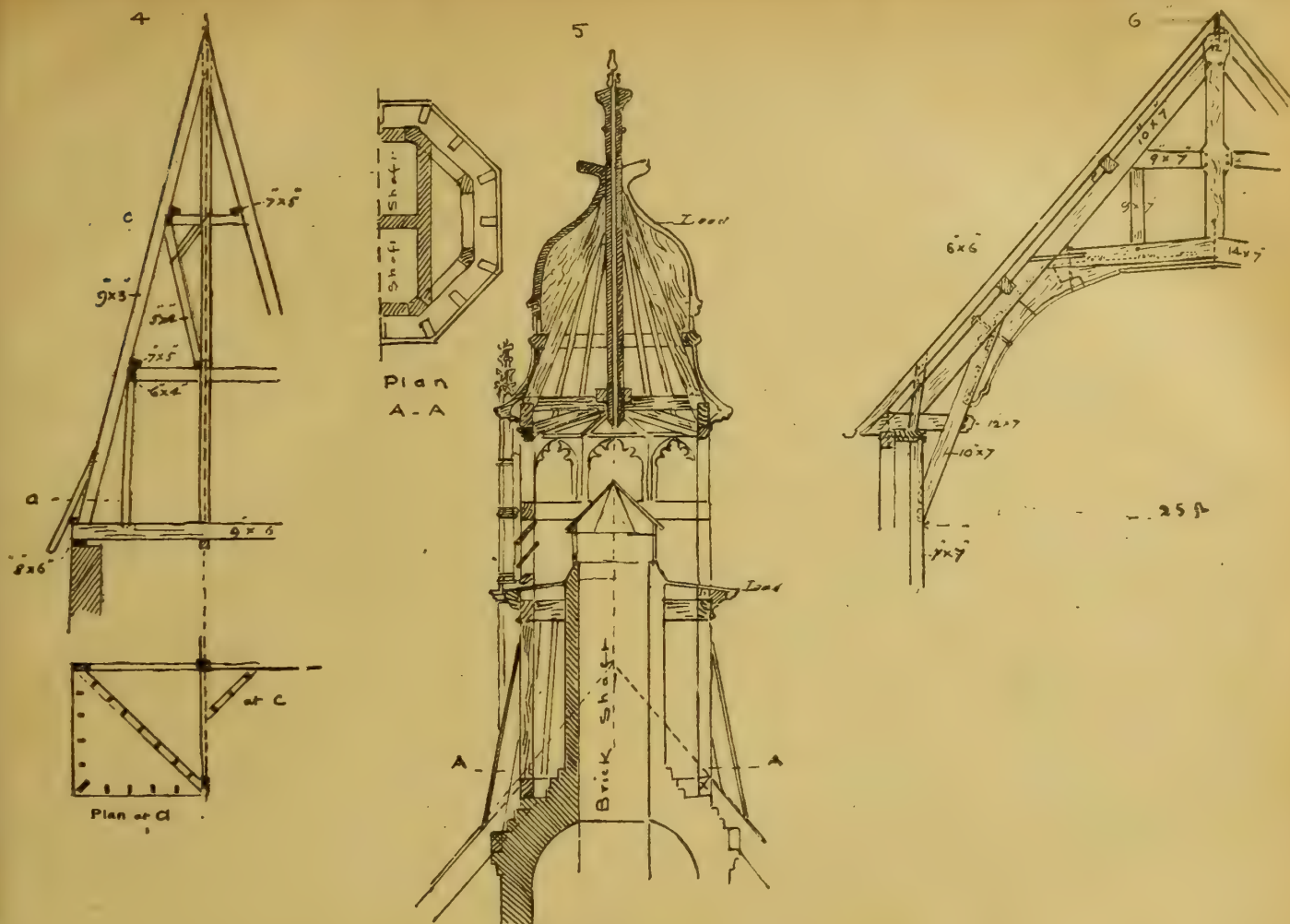
THE open rib or braced roof presents many varieties for the architect's consideration, and in writing his specification he should consider the best manner of constructing them. It would be undesirable to cut out of one piece of timber a curved rib of any length, as it would have to be cut across the grain, and would be apt to split or twist. Ribs are generally built up in thicknesses of plank in lengths of, say, 3ft. or more, and about 1in. to 1½in. or 2in. thick, breaking joint, cut to the curve and bolted through at intervals of, say, 1ft. to 18in., secured to a sole-piece or curb at the base, halved and bolted at joints. Such a method of construction has been successfully used in the erection of railway stations, drill halls, and large assembly halls. But for roofs of churches and chapels which generally range in span from 20ft. to 30ft., the curved ribs are composed of planks of 3in. or 4in. in thickness, and of convenient lengths of 3ft. or more, cut to curve, and the inner edges grooved to principals and collars or braces, as we have shown in our sketches, pp. 164 and 165 (Figs. 13 and 14), or as drawn to a larger scale in our present sketches 1 and 2. The ends of the pieces are rebated together or scarfed, and the inner edge is tongued to fit into stopped grooves, say 1½in. wide, and about 1in. deep, on the inner side of timbers. Iron bolts are used to bolt the pieces together at the joints. Many ribs with foliated or cusped edges are put together in this manner. Section 6 is an example of an executed church with ribs of this kind. The other sections we give illustrate one or two common types of turret construction. In these structures the clauses ought to particularise certain points. First, as to the foundation—that it should be supported on a brick core or masonry

substructure, like that of a staircase tower; or second, that it should rest on trusses or principals framed together for the purpose; third, that there should be sole-pieces or sills framed together to carry the uprights, and be securely fastened thereto by iron bolts or straps; fourth, that the angle-posts should be cross-braced, and fixed to a head or curb properly framed at the angles, and secured by ironwork; fifth, that the bell-cot or lantern should be framed or put together with proper joints, and be connected to the head in a secure manner, and that the lantern-roof connections should be so formed as to prevent the possibility of rocking or vibrating motion, due to a bell or a wind pressure, and the cupola or roof be framed securely. With these objects in view, the different curbs or horizontal plates should be dovetailed and secured by iron straps or cleats, and the uprights be prevented from swaying by cross-braces or proper connections.

##### THE JOINER.

For joiner's work Onega and Archangel deals are recommended by many. The specification should name port, or some London merchant. One authority recommends the White Sea ports, as from Petersburg, Finland, and certain Swedish ports. We have given directions and clauses for these requirements. Timber for joinery should be specially selected, and be free from large knots, and a general clause may be inserted to the effect that if any joinery should shrink or open before the final certificate, it is to be replaced at the contractor's expense. A useful clause should state that the joiner's work is to be put together at the time of signing the contract, but not to be wedged up before required. If so desired, the dimensions and thicknesses figured in drawings specified are to be adhered to as the finished ones; but this is not the custom





of joiners, and has its drawbacks. The usual clauses we shall give in our next.

**33. Barrel-Vaulted Roof.**—The roof to be as shown, with each pair of rafters framed with collar-beam and braces 6in. by 4in., placed 1ft. 9in. apart, bolted at the junctions with  $\frac{1}{2}$ in. bolts, nuts, and washers. The underside of rafters to be boarded with 1in. or 1 $\frac{1}{2}$ in. wrought matched V-jointed tongued boards, laid horizontally, and securely nailed to rafters. Put over same a layer of McNeill's roofing felt, properly laid and tacked. Lay battens 3in. by 1in. on the back of every rafter, and across these lay slating battens (or double-oak tiling laths) for slates or tiles, fixed to a proper gauge; internally screw to rafters moulded ribs, as shown, at intervals, and also horizontally at the junctions and braces, and collars to form panels. Or—

The boarding to be wrought one side with matched and beaded joints tongued to ribs.

**34. Trimmers.**—Trim for all hearths, landings, skylights, trap-doors, &c., in floors with trimmers and trimming-joists 1in. thicker than the joists supported. The joists are to be housed into trimmers, and supported by 2 $\frac{1}{2}$ in. by 2in. deal fillets, spiked to trimmers.

The fireplace trimmers to be secured to wall with  $\frac{1}{2}$ in. wrought-iron bolts, nuts, and washers, the same passing through the trimmer arches and fixed into body of wall by nuts and washers.

**35. Dormers.**—Trim for dormers in roof with sides composed of 4in. by 2in. studs, 4in. by 3in. heads and sills, 4in. by 4in. corner-posts, cover sides and top with  $\frac{1}{2}$ in. rough boarding edges, shot, and put 2in. roll where required. Or—

Construct dormers according to drawings, with 4in. by 4in. angle-posts, 7in. by 1 $\frac{1}{2}$ in. ridge boards, 7in. by 2in. valley boards, rafters 4 $\frac{1}{2}$ in. by 2in., ceiling joists 4 $\frac{1}{2}$ in. by 2in. Cover the roof and sides with 1in. boarding and felt. Or—

The dormers to main roof to have 5in. by 5in. wrought, rebated, and twice-moulded posts, 5in. by 4in. wrought, rebated, and moulded head, 6in. by 4in. oak, sunk, weathered, rebated, and cheek-throated sill. The rafters to be 3 $\frac{1}{2}$ in. by 2in., plates 3in. by 3in., ceiling joists 3 $\frac{1}{2}$ in. by 2in., ridge 6in. by 2in., valleys 7in. by 2in., and cheeks to be framed with 3in. by 2in. studs. The roof and cheeks to be covered with 1in. rough boarding, and felted with McNeill's roofing felt. Fix under verge of tiling and beneath eaves 4in. by 2 $\frac{1}{2}$ in.

deal moulding, with tongued and mitred angles screwed to framing. The tympanum of gable to be faced with 1 $\frac{1}{2}$ in. deal. The casements to be 2in. ovolo moulded, hung with 2 $\frac{1}{2}$ in. iron butts, and grooved. The bottom rail of casement to be rebated and grooved to exclude wet. Fix approved casement stays and fastening of Crittall Manufacturing Co., Braintree (or N.A.P. Casement Co., or White and Son, Oxford-street), and finish inside with architrave moulding, window-board tongued to oak sill.

Trim for trap doors and skylights on roof, and put a rough deal rebated curb round opening 6in. or 9in. above roof, with angle fillets round the same; small gutter at top. The glazed lights to be 2in. wrought rebated, grooved, and throated, with bars rebated for glass, &c.

**36. Generally.**—All rafters to be notched down on purlins and plates, and to be cut true at the ridges and securely spiked thereto. All holes for butts to be drilled.

**37. Boarding and Battening.**—The roof to be covered with  $\frac{1}{2}$ in. (or 1in.) rough deal boarding, and a layer of McNeill's felt (or bituminous, inodorous felt), lapped at edges, to be nailed to boarding with compo nails. Lay 2in. by  $\frac{1}{2}$ in. battens to proper gauge for slating or bends.

**38. Gutters, &c.**—All flats and gutters to be laid with 1 $\frac{1}{2}$ in. deal boards laid to falls of not less than 2in. in 10ft. on 3in. by 2in. framed bearers with rebated drips, rolls for lead, dovetailed cesspits, and  $\frac{1}{2}$ in. rough deal bar-board bevelled to fit at sides of gutters and valleys. Provide and fix tilting fillets to all eaves 3 $\frac{1}{2}$ in. by 1 $\frac{1}{2}$ in.

**39. Turret on Roof (15ft. high and 7ft. on base).**—The turret on roof to be constructed according to detail drawings, and the scantlings of timber to conform thereto. Prepare a curb on two roof trusses, or a sill of 9in. by 6in. timbers, halved and bolted at angles (or secured by wrought-iron cleats  $\frac{1}{2}$ in. thick and 3in. wide, extending 9in. on each timber). At the corners tenon-posts 6in. by 6in., and to the height required below lantern, and frame a curb 6in. by 6in. to receive pillars of lantern, bevel-tenoned and bolted at angles. Each side of turret to be stiffened by cross-braces 6in. by 4in. on two heights, with horizontal tie-pieces 6in. by 4in. between, tenoned to angle-posts, and fill in with 4in. by 2in. quarters. The upper open lantern to be framed as shown, with four (or eight) angle-pillars tenoned into curb and into

upper plates 4in. by 4in. Notch and bolt down the angle-ribs shaped to profile of cupola and frame into a cross-bearer a centre-post 4in. by 4in. into which the ribs are to be framed at apex with proper intermediate ribs for  $\frac{1}{2}$ in. boarding for lead covering.

**40. Turret or Flèche (20ft. by 25ft. in height, and 8ft. base).**—The turret on roof to be constructed according to detail drawings, and the scantlings to conform thereto. Frame sill pieces or curb 9in. by 6in. on the straining beams of trusses, halved at angles and strapped to trusses. The corner uprights to be 6in. by 6in. (or 8in. by 8in.), stub-tenoned to sill, and to be secured thereto by wrought-iron straps (or angle cleats), 2 $\frac{1}{2}$ in. by  $\frac{1}{2}$ in., and 9in. each way, with 6in. by 3in. intermediate posts, with cross braces 6in. by 4in. between filled in with quartering (or, the side framing to be composed of cross braces filled in with 4in. by 2in. quarters). The uprights to be bolted to head 6in. by 6in., dovetailed at corners (or secured by wrought-iron cleats), and to have cross ties notched to same and screwed. The lantern to be formed of wrought and moulded posts, 6in. by 6in. (or turned balusters or columns), tenoned to head of turret and to plate of cupola, 6in. by 4in., which is to be securely framed at angles (or secured by wrought-iron cleats). This plate to have a centre tie 8in. by 6in., notched to it and screwed. Frame into centre of tie a post 6in. by 6in. to form finial. Notch to plate and tenon to centre posts the angle-shaped rafters, 6in. by 3in., which are to be securely bolted or strapped to plate, or fir the rafters (to shape of cupola). The rafters to be covered with  $\frac{1}{2}$ in. rough deal boarding, edges shot, for lead covering. (If necessary, specify struts from centre post to main rafters, and purlins 3in. by 2in.). Or—

**41. Turret (see sketch No. 3).**—The turret to be constructed as shown in drawings, and to rest on two or more trusses or straining beams 11in. by 6in. Bolt to trusses (two or four), sill-pieces 6in. by 6in., for the eight inclined corner posts of turret. The corner posts, 6in. by 6in., to be stub-tenoned to sill and secured the same by wrought-iron straps or cleats, 3in. by  $\frac{1}{2}$ in. by 9in., bolted through timbers with  $\frac{1}{2}$ in. bolts, nuts, and washers.

Each pair of posts to be cross-braced with 6in. by 3in. pieces, bolted at centre and to tie-pieces in centre. The angle-posts to be secured to framed head, 8in. by 6in., by iron cleats, as before, and the sides to be filled in with 4in. by



2in. quartering for 3in. rough fir boarding for lead. The upper part of turret to be framed with eight turned pillars with caps and bases, each out of pieces 6in. by 6in., let into head and tenoned into 9in. by 4in. plate of cupola, which is to be framed with cross-pieces. A centre-post, 4in. square, bolted to centre, to be carried up to form a finial. Each rib of cupola to be cut out of timber, 10in. by 3in., shaped to curve, notched and bolted to plate, and tenoned to post at apex. Put a moulding 6in. by 6in. round cupola. If there are louvres, state size; fix into grooved frame 4in. by 3in., louvres 7in. wide by 2in. thick.

42. *Cupola Roof.*—The roof over turret (octagonal) to be formed according to details. The main ribs to be notched and bolted to bottom plate, 6in. by 6in., with 3in. wrought-iron bolts. The principal ribs to be 4in. by 3in., and intermediate ribs 4in. by 2in., fixed to curve of cupola. The ribs to be tenoned into curb 6in. by 4in. Fix angle-posts of lantern 4in. by 4in., wrought as shown with moulded edges, scarfed and bolted to sill and beads, rafters 3in. by 2in., fixed to shape, and fix finial post 4in. square, turned at top, and fix moulded cornice round lantern, 6in. by 2in., bracketed out and screwed to framing.

43. *Timber Spire* (see section 4).—The spire to be framed as shown in section or details with bevel lap jointed at angles wall-plates 9in. by 6in., and secured to walls by wall-straps, 3in. by 3in. and 6ft. long, secured to masonry of tower; tie-beams 11in. by 6in., notched and bolted to plate; angle-ribs 9in. by 3in., centre post 6in. by 6in., horizontal frames and collars 6in. by 4in., purlins 7in. by 6in., struts 5in. by 4in., and with all necessary ashlar pieces, springing pieces, and quarters 4in. by 2in. The main ribs to be framed into tie-beams and secured by wrought-iron 3in. bolts or 2in. by 3in. straps, with nuts, washers, &c., and to be tenoned into central post and notched to purlins with all necessary straps, bolts, and other fixings for boarding or shingles. Provide and fit 1/4 cwt. per square of forged strap-iron, bolts, nuts, heads, washers, plates, cleats, &c. All straps to be of forged iron dipped into linseed oil whilst hot, and painted two coats in oil when fixed.

### THREE-HINGED MASONRY ARCHES; LONG SPANS ESPECIALLY CON- SIDERED.\*

By DAVID A. MOLITOR, M.Am.Soc.C.E.

(Continued from p. 174.)

THE second case is one of loading for maximum compression in the extrados for any point  $m$  of the left half of span. The same loading will also give the minimum stress in the intrados at  $m$ . In this case the live load must cover the span from the left hard abutment

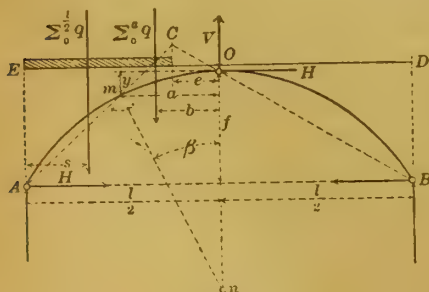


FIG. 7.

E up to the load divide C, Fig. 7. Retaining the previous notation, the moment equation for the point  $m$  is—

$$(a-b) \Sigma q - aV + \frac{p}{2}(a-e)^2 - Hy = 0,$$

which gives for  $y$  the value—

$$y = \frac{(a-b) \Sigma q - aV + \frac{p}{2}(a-e)^2}{H} \quad (19)$$

in which—

$$V = \frac{p}{2}l \left( \frac{l}{2} - e \right)^2 \text{ and } H = \frac{s}{f} \Sigma q + \frac{p}{4f} \left( \frac{l}{2} - e \right)^2$$

also—

$$S = \Sigma q + \Sigma q + p(a-e) - B = \Sigma q + p(a-e) - \frac{p}{2}l \left( \frac{l}{2} - e \right)^2 \quad (20)$$

3. Case of loading for the half-span covered with uniformly distributed live load for any point  $m$  of the left half of span. In this instance the locus of  $y$  represents a line of thrust for the assumed case of loading. The condition imposed makes  $e = 0$ . Hence, for load extending from D to O, (17) and (18) give—

$$y = \frac{(a-b) \Sigma q + \frac{ap}{8}}{H} \quad (21)$$

and—

$$S = \Sigma q + \frac{pl}{8} \quad (22)$$

and for load extending from E to O (19) and (20) give—

$$y = \frac{(a-b) \Sigma q + \frac{pa^2}{2} - \frac{ap}{8}}{H} \quad (23)$$

and—

$$S = \Sigma q + ap - \frac{pl}{8} \quad (24)$$

In equations (21) and (23) the value of  $H$  remains constant for any position of  $m$ , and has the value—

$$H = \frac{s}{f} \Sigma q + \frac{pl^2}{16f} \quad (25)$$

This condition of loading was formerly applied as a case for maximum stresses at the quarter points; but, as is readily seen from the above, this assumption gives values which are much too small.

4. Case of loading for maximum values of  $H$  and  $S$ , the entire span being symmetrically covered with uniformly distributed live load. For this condition of loading, the shear  $V$  at the crown O becomes zero, and the locus of  $m$  represents a line of thrust for the imposed loads. The equation of moments about any point  $m$  on the line of thrust is—

$$(a-b) \Sigma q + \frac{a^2p}{2} - Hy = 0;$$

which gives—

$$y = \frac{(a-b) \Sigma q + \frac{a^2p}{2}}{H} \quad (26)$$

in which—

$$H = \frac{s}{f} \Sigma q + \frac{pl^2}{8f}$$

also—

$$S = \Sigma q + ap \text{ and } S_{max.} = \Sigma q + \frac{pl}{2} = A_{max.} \quad (27)$$

(b) *Train of Concentrated Live Loads and Symmetrical Dead Load.*—(1) Case of loading for maximum compression in the intrados for any point  $m$  of the left half of span. Using the notation given under (a) and assuming a system

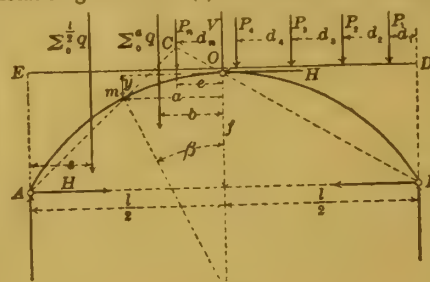


FIG. 8.

of loads as in Fig. 8, extending over the span from D to the load divide C, the following equations are derived in the manner already indicated for (17) and (18). The same case of loading will also give the minimum stress in the extrados at  $m$ .

$$y = \frac{(a-b) \Sigma q + aV + \Sigma P \left( \frac{l}{2} + a - d \right)}{H}$$

in which—

$$V = \frac{1}{l} \left[ \Sigma P d - \Sigma P (l - d) \right] \quad (28)$$

and—

$$H = \frac{s}{f} \Sigma q + \frac{1}{2f} \left[ \Sigma P d + \Sigma P (l - d) \right]$$

Also—

$$S = A - \Sigma q = \frac{1}{l} \Sigma P d + \Sigma q - \Sigma q = \Sigma q + \frac{1}{l} \Sigma P d \quad (29)$$

It will be seen from the value of  $V$  in (28) that

a load  $P$  falling exactly at O will neither increase nor decrease the value of  $V$ . 2. Case of loading for maximum compression in the extrados for any point  $m$  of the left half of span. The same loading will also give the minimum stress in the intrados at  $m$ . The loads are assumed to cover the span from E to the load divide C, and the distances  $d$  are measured as before from the abutment D. Notation as before, Fig. 8:—

$$y = \frac{(a-b) \Sigma q - aV + \Sigma P \left( \frac{l}{2} + a - d \right)}{H} \quad (30)$$

in which—  $V = \frac{1}{l} \Sigma P (l - d)$

$$\text{and— } H = \frac{s}{f} \Sigma q + \frac{1}{2f} \Sigma P (l - d)$$

also

$$S = \Sigma q + \Sigma q - B + \Sigma P = \Sigma q + \Sigma P - \frac{1}{2} \Sigma P (l - d) \quad (31)$$

In order to obtain the greatest load effects in this and the previous cases, the heaviest loads should be placed near O in case 1, and at C in case 2.

(c) *Loading as Under (a) Combined with a Concentrated Live Load W.*—(1) Case of loading for maximum compression in the intrados for any point  $m$  of the left half of span, giving also the minimum stress in the extrados at  $m$ . Since a single concentrated load exerts its maximum

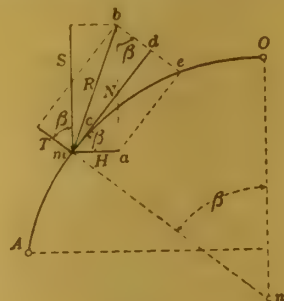


FIG. 9.

positive influence on  $y$  when applied just to the right of the crown O (as may be seen from equations (28), the load  $W$  will be assumed to act at a unit distance to the right of O for any point  $m$  of the left half of span. Hence equations (17) and (18) will apply here when the effect of  $W$  is introduced (see Fig. 6).

$$y = \frac{(a-b) \Sigma q + aV + ep \left( a - \frac{e}{2} \right)}{H}$$

in which—

$$V = \frac{1}{l} \left[ \frac{pl^2}{8} + W \left( \frac{l}{2} - 1 \right) - \frac{ep}{2} (l - e) \right] \quad (32)$$

and—

$$H = \frac{s}{f} \Sigma q + \frac{1}{2f} \left[ \frac{pl^2}{8} + W \left( \frac{l}{2} - 1 \right) + \frac{ep}{2} (l - e) \right]$$

Also—

$$S = \Sigma q + \frac{p}{2}l \left( \frac{l}{2} + e \right)^2 + \frac{W}{l} \left( \frac{l}{2} - 1 \right) \dots \quad (33)$$

2. Case of loading for maximum compression in the extrados for any point  $m$  of the left half of the span, producing also the minimum stress in the intrados at  $m$ . Here  $W$  exerts its maximum influence on  $Y$  when applied vertically over  $m$ , and equation (19) and (20) are modified as follows. (See, also, Fig. 7):—

$$y = \frac{(a-b) \Sigma q - aV + \frac{p}{2}(a-e)^2}{H}$$

in which—

$$V = \frac{1}{l} \left[ \frac{p}{2} \left( \frac{l}{2} - e \right)^2 + W \left( \frac{l}{2} - a \right) \right] \quad (34)$$

and—

$$H = \frac{s}{f} \Sigma q + \frac{1}{2f} \left[ \frac{p}{2} \left( \frac{l}{2} - e \right)^2 + W \left( \frac{l}{2} - a \right) \right]$$

also—

$$S = \Sigma q (a - e) - \frac{1}{l} \left[ \frac{p}{2} \left( \frac{l}{2} - e \right)^2 + W \left( \frac{l}{2} - a \right) \right] \quad (35)$$

\* Read before the American Society of Civil Engineers.



IV.—CONDITIONS OF STRESS ON A RADIAL SECTION OF AN ARCH.

(a) *The Resultant Normal Thrust on the Section.*—The resultant thrust  $R$  at any point  $m$  of a linear arch  $A O$ , Fig. 9, is obtained from equation (7), as  $R = \sqrt{H^2 + S^2}$ , in which  $H$  is the horizontal thrust and  $S$  the vertical shear for this point. But as  $R$  is not usually normal to the radial section  $m n$ , it will have components perpendicular to and parallel with this section. The resultant  $R$  is resolved into  $N$  (the normal thrust) and  $T$  (the tangential thrust) respectively perpendicular to and parallel with the radial section  $m n$ , which section is represented by the radius vector of the curve  $A O$  at the point  $m$ , and makes the angle  $\beta$  with the vertical. The values of  $N$  and  $T$  in terms of  $H$  and  $S$  are now found without involving  $R$  in the result. The forces  $S$ ,  $H$ ,  $R$ ,  $N$ , and  $T$  are shown in their proper relationship in Fig. 9, from which the following equations are obtained:—

The angle  $a m d =$  the angle  $a b d$   
 $=$  the angle  $O n m = \beta$

also—  $a b = S$ , and  $b d = T$ ,

also—  $a e = e d = a b \sin. \beta = S \sin. \beta$ ,

and—  $m c = m a \cos. \beta = H \cos. \beta$

hence—

$$N = m d = m c + c d = H \cos. \beta + S \sin. \beta \dots (36)$$

and—

$$T = b d = b e - e d = S \cos. \beta - H \sin. \beta \dots (37)$$

However, the tangential force  $T$  rarely becomes sufficiently large to require any consideration, especially when an arch is so designed that no tensile stresses will ever occur, thereby confining the thrust  $R$  to the middle third of the arch-ring, and reducing the angle between  $R$  and  $N$  to a very small quantity. Also the high factors of safety (6 to 10) used in masonry arches would not warrant the consideration of so small a factor as  $T$ .

(b) *The Stresses on the Section.*—1. Analytical Solution. In Fig. 10, let  $A B = D$  represent the

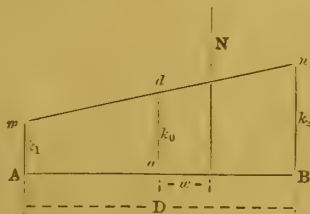


FIG. 10.

thickness of the arch on a radial section  $m n$ ; also let  $g$  be the middle point of  $A B$ , and the point of application of the resultant thrust  $N$ , distant  $w$  from  $g$ . Required, the manner in which  $N$  is distributed over the section and the intensities of the unit stresses  $k_1$  and  $k_2$  on the extreme elements of the arch-ring. If  $N$  is given for an arch of unit breadth then  $k_1$ ,  $k_2$  will be unit stresses. For  $N$  acting in  $g$ , it is evident that the stress is uniformly distributed over  $A B$  and  $k_0 = k_1 = k_2 = \frac{N}{D}$ . For  $N$  acting at a distance  $w$  to the right of  $g$ ,  $k_1$  will be less than  $k_0$ , and  $k_2$  will be greater than  $k_0$ , each by an amount  $f = \frac{M y}{I}$  representing the effect of the moment  $N w$ . Therefore—

$$k_1 = k_0 - \frac{M y}{I} \text{ and } k_2 = k_0 + \frac{M y}{I} \dots (38)$$

which—

$$y = \frac{D}{2}, I = \frac{b h^3}{12} = \frac{D^3}{12} \text{ for } b = 1$$

$$\text{and } M = N w = w D k_0$$

By substituting these values in 38, and reducing

$$k_1 = k_0 \left( 1 - \frac{6 w}{D} \right) \text{ and } k_2 = k_0 \left( 1 + \frac{6 w}{D} \right) \dots (39)$$

The lines  $m d n$  represents the manner of distribution of stress produced by the resultant  $N$  on the section  $A B$ .

(2) *Graphical Solution.* Equations (39) may be written thus—

$$k_1 = \frac{6 k_0}{D} (D - w) \text{ and } k_2 = \frac{6 k_0}{D} (D + w)$$

in which form they may be represented graphic-

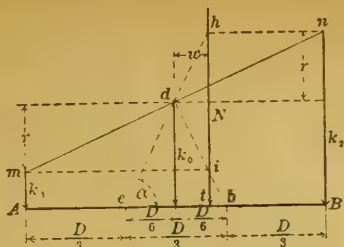


FIG. 11.

ally. In Fig. 11, draw to scale of forces  $k_0 = \frac{N}{D}$  at  $g$ , perpendicular to  $A B$ , and lay off distances  $e g$  and  $b g = \frac{D}{6}$  to the right and left from  $g$ . Draw  $e d$  and prolong same to intersect  $N$  in  $h$ , also draw  $d b$  intersecting  $N$  in  $i$ . Then will  $i t = A m = k_1$ , and  $t h = B n = k_2$ , and  $m d n$  will represent the law of variation of stress over the section  $A B$ .

$$\text{For } k_1 = k_0 - r = t b \tan \alpha = \frac{6 k_0}{D} t b = \frac{6 k_0}{D} (D - w)$$

$$\text{and } k_2 = k_0 + r = e t \tan \alpha = \frac{6 k_0}{D} e t = \frac{6 k_0}{D} (D + w)$$

In equations (39) when  $w = 0$ ,  $k_1 = k_2 = k_0$ , and when  $w = \frac{D}{6}$ ,  $k_1 = 0$ , and  $k_2 = k_0$ . When  $w > \frac{D}{6}$ ,  $k_1$  becomes negative or tensile. Hence, to avoid tensile stresses on any section  $A B$ , the resultant normal thrust  $N$  must have its point of application  $t$  within the middle third  $e b$  of said section.

(c) *Thickness of Arch Ring.*—Given the direction, amount, and point of application of the normal thrusts  $N_e$  and  $N_i$ , obtained from the loading for maximum compression in the extrados and intrados respectively, for a radial section  $A B$ , Fig. 12, to find the thickness  $D$  of the arch ring which must be provided so that a certain assigned unit stress  $k$  on the extreme elements of the ring shall never be exceeded. While  $N_e$  and  $N_i$  can never occur simultaneously, the centre line of the arch must be so placed, with respect to these thrusts, and a minimum value of  $D$ , that the above conditions may be complied with. The dimension  $e$  in Fig. 12 is obtained from the difference between maximum and minimum  $y$ , which vertical difference is projected on the radial section  $A B$  by multiplying with  $\cos. \beta$ ; hence  $e = \Delta y \cos. \beta$  is a known quantity, and  $w$  and  $w'$  are to be found, likewise  $D$ . The values  $k_0$  in equations (39) for the two thrusts are—

$$k_0 = \frac{N_e}{D}, \text{ and } k'_0 = \frac{N_i}{D},$$

and, from the figure,  $w' = e - w$ . The values substituted in the second equation (39) give the two following values of  $k = k$ , the given allowable compressive stress—

$$k = \frac{N_e}{D} \left( 1 + \frac{6 w}{D} \right),$$

$$\text{and— } k = \frac{N_i}{D} \left( 1 + \frac{6 (e - w)}{D} \right).$$

These equations, when solved for  $D$  and  $w$ , give the dimensions sought—

$$D = \frac{N_i}{k \left( 1 + \frac{N_i}{N_e} \right)} + \sqrt{\frac{6 e}{k} \left( \frac{N_i}{1 - \frac{N_i}{N_e}} \right) + \left( \frac{N_i}{k \left( 1 + \frac{N_i}{N_e} \right)} \right)^2} \dots (40)$$

$$w = \frac{k D^2}{6 N_e} - \frac{D}{6} \dots (41)$$

The ordinate of the arch centre-line for the section  $A B$  is also found from  $w$ , and the ordinate to the point of application of  $N_e$  which may be called  $y_{min}$ . Calling the ordinate of the centre line  $y_0$ , and the inclination of  $A B = \beta$  from the vertical,

$$y_0 = \frac{w}{\cos. \beta} + y_{min} \dots (42)$$

The values of  $k_1$  for the above thrusts and dimensions may now be found from the first of equations (39).

(d) *Tensile Stresses.*—It may occur that after having found  $D$  from (40) and  $k_1$  from (39), the latter value may be negative or tensile. Should this tensile stress be in excess of the allowable

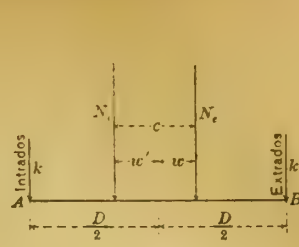


FIG. 12.

stress, then the thickness  $D$  must be further increased, or if the material of the arch be concrete, the excessive tension may be taken up by the insertion of wire netting or iron rods. The method of computing the area of metal required is given in the following:—In Fig. 13, let  $A B$  be the radial arch section  $k_1$ , a tensile stress on the extreme element at  $A$  and  $k_2$ , the corresponding compressive stress at  $B$ .  $a b$  is a steel wire placed at a distance  $v$  from the axis of the arch. Let  $a$

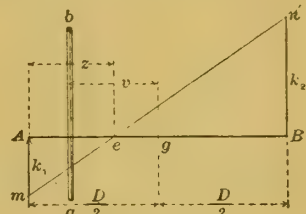


FIG. 13.

be the area of the steel required for an arch ring of unit breadth, and  $f$  = the allowable unit stress for steel. The total tensile stress on the arch ring (for unit breadth) will be represented by the area  $A m e = \frac{k_1 z}{2} = u'$ . From the similar triangles  $A m e$  and  $B e n$ —

$$\frac{z}{D - z} = \frac{k_1}{k_2}, \text{ or } z = \frac{k_1 D}{k_1 + k_2}; \text{ making } u' = \frac{k_1^2 D}{2(k_1 + k_2)} \dots (43)$$

The point of application of  $u'$  is the centre of gravity of the triangle  $A m e$ , which is distant from  $g$  by an amount  $\frac{D}{2} - \frac{z}{3}$ . Hence the moment of  $u'$  about  $g$  is—

$$M = u' \left( \frac{D}{2} - \frac{z}{3} \right),$$

which, when taken up by the steel rod, produces therein the force—

$$u = \frac{u' \left( \frac{D}{2} - \frac{z}{3} \right)}{f} \dots (44)$$

But  $a = \frac{u}{f}$ ; hence from (43) and (44) the value of  $a$  is found as—

$$a = \frac{k_1^2 D \left( \frac{D}{2} - \frac{k_1 D}{3(k_1 + k_2)} \right)}{2 f v (k_1 + k_2)} \dots (45)$$

In equation (45)  $k_1$  is tensile stress and  $k_2$  is compressive stress, and both enter into the equation without regard to sign of stress.

V.—DEFORMATIONS OF THE ARCH RING.

(a) *General Considerations; Changes in Length of the Arch Ring.*—An arch ring, when under the influence of stress and changes in temperature, is subject to elastic deformations. The compressibility of masonry by stress and the shrinkage caused by the setting process of mortar and concrete, bring about a permanent shortening in the arch ring during construction and test loading. The resultant effect of these several shortenings and temperature changes produces a deformation of the arch ring which must be provided for in the construction, to prevent a deflection below the normal, which, if it occurred, would materially increase the horizontal thrust on the abutments. This super-elevation, which must be given to the arch ring in order that it may attain its proper rise when completed, is called camber. Besides the above deformation, which is partly elastic and partly permanent, provision must also be made for the



settlement in the falsework caused by the weight of the arch-ring up to the time of closing, when the latter becomes self-sustaining. This part of the problem is here omitted as depending entirely on the nature of the falsework and local building conditions. The change in length of the arch-ring resulting from stress, temperature, compressibility of material, and shrinkage of masonry will now be found. The normal arch-thrust  $N$  may be found, for any combination of dead and live loads, from the preceding equations, and this thrust increases from the crown toward the haunches. The cross-section of the arch-ring is also a variable quantity. Hence it is necessary to divide the arch-ring into sections over which the cross-section and normal thrust may be considered constant. The sum of the increments of change of these sections gives the change in length of the arch-ring. Let—

- $L$  = length of a section of arch, over which the area and thrust are assumed constant.
- $\Delta L$  = increase in the length  $L$  for any assigned reasons. Decrease is negative.
- $\delta = \sum \Delta L$  = sum of the changes  $\Delta L$  from the crown to the abutment.
- $N$  = normal thrust acting through the length  $L$ .
- $F$  = average cross-section of the section of length  $L$ .
- $E$  = modulus of elasticity of the material for the working stress  $\frac{N}{F}$ .
- $E'$  = modulus of permanent set of the material for the working stress  $\frac{N}{F}$ .
- $t$  = a rise, and  $-t$  = a fall, in temperature, in degrees Centigrade.
- $\alpha$  = coefficient of expansion for  $1^\circ$  Centigrade.
- $\epsilon$  = coefficient of shrinkage from setting of mortar or concrete in air.

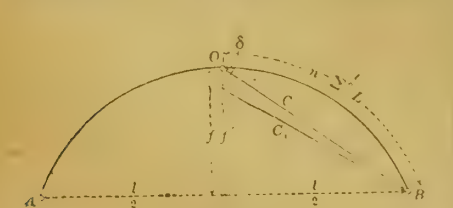
then 
$$\Delta L = -\frac{NL}{EF} - \frac{NL}{E'F} - \epsilon L + \alpha t L$$
$$= -\frac{NL}{F} \left( \frac{1}{E} + \frac{1}{E'} \right) - L (\epsilon - \alpha t) \dots (46)$$

and 
$$\delta = -\left( \frac{1}{E} + \frac{1}{E'} \right) \sum \frac{NL}{F} - (\epsilon - \alpha t) \sum L \dots (47)$$

The elastic change in length of an arch-ring in a completed structure no longer subject to increased permanent set is—

$$\delta' = -\frac{1}{E} \sum \frac{NL}{F} + \alpha t \sum L \dots (48)$$

(b) *Deformation; Analytical Solution.*—To find the deflection at the crown of an arch-ring,



which latter has shortened an amount  $\delta$ , as found from (47) or (48). Let  $C$ , Fig. 14, be the chord from crown to abutment, corresponding to the half span  $\frac{l}{2}$  and rise  $f$ ;  $C_1$  = the length of this chord after the half-arch ring has shortened an amount  $\delta$  and the rise has diminished to  $f'$ , the remaining unchanged; also,  $n = \sum \frac{l}{2} L$  = the length of the centre line of the arch ring between the crown and the abutment. A shortening  $\delta$  in the length  $n$  will produce a shortening  $\frac{C}{n} \delta$  in the chord  $C$ , making  $C_1 = C - \frac{C}{n} \delta$ . From the figure—

$$C = \sqrt{f^2 + \left( \frac{l}{2} \right)^2},$$

which, substituted in the previous equation, gives—

$$C_1 = \left( 1 - \frac{\delta}{n} \right) \sqrt{f^2 + \left( \frac{l}{2} \right)^2} \dots (49)$$

and—

$$\Delta f = f - f' = f - \sqrt{C_1^2 - \left( \frac{l}{2} \right)^2} \dots (50)$$

The value  $\Delta f$ , which represents the deflection at the crown, may then be found from equations (49) and (50). While the value  $\frac{C}{n} \delta$  is not exactly correct, yet the approximation is so close

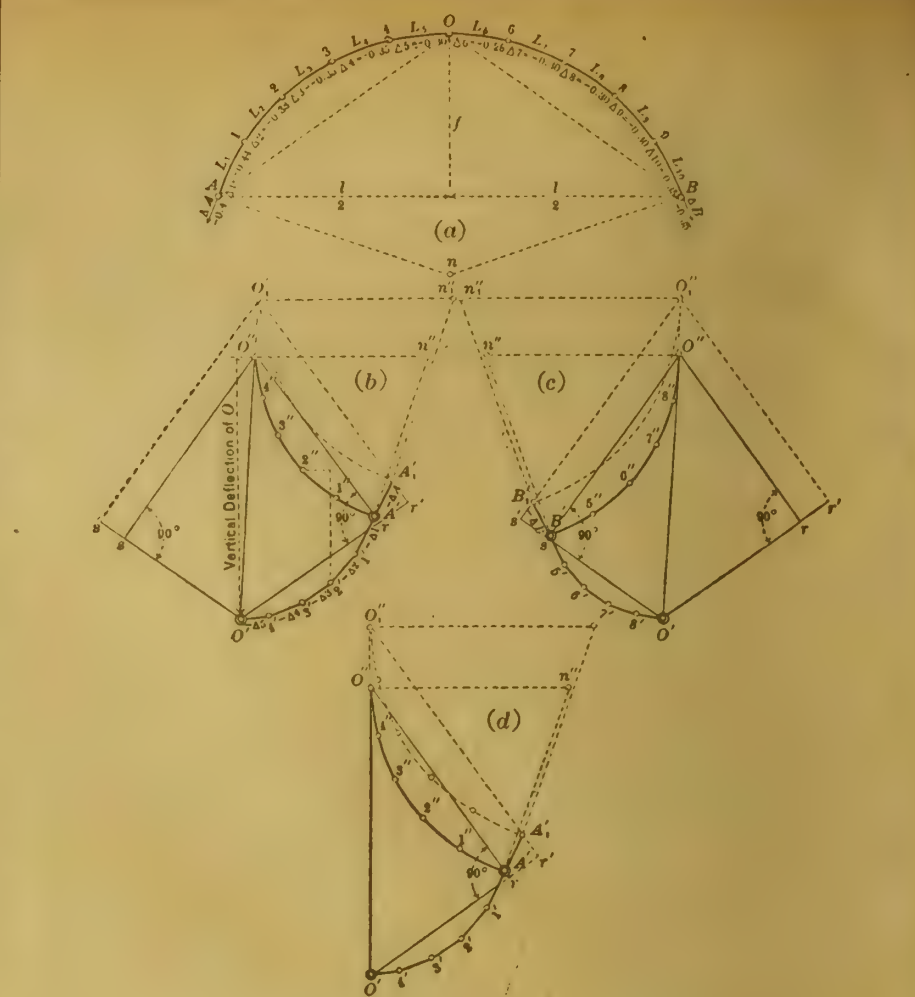


FIG. 15.

that the resulting equations are entirely within the knowable accuracy even for long spans. As will be noticed, this solution applies to arches of any shape not necessarily circular, but is most accurate for circular arches.

(c) *Deformation; Graphical Solution.*—The general case for any condition of unsymmetrical loading and displacements of abutments can best be solved by the graphical method.\* Only the application of the method is here given, without repetition of its derivation, for which see above-named article. In Fig. 15a, let  $AOB$  represent the line of thrust of a three-hinged arch for any particular case of loading;  $L_1, L_2, L_3$ , &c., the sections in which the arch is divided; and  $-\Delta_1, -\Delta_2, -\Delta_3$ , &c., the contractions in the lengths  $L_1, L_2, L_3$ , &c., respectively, caused from any combination of conditions, as stress, shrinkage of masonry, temperature, &c. In Fig. 15b, draw in succession, from any point  $A'$ , the contractions  $-\Delta_1, -\Delta_2, -\Delta_3$ , &c., respectively, parallel to the elements  $L_1, L_2, L_3$ , &c., of Fig. 15a, and in the direction in which these contractions act relatively to the fixed point  $A$ . In the example, the  $\Delta$ 's being negative, the elements of the arch, Fig. 15a, all move towards  $A$ , and hence the quantities  $-\Delta_1, -\Delta_2, -\Delta_3$ , &c., are applied downward from  $A'$ . The broken line  $A'O$  then represents the motion of the point  $O$  relatively to the point  $A$ , assuming that the arch elements move parallel to themselves. In like manner, the broken line  $O'B$ , Fig. 15c, represent the motion of the point  $O$  relatively to the point  $B$ . However, the elements of the arch do not move parallel to themselves, but the half arch  $AO$  revolves about  $A$  and the half arch  $OB$  revolves about  $B$  until the point  $O$ , common to both halves, attains its new position. This revolution is performed by a second operation, as follows:—In Fig. 15b, draw  $A'O'$  perpendicular to  $AO$  and through  $A'$ ; also, through  $O'$  draw  $O'r$  perpendicular to  $A'O'$ , and in Fig. 15c, through  $B'$  draw  $B'O'$  perpendicular to  $BO$ , and through  $O'$  draw  $O's$  perpendicular to  $B'O'$ . Now transfer

$O's$  from Fig. 15c to Fig. 15b parallel and equal to itself, and in Fig. 15b draw  $sO'$  perpendicular to  $O's$ , and  $O'O'$  will represent the direction and amount of the displacement of the point  $O$ . Also transfer  $O'r$  from Fig. 15b to Fig. 15c, and in Fig. 15c draw  $rO'$  perpendicular to  $O'r$ , and  $O'O'$  will check in direction and amount the value  $O'O'$  found in Fig. 15b. To find the displacements of the individual points 1, 2, 3, &c., draw a broken line  $A', 1', 2', 3', 4', O'$  with its elements proportional and respectively perpendicular to the elements  $A, 1, 2, 3, 4, O$ . The lines  $1'1', 2'2'$ , &c., will represent the true displacements of the points 1, 2, &c., respectively. The same construction applied to Fig. 15c gives the displacements of the points of the half-arch  $OB$ . When the abutments are displaced by amounts  $-\Delta A$  and  $-\Delta B$  respectively, these displacements are embodied in the diagrams of Figs. 15b and c, as indicated by the dotted construction, and the displacements are then measured from the dotted broken lines  $O'_1A'$ , and  $O'_1B'$ , respectively, to the broken lines  $O'A'$  and  $O'B'$ . For symmetrical loading, where the displacements in the half-arch  $AO$  are exactly equal to those in the half-arch  $BO$ , the line of thrust is symmetrical, and the deflection at the crown  $O$  must be vertical. This extra condition makes it possible to dispense with one of the diagrams, and the solution becomes as shown in Fig. 15d. The point  $O'$  is then the intersection of  $A'O'$  perpendicular to  $AO$ , and the vertical  $O'O'$  through  $O'$  becomes the deflection at the crown. It should be noticed, in the solution Figs. 15, that Fig. 15a is drawn to a small scale, while the displacement diagrams b, c, and d are drawn to natural scale. For small contractions, these diagrams may be drawn to a scale of 10 to 100 times the natural.

(To be continued.)

Mr. G. B. Roche, the consulting engineer to the London, Chatham, and Dover Railway Company, presided, on Thursday last week, at the Crystal Palace over the annual distribution of the prizes and certificates gained by the students attending the school of engineering.

\* See article "Distortion of a Framed Structure," by David Molitor, in *Journal of the Association of Engineering Societies*, Vol. XIII., p. 310.



## THE THEORY OF RETAINING WALLS.

ALTHOUGH the subject of retaining walls and the proper proportions which must be given to resist a given earth thrust has been discussed by many writers and is embodied in most treatises on civil engineering, practice has shown that the results are not always satisfactory. This may be due to defects in the theory, or more probably to the existence of conditions which the theory has neglected to take into account, but which persist in making themselves felt in actual practice.

For these and other reasons, Herr Iszkowski has re-examined the subject, and contributes what he terms a 'rational' theory of retaining walls to the *Oesterreichische Monatschrift für den Oeffentlich Baudienst*. Some of the points made will bear consideration.

The fundamental question involved is that of the actual pressure exerted by the earth, and it is usually this which is made the subject of assumptions not in accordance with the actual facts. Instead of being a solid prism, acted upon only by the force of gravity and the resistance of friction upon its surface, the nature of the earth enters largely into the manner of its action in sliding or breaking.

The angle of repose of loose earth can readily be determined for any given nature of material; but, when a bank slides or breaks down under the pressure of earth behind it, the angle of rupture is different from the angle of repose, and in many cases the surface is not that of a straight slope, but, rather, a concave break, usually of the same form and curvature for the same materials.

Taking these facts into consideration, Herr Iszkowski deduces a formula from which the angle of rupture can be computed for different kinds of earth under the varying conditions of actual practice, and a table enables the more usual angles to be taken at once.

The paper is a valuable addition to the literature of the subject considered on its theoretical side; but, as a matter of fact, the chief difficulty in the application of any such method of computation is the fact that the nature of the filling behind a retaining wall is rarely known at the time the wall is designed, the wall generally being constructed first and then filled with any loose material which may be available. Therefore, computations based upon the specific gravity of the backing and its angle of slope can be considered only as approximate, and a large margin must be allowed for a material which may at times be almost liquid and at others frozen into a mass, like rock.

## THE SANITARY INSPECTORS' ASSOCIATION AT NEWCASTLE.

THE autumn excursion of the Association of Sanitary Inspectors was held in Newcastle-on-Tyne on Thursday, Friday, and Saturday of last week. The proceedings were inaugurated by a garden-party in Jesmond Dene on the Thursday afternoon by invitation of the local branch. The members and their wives and friends were received in the banqueting-hall by Earl Percy, president of the Northumberland and Durham branch. There was a fairly large gathering of members from different parts of the country. In offering a welcome to the Association on behalf of the Northumberland and Durham branch of the Association, Lord Percy said: "I think that we may say that we are not so far behind any other part of the country in our zeal for sanitary improvement. At the same time, zeal requires a certain amount of discretion to be really useful, and it requires to be intelligent also. And the object of your Association is that your zeal for sanitary improvement may be both discreet and intelligent. That result cannot be better attained than by bringing together from all parts of the country those who are interested in the practical working of sanitary science to a conference one with another. Some few years ago we had a visit to Newcastle of the Sanitary Institute, and we had a most successful meeting. It is not for me to say what impression they carried away of sanitary things in Northumberland, but they certainly did not, as far as I am aware, say anything which showed we were behind in that respect. The Sanitary Institute may be called the theorists of sanitary science. They have to deal principally with the theories and the principles which lie at the basis of sanitation, and you are the practical workers who

should know the practical difficulties and the practical necessities of the case; and we all know that theory and practice are very different, and that it is only by bringing both to bear on the subjects of our investigation that we can really make progress. There is one way in which I understand you are anxious to use your influence, and that is in the way of improving the position of sanitary inspectors throughout the country. There are two circumstances in connection with the position of sanitary inspectors which, in your opinion—and I agree with you—demand careful consideration and reform. One of these is the very dependent relation which they bear to the local bodies by whom they are employed. These are days when local bodies are all to the front. We, in these days, are very strongly in favour of the principle of representation, and as in old days great people were flattered, and received and swallowed the flattery of those below them, so there is some danger of local and representative bodies being flattered in the same way, and gulping down the same amount of flattery. I have seen some signs of that sort of touchiness of criticism on the part of local bodies which was supposed to be confined to exalted individuals in former days; and I have also seen some signs of local bodies liking to be flattered. I am not going to err upon the other side; I am not going to detract in the least bit in the world from the zeal and devotion which is exhibited by many local bodies, and those who serve on them throughout the country. It is the proud boast of England, and it has always been, that we get out of our people more unpaid labour than any other nation in the world. And when we consider how much time those who serve on local bodies give "for love," as it is termed, it is necessary to speak with considerable caution before we criticise the way in which they give their labour, or be hard if they show any signs of failure in the discharge of their duties. But at the same time there are many different kinds of representative bodies, that we cannot talk of local bodies in the abstract as if they were all of one class. You have first of all a gigantic body like the County Council of London, which cannot be compared to anything else in the universe. You then have the large corporations of the great towns like Birmingham, Liverpool, and Newcastle. Then you have your smaller corporations; and next descend to your ordinary urban and rural authorities. All these various bodies are moved by different influences, and cannot be placed in one common class. You cannot predicate for the whole set of local bodies in England many general propositions that will be true of them all. There are some local bodies who are certainly open to influences which are not desirable. You find that private interests, private jealousies, private prejudices do affect local bodies in a very undesirable way, and I have observed, from time to time, especially in matters connected with sanitation, that even-handed justice has sometimes been rather wanting. Those, therefore, who have to carry out their arduous and difficult duties under the supervision of such local bodies are liable to be put in positions which are certainly disagreeable, perhaps dangerous to their own interests, and do not have that freedom and that liberty which they ought to have if they are to perform their duties properly. Legislation with regard to this subject is proposed, with the object of putting sanitary inspectors in a more independent position than they occupy now. Some step in that direction is desirable or necessary. I am not so clear upon the exact step that ought to be taken, although I have read the Bill which is proposed for that object. One of my doubts—and I speak with great respect of all constituted bodies—is whether the Local Government Board is quite an ideal institution to which to appeal. I cannot suggest anything better; but of late years the Local Government Board does not come quite up to one's ideals of what a central body might be. There is one difficulty that you will always have in bringing into operation a central government body like that: that all Government offices move so slowly, and there is so much circumlocution and red tape that the control which we might naturally look for from such a central institution may not be quite so efficient as we expect it to be. But certainly I do say the sanitary inspector should be more independent than he is now in his position, and he should be able fearlessly to do his duty; but at the same time there should be some strong, some prompt, some ready means of pulling him up if he fails in that. And in proportion as you regard his duties as important, as essential to the

welfare of the population, so much the more is it essential that, if he does misconduct himself, there should be some ready way of correcting him. But there is another point which you are all interested in, and that is the provision for sickness or old age in the case of sanitary inspectors. Now, this is a very difficult subject again, because we are in this country throwing more and more expense upon the public, and we all know how popular a thing it is for anyone who wishes to get a seat on a representative body to pose as an economist. Therefore I am afraid that you will find some difficulty in gaining a large amount of support to anything which throws more expense upon the rates or taxes. At the same time you will not get good and efficient service from any body of men, no matter what position they are in, unless you do one of two things: unless you pay them very highly, give them far more than is necessary to maintain themselves and their families in a proper condition, or else, if you do not do that, give them some prospect of a retiring allowance. I am entirely at one with the sanitary inspectors who wish that some permanent provision should be made for them after they have discharged their duties, which are certainly arduous, and not what the general public would consider a fascinating occupation, and who, in addition to giving their time to these, are exposed to certain dangers which the rest of the population are comparatively free from." Mr. T. G. Dee (London), chairman of the council of the Association, proposed a vote of thanks to the chairman, and Alderman Newton, of Newcastle, seconded, which was supported by Professor Philipson and Dr. Armstrong, the city medical officer of health. Earl Percy responded.

On Friday morning the delegates were welcomed by the mayor, after which Mr. Thomas G. Dee (London) took the chair. On the motion of Mr. Alexander, seconded by Mr. Thomas (London), a resolution was adopted to petition the Local Government Board as to the approaching appointment of the board for the examination and certification of candidates for the position of sanitary inspectors, and declaring that it was of great importance that the practical experience of members of the association should be represented on each examination board. Mr. W. Bland (Newcastle-on-Tyne) read a paper on the advantages of sanitary inspection, in which he urged the establishment of a Government board of health, to whom all matters affecting the public health should be referred, and who should have direct control over all local inspectors; the relief of medical officers and inspectors from the fear of local influence; the appointment of competent and trained men as inspectors; and the education of the public in the laws of hygiene and sanitation by the compulsory teaching of these subjects at our schools. Dr. H. Scurfield, medical officer of health, Sunderland, read a technical paper on "Testing Ventilation." A paper on "Sanitation in Colliery Districts" was read by Mr. W. F. Curry, surveyor and sanitary inspector, Morpeth. Mr. Curry advocated a better water supply and the provision of a bathroom in the pitman's house. Mr. C. Irvin, River Tyne port inspector, read a paper on "Port Sanitary Administration." Twenty-five years ago, he said, there was no systematic inspection of ships, and severe epidemics were brought from foreign countries; but since the new regulations all this had been changed. Mr. W. H. Wells, chief sanitary inspector to the Newcastle Corporation, read a paper on "Suggested Improvements in any future Public Health Legislation." The members of the association dined together in the evening.

Saturday was spent by the members in making excursions down the River Tyne in the commission's steamer the *J. C. Stevenson*, and in visiting works of interest in the neighbourhood. A church parade of the visitors at St. Nicholas' Cathedral took place on Sunday.

## OVERHANGING FOUNDATIONS.

THE columns supporting the floor beams, &c., of the Gillender Building, New York, are carried on three masonry piers, each built on the deck of a pneumatic caisson, which extended transversely across the whole width of building. Each caisson was about 24ft. by 12ft. and 9ft. high, and was sunk to a depth of 42ft. below the surface of the street. Each masonry pier carries two transverse girders of a length equal to the width of the building, and they overhang their

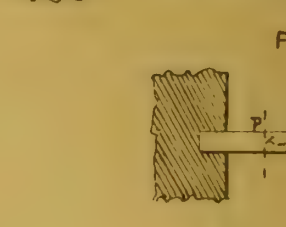
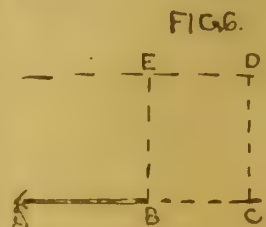
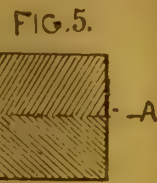
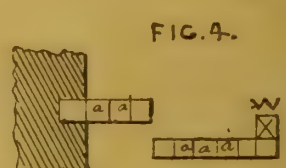
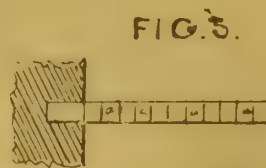
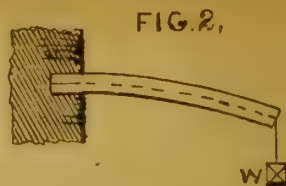
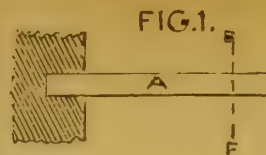


supports 4ft. or 5ft. at each end. Across the tops of each pair at the ends were placed a double-webbed plate girder, which also overhung, and supported at its ends a pair of columns. By this plan of double cantilevers the superstructure was carried, composed of wall columns, so as to overhang all the foundations. This ingenious plan, described by the *Engineering Record*, is really a kind of building puzzle, known to children who build with toy wood bricks by placing every successive transverse two bricks wider and wider apart till the limits of the length of brick are reached, the whole piled-up structure resting on a small base.

#### THE CANTILEVER BRIDGE: ITS DESIGN AND CONSTRUCTION.—I.

OF all the many different types of bridges, the cantilever is the only one which can, even in a somewhat moderate and restricted degree, cope with the suspension principle, the supreme favourite *par excellence* with American engineers. Not only can it successfully rival it, but it has surpassed it in magnitude, dimensions, weight, and other properties which are common to the two descriptions of structures upon a scale of magnitude. The Forth Bridge, felicitously termed by our witty Gallic neighbours "Le pont Fort," still holds the record in the annals of long-span bridge-building, although it will probably not do so much longer if the news be correct which has come to us from the other side of the Atlantic. It is a little singular that the last textbooks and volumes relating to the theory and practice of engineering and architectural construction either make no reference to the cantilever type, or treat it in so indifferent and perfunctory a manner as to afford little or no information to those desiring to study the subject. One of the reasons of this apathy may be due to the fact that this principle has been rarely employed in this country. The same remark would apply to suspension bridges, only *à fortiori*, since, except for purely ornamental purposes on a very small scale, that system is absolutely tabooed by English engineers. It must, nevertheless, not be concluded as a corollary of these statements that the young engineer and student are not to make themselves thoroughly acquainted with the principles and rules which govern the design and construction of these bridges. They can never know when they may be called upon to prepare plans for them, and advise their clients about them. It is with regret that we have observed in our own experience a good deal of general ignorance, sometimes among those who ought to be better informed on the subject, respecting the cantilever principle. The horizontal beam or girder supported at both ends seems to be much more readily and better understood than the example which has one extremity supported and the other free. One of the objects of the present series of articles is to afford in a simple and practical manner the information necessary, not only to a thorough comprehension of the cantilever principle, but of the design and construction of bridges in which that principle is embodied and utilised.

The beam A in Fig. 1 represents a cantilever in its simple form, being fixed at one end in a wall, and unsupported or free at the other, and unacted upon by any external force, except by its own weight, which, for our present purpose, may be neglected. It may be built into the wall as shown, or it may be bolted down to it, or anchored down by a raking stay. The method of fixing it is immaterial, so long as it is fixed. Now, let a weight, W, be hung at the free end of the beam, as in Fig. 2, and it will bend it. The amount of the deflection is purposely greatly exaggerated, so as to render the explanation of the figure clearer. It will now be seen that if we divide the depth of the beam by the dotted line, the fibres in the part of the beam above that line will be lengthened, and the fibres in the part below will be shortened. Consequently, the upper or the convex part of the beam will be subject to a pull, and the lower or concave part to a thrust. In other words, the action of the load causes a tensile stress in the upper and a compressive stress in the lower part of the beam. Evidently there must be a line of demarcation, so to speak, where the change in the character of the stresses takes place—that is, where tension becomes compression, and *vice versa*. This line is represented in Fig. 2 by dashes, and is the line of neutral fibres or the neutral layer, and its peculiar properties are that the bending of the beam neither



shortens nor lengthens it, nor subjects it to any stress whatever. But in addition to these two stresses, there is another brought upon the beam by the weight which has to be taken into account, which is not quite so easy of comprehension as the two former. The following illustration will assist the beginner to understand its action. This stress is termed the shearing stress, which is produced by the shearing force, which tends, as the name implies, to shear or cut the beam right through at one or more points in its length. Let the cantilever beam in Fig. 3 be supposed to be made or built up of a number of small pieces, *aaa*, slightly connected together, and let us see what will take place if a weight be now placed at the free end of the beam, sufficiently great to overcome the resistance to fracture offered by the connections of the separate pieces composing the beam. The effect of the weight will evidently be to cause one or more of the pieces to slide vertically upon those next to them, until ultimately the beam is sheared through, as shown in Fig. 4. Consequently a shearing force may be defined as that force which tends to cause one section of a beam to slide upon another, and the shearing stress will be therefore the resistance which the different sections of the beam oppose to the shearing action.

It is known that the tensile and compressive stresses in the upper and lower parts of the beam resist the bending action of the load or weight, and the question will at once arise, What part does the shearing stress play under the circumstances? Does it also assist in withstanding the bending action? As a matter of fact this point has not been quite satisfactorily ascertained; but it is assumed that the shearing forces have nothing to do with the bending action. The whole of the deflection of a beam or girder is regarded as due, and due only, to the deformation produced in the beam by the bending action or bending moment of the load, and is not influenced in any degree by the shearing forces. So far as relates to long beams, the shearing stresses have but a very secondary importance compared with those of tension and compression, especially if the length of the beam be great, and are frequently treated as a *quantité négligeable*, as they frequently may be. The assumption already quoted that the shearing forces count for nothing in the deflection of a beam is practically sufficiently accurate when  $\frac{L}{D}$  has a fairly high

value, L and D being the length and depth of the beam respectively. In the case of flanged beams and girders, as will be subsequently pointed out, it will be found that the shearing stresses cannot be disregarded, but call for quite as much, and in instances of open web structures for sometimes more, care and consideration than the other two descriptions of stresses. If in Fig. 1 a vertical cross-section be made at the line EF, it will give us Fig. 5, in which the line N A represents the neutral axis of the beam. The two Figs. 2 and 5 taken together

prove that the neutral layer of fibres extends over the whole length and breadth of a beam. Calling the neutral layer, as some authors do, the neutral plane, the neutral axis may be defined as the intersection of that plane by a vertical plane passing through the geometrical axis of the beam. An important detail to be borne in mind in connection with the neutral axis of a beam is that putting T for the tensile forces above the axis of the beam, and C for the compressive forces below it, and *x* and *y* for the distances any two fibres may be respectively from it, we shall always have—

$$T : C :: x : y \dots\dots\dots (1)$$

or, in words, the forces of tension and compression acting upon any two fibres, one above and the other below the neutral axis, are in direct proportion to their respective distances from that axis. It follows as a corollary from (1) that the neutral axis, therefore, is situated at the centre of gravity of each cross-section of the beam. The paramount importance of the neutral axis in everything relating to the design and theory of beams is due to the fact that it forms the common fulcrum of the external forces and the internal resistances. There is a very simple rule for ascertaining whether a stress is tensile or compressive, or a shearing stress. In the two former cases the external force will be parallel to the longitudinal axis of the beam, and in the latter perpendicular to it.

Having thoroughly investigated and become conversant with the causes which lead to the development of stresses and strains in cantilever beams, we may pass on to compute and estimate the actual results of these stresses expressed in units of weights and units of length. It may perhaps be as well to first distinctly define the terms stress and strain, as a good deal of confusion exists concerning them, and they are frequently regarded by beginners as synonymous phrases, whereas they have widely different significations. The direct effect of a load upon a beam is to produce stresses in the various parts of it, which in the instance before us are those of tension, compression, and shearing. These stresses give rise to corresponding resistances in the material, which are usually attended by slight changes which take the form of lineal contraction and expansion. This lengthening or shortening, as it may happen, is termed the "strain," which is not to be confounded with the "stress," which produces it. The order of procedure is the following:—First, the load; secondly, the stress; thirdly, the resistance; and fourthly and lastly, the strain. Should any one of these four be equal to zero, the rest are all similarly nullified.

An inspection of Fig. 2 will serve to indicate that the weight or load W, in addition to creating stresses in the beam, produces an appreciable deformation of it—that is, bends it. It possesses, therefore, a bending action, or, as it is generally termed, a bending moment, and, if this moment be sufficiently great, it will fracture the beam transversely—that is, break it across. Numerous



complicated, circuitous, and cumbersome definitions are given in textbooks and treatises of the phrase "bending moment," many of which are far more calculated to bewilder than to aid the student. Generally speaking, all moments have two characteristics, which are a reference to some point or body or another, and a tendency to produce rotation in that body. The value of the moment of a force about a point depends solely upon two data. These are the magnitude of the force and the length of the perpendicular distance of its line of action from the fixed point. As an illustration we may take the diagram in Fig. 6, in which AB is the given force acting in the direction shown by the arrow at A and D, the point at which the moment is required. Produce the straight line AB to C, and from the point D draw DC perpendicular to the prolonged direction of the force AB. Then the moment of the force AB about the point D is measured by the product of the number of units of weights in the line AB, and of the number of the linear units in the line DC, the diagram being, of course, properly drawn to scale, or algebraically, putting M for the moment of the force AB, we have—

$$M = AB \times DC \dots\dots\dots (2)$$

As a proof that only the two data already stated are required for determining the value of M—that is, the magnitude of the force, and the measure of the perpendicular let fall from the point upon the direction of the force, let the moment of the same force be required about the point E, and put it equal to  $M_1$ . Calling the force AB equal to F, we obtain—

$$M_1 = F \times BE \dots\dots\dots (3)$$

but from the diagram  $BE = DC$ , so that the moment about the two points are equal, and the equation becomes—

$$M_1 = M = F \times DC = F \times BE \dots\dots\dots (4)$$

The moment of the force F represents the power which it has to cause a body to rotate about the points D and E, supposing either two of these points in the body to be fixed, but leaving the body free to gyrate round them. From equation (4) it can be demonstrated that the moment of a force about a point in its own direction or line of action is equal to nothing, since, as a perpendicular cannot be let fall on a line from a point in the same line, OC and BE in (4) are equal to zero, and equation (4) will then be written—

$$M_1 = M = F \times O = O \dots\dots\dots (5)$$

It is obvious that the perpendicular distances BC and DE in Fig. 6 represent virtually the leverage with which the force acts. Hence they are usually called the lever arms, and the term is frequently applied to those parts of a cantilever bridge which are situated between the supports and the central girder, as well as to the spans of a swing-bridge, which is also a true example of the cantilever principle, as will be subsequently investigated. Thus the bending moment or the moment of any external force at any point of a beam may be briefly defined as the product of the force and the lever arm. To apply this rule to the general case of the determination of the bending moment at any point of a cantilever beam, let W in Fig. 7 represent an external force—in this instance a weight or load—upon the beam acting in the direction of the arrow A along the dotted line. It is required to find its moment about the point P. From P draw a perpendicular to meet the direction of the load, which make equal to F, and we obtain the lever arm of the force, which is equal to the distance  $a$  in Fig. 7, so from equations (2) and (3) we find the bending moment which will be represented by the letters B.M. expressed—

$$B.M. = F \times a \dots\dots\dots (6)$$

By altering the number, magnitude, and position of the loads, an interminable number and variety of bending moments might be obtained, but as our object is not to write a treatise on cantilevers, we shall restrict our subject to such examples, and such examples only, as meet the requirements of actual practice in the design and construction of the type of bridge we have selected. It follows, as seen in Fig. 7, and from the previous statement, that there is no bending moment at the point where the weight is situated, since the lever-arm  $a$  vanishes there. If, instead of taking  $a$  equal to zero, it is made exceedingly small, we shall have theoretically as in equation (6)—

$$B.M. = F \times a;$$

but, practically, the bending movement will be, putting S for the shearing stress—

$$B.M. = F \times S \dots\dots\dots (7)$$

This brings us to the consideration of the shearing stresses, which have been only touched upon so far, but which will be further investigated in the next article. T. C.

## SCOTCH ARBORISTS IN THE FOREST OF DEAN.

THE members of the Royal Scottish Arboricultural Society to the number of 60 started, on Tuesday in last week, on their annual excursion, which was this year held in the Royal Forest of Dean. The headquarters of the society is the Speech House Hotel in the heart of the forest, which spreads out on all sides and covers many thousand acres. Hitherto this woodland area has been managed on the park-like system which is so characteristic of English forestry, but recently the present deputy surveyor has inaugurated a new régime, which aims at bringing the management of the Forest more into conformity with modern scientific ideas. In its present transitional state the area furnishes an excellent object-lesson of both good and bad sylviculture. The members brought their excursion to a close on Friday, when they paid a visit to the southern portions of the Forest of Dean. The excursionists proceeded on foot shortly after eight o'clock to enjoy the numerous objects of arboreal interest which present themselves on the examination of portions of the King's Walk, immediately adjoining headquarters. The holly trees, which abound in this particular wood in great numbers, are said to have been largely planted in the time of Charles II., and almost all seem to have reached the same stage of maturity. Although a considerable number have, in consequence of great age, fallen into a state of decay, the majority still possess that healthy appearance and condition which appeal to the arboriculturist, and give indication of steady growth, while the fulness of their crown causes them to stand in pleasant contrast to the tall, gaunt, mercantile trees amongst which they grow. They do not seem to have been planted in any definite order, but appear at regular intervals, either singly or grouped together, and, accordingly, the 3,000 trees which are contained in the holly wood necessarily cover an extensive tract of ground. The trees possess, for the most part, girths of an average measurement of 3ft. to 3½ft., but the dominant trees possess trunks which far outstrip the others in size, and may possibly belong to an earlier period. The largest of these was measured and found to tape 7ft. 11in. around the stem, and possessed shafts ranging in circumference from 4ft. to 4½ft. Another specimen, less symmetrical in appearance, but having larger individual measurements than the first, also attracted considerable attention. The trunk measured 9½ft., and two of its branches measured respectively 5ft. 2in. and 4ft. 11in. in circumference. Among the commercial timber, of which there is also here a goodly proportion, there were pointed out to the excursionists several specimens worthy of close attention, their massive size and general features indicating the suitability of the soil for their healthy cultivation, and for the development of timber well fitted for industrial purposes. At one o'clock carriages were brought in requisition, and the party drove to Fancy Colliery, where they alighted, and proceeded on foot to the top of Fancy Mount, from which an extensive view of the forest was obtained. They then walked to Church Hill inclosure, one of the protected plantations of the forest. It contains some of the large old oaks, remnants of the old crop which was removed about forty years ago. It is now occupied with oaks of forty years' growth, interspersed with larch and a few chestnuts. The larches are more numerous in the south-western part, where the oaks have failed. There were noticed also many rides with lines of deodora and spruce, Scots pine, lime trees, and beech, forming good protective lines. The growth is good, but they are heavily thinned, with the result that fern and brambles have got possession in parts, and this will render planting in the near future an absolute necessity. Carriages were again resumed, and the excursionists drove in the direction of Danby Lodge, where are situated the famous Danby beeches, which are accounted the finest trees of their kind in the Forest of Dean, not excepting, perhaps, the high beeches at Coleford, which the excursionists visited on Thursday. Thence the party walked down the Roman road to Soudley, and had an opportunity of noticing

the structure of the old Roman ways. Although this particular road is known by the name, every carriage road in the Forest of Dean is a Roman way. For some considerable way portions of the pavement were perfect, and of an average width of about 8ft. The date at which these roads were made is placed in the first century, at which time the art of road construction had reached its highest perfection. Blaize Bailey was the last item upon the programme, and its various sections were examined with a considerable degree of care. One section of fifty years' growth was found to contain an open crop of oaks with fine growth, and almost incredible for the age, since many girth 4ft., while, exceptionally, some of 4ft. 6in. in circumference were found. A second section, consisting of oaks planted in 1872, was found to be well developed. These were mixed with larches and chestnuts. The three kinds were girthed, and were found to measure in the former kind from 20in. to 25in., and in the two latter an average of 2ft. 6in. The carriages were again mounted, and the return journey was made to headquarters in the Speech House, which was reached at seven o'clock. The excursionists returned by special train to Scotland on Saturday.

## LOSS OF WATER FROM RESERVOIRS.

IN determining the condition of a reservoir as to tightness or security against leakage, it is necessary to make allowance for such losses as occur from causes other than direct leaks. One of these causes of diminution in the contents is that of evaporation, and in sections where the relative humidity of the atmosphere is low this is amply sufficient to need investigation. In most cases the measurement of evaporation-losses from reservoirs has to be made for each instance, as very little recorded information is available, and the conditions vary for different localities.

A valuable paper upon this subject has been prepared by Mr. L. G. Carpenter, of the State agricultural experiment station at Fort Collins, Colorado, and published as a station bulletin. The tests were intended to cover the losses by seepage as well as by evaporation, but it was found that the loss by seepage was less than was expected, and that the loss by evaporation was correspondingly more important.

It is well known from meteorological investigations of humidity that the capacity of the air for moisture depends upon its temperature, upon its dryness, and upon the freedom with which it circulates, and the same conditions appear in connection with lake and reservoir evaporation. As Mr. Carpenter says, "The amount of evaporation depends upon the dryness of the air, and upon the wind. The wind brings fresh, unsaturated air in contact with the water surface, and gives opportunity for more vapour to be absorbed. Unless the temperature of the water surface is warmer than the dew-point of the air, evaporation cannot proceed; if lower, condensation may take place."

The tests were made by observing the difference in level in a standard tank 3ft. square and 3ft. deep, the depth being measured to the nearest thousandth of a foot, twice daily. Corrections for rainfall were taken from the readings of a rain-gauge, and, as tabulated, the monthly averages are given for each month in the year from 1887 to 1897. The maximum evaporation (average) in one month was for July, being 5.44in., and the minimum for December, being 1.22in., the average yearly evaporation for eleven years being 4.1in.

It might at first be supposed that the elevation of Fort Collins—4,990ft. above the sea—helped to increase the evaporation, but tests made upon the Sweetwater reservoir, in Southern California, and only 220ft. above sea-level, showed an evaporation of more than 59in. per year, while the Arrowhead reservoir, 5,160ft. above sea-level, gave but 39.15in. per year. While the monthly losses showed variations, Mr. Carpenter considers that for the whole year the evaporation, in all probability, is considerably less at high elevations than at low ones.

Measurements on the lakes showed that the results were somewhat larger than indicated by the tank, this being due to the freer action of the air and to the increased surface exposed by the waves, and the principal conclusion arrived at is that the allowance for evaporation in open reservoir is about 60in. per year.

Assuming, then, a loss of 5ft. in depth per year, an area of 100 acres would require ½c.ft.



per second for the whole year to make good the losses for evaporation; one of 500 acres would require 3½c.ft. per second—considerably more than would be used to irrigate the whole area.

Mr. Carpenter's paper gives the results of the tests, fully tabulated.

#### STEEL v. COPPER PIPES.

THE use of copper steam-pipes is common; but, owing to defective brazing, or to action by the removal of the zinc brought about electrically, which has caused failures of copper steam mains, lap-welded wrought-iron pipes or seamless steel pipes are recommended in place of brazed copper pipes by the Board of Trade. The Board believe that the risk of explosion in copper pipes would be materially reduced by hooping them with wrought-iron or steel bands, or by serving them with wire. In America, where higher steam pressures are used, wrought-iron and steel pipes are largely employed. The provision for expansion of pipes is, of course, essential, and its neglect is affirmed by the Board to be the cause of failures of pipes and boilers in this country.

#### BOOKS RECEIVED.

*Later Renaissance Architecture in England*, by JOHN BELCHER and MERVYN E. MACARTNEY. Part IV. (London: B. T. Batsford.) The fourth part is rich in examples of the domestic buildings which followed the Elizabethan period. These are characterised by a quieter treatment of the Classic orders and details. Such examples are given in this part as the south front of Christ's Hospital, with its broad-faced stone dome, pilasters, pediments, and plain brickwork and windows; the University Library, Cambridge; the Guildhall and Corn Exchange, Rochester, and details; The Close, Salisbury; Eagle House, Mitcham; and several more of the plain brickwork style. More noted examples of Classic work are to be seen in the fine view of the Radcliffe Library, Oxford; the splendid ceiling of the saloon, Colehill, Berkshire; the Banqueting Hall, Whitehall; Thorpe Hall staircase; Hampton Court Palace, of which we have the fine colonnade to King's entrance; Stoneleigh Abbey, Kenilworth; the Chapel, Farnham Castle; stalls of Trinity College Chapel, Cambridge; Hall of the Brewers' Company, and some fine views and plates of details of Greenwich Hospital. The photo. illustrations are quite equal to those in previous parts, and are inclosed in a portfolio. The details and interior decorations given of staircases, halls, and ceilings will be found of value. Every admirer of the Renaissance in this country should possess a copy of this work.

The Matlock Urban District Council took over, on Friday, the undertaking of the Matlock Waterworks (Limited), which has been in existence since 1860. The transfer took place by private agreement, the price paid being £18,550. The council have obtained Parliamentary sanction to the scheme for erecting a reservoir on Matlock Moor, to hold 110,000,000 gallons. By this means provision will have been made for the supply of the town for the next fifty years, assuming the recent growth of the place to continue for that time at the present rate.

The foundation-stone of a new ward to the cottage hospital at Warminster was laid on Thursday in last week. Miss Smith, of Bonham-terrace, Warminster, has presented to the trustees £5,000 for the erection and endowment of a men's ward to the hospital. The wing, which will be built of Frome stone with Bath-stone dressings, will contain a men's ward to hold five beds, two probationers' bedrooms, servants' rooms, baths, lavatories, and other offices.

Cardinal-Archbishop Vaughan has just laid the foundation-stone of a new church on a site between the Victoria and Albert Docks, at Custom House, E. It will be Decorated Gothic in style, and will be built of brick with Portland-stone dressings without and Bath stone within. When complete it will accommodate 600; but at present only two-thirds of the structure will be erected. It is designed and will be constructed by Mr. R. L. Curtis. The sanctuary and side chapels will be approached by three polished marble steps from the nave and aisles, and the high altar, with its oak predella, will be elevated by three steps more. The altar is to be of Caen stone, standing clear of the sanctuary walls. The portion to be raised immediately will involve a cost of £3,211. The interior woodwork of roof, floor, and seating is intended to be of pitch-pine. The dimensions measure—from east to west, 120ft.; and 60ft. from north to south.

#### OBITUARY.

M. CHARLES GARNIER, the architect of the Paris Opera House, died on Wednesday night in last week, at his residence in Paris, of apoplexy. He had been in ill-health for a long time past, and in May underwent a painful operation. He recovered from the effects of this, and so recently as three days before his death was still busying himself with his usual occupations. He experienced a violent pain in the heart and the commencement of an attack of apoplexy. Born in Paris in 1825, in very humble circumstances, his mother (who is still living) being, it is said, a vendor of vegetables in the streets, he studied in a school of sculpture, obtaining various prizes, and in 1842 he entered the School of Fine Arts, then under Leveil and Hippolyte Lebas. In 1848 he won the Grand Prize de Rome in Architecture by a plan for a school of arts and crafts. Visiting Italy, Greece, and Turkey with Theophile Gautier and Edmond About, he measured the Temple of Jupiter in the Isle of Aegina, and in 1852 drew plans for its suggested restoration, which were published in a monumental work at the cost of the French Government. In 1854 he returned to Paris, and sought official employment; but only succeeded in obtaining the ill-paid post of assistant architect in the restoration by Ballu of the Tour St. Jacques, the building in which Pascal studied. In 1860 he became one of the municipal architects, and 20 years later succeeded to the appointment of chief architect for the city. In 1861 he took part in the prize competition for the new Opera. His design, one of 170, after a series of selections, was unanimously accepted. This work took up 15 years of his life. He installed himself in a shed, and there, during the erection of the building, covered 30,000 foolscap sheets with his plans. An underground layer of water necessitated the placing of concrete under the water so that the foundations might be laid in the water and that the latter might then be extracted. By 1870 the building was practically finished externally, and in 1873 the destruction by fire of the old Opera demonstrated the necessity of the new edifice; but it was not opened till January, 1875, nor was it till 1877 that it could be seen to full advantage. A wide avenue was then opened in the labyrinth of streets called the Quartier des Moulins from the windmills of old Paris having stood there, and this was named the Avenue de l'Opéra. The cost of the Opéra amounted to 35 million francs. Some other Continental opera-houses will seat a larger number of people and have better acoustic properties, but all the accessories of the hall are on a scale which defies competition, and the decorations are lavish and indeed overdone. M. Garnier also designed the theatre and gaming-house at Monte Carlo, the Nice Observatory, and some of the buildings of the Paris Universal Exhibition of 1889. He repeatedly exhibited water-colours and drawings at the Salon, winning a first-class medal in 1863. In 1874 he succeeded Baltard at the Academy of Fine Arts: he was also a member of the Institut de France, and he became in 1889 Commander of the Legion of Honour, being promoted in 1895 to the dignity of Grand Officer. At the time of his death he was the president of the Société Centrale des Architectes Français. He had been since 1867 an honorary corresponding member of the Royal Institute of British Architects, and in 1886 the Royal Gold Medal was conferred upon him. A feature of the investiture was the impulsive action of the recipient, who embraced the venerable president, the late Mr. Edward P. Anson, and kissed him on both cheeks, to his evident embarrassment and annoyance. In acknowledging the gift of the medal, M. Garnier, who spoke in French, narrated in picturesque language how, in 1855, when he returned from Rome after completing his studies, poor, friendless, and without work, he found himself in difficult straits. He was commissioned by the Préfet of Paris to execute two water-colour sketches of buildings for an album to be presented to Queen Victoria, who was then on a visit to the Emperor and Empress, and so earned his first money in his native land.

DR. GEORG EBERS, the famous Egyptologist and novelist, died at Tutzing on Sunday evening, at the age of 61. Professor Georg Ebers was born at Berlin. He commenced his education at a school in Thuringen, and was afterwards sent to Gottingen University, where he began by studying law, but owing to a paralytic affection which attacked his lower extremities he devoted himself to Classical and Oriental philology and

archæology. Professor Ebers went to Berlin in 1859, at which period researches into Egyptian antiquity exclusively absorbed him. Complete recovery from paralysis enabled him to set out on a course of foreign travel, during which he visited all the greatest museums and collections. In 1865 he settled at Jena, at which University he became Extraordinary Professor of Egyptology in 1868. In the following year Professor Ebers started on a fourteen months' tour in North Africa, Egypt, and Arabia Petrea. Returning to Germany with enhanced reputation, in 1870 he took up the Professorship of Egyptology at Leipzig. Professor Ebers spent the winter of 1872-1873 in Egypt, where he discovered various inscriptions, and especially the papyrus bearing his name, which has thrown much light on ancient medical science, while his antiquarian work excited the warmest admiration of Egyptologists. Professor Ebers wove his learning into a romantic web, as in "Eine Aegyptische Königstochter." This work, which depicts the daily life of the Egyptians at the time of the Persian conquest, has been translated into most European languages.

#### CHIPS.

The new Roman Catholic Church, dedicated to St. Teresa, taking the place of the temporary church in the adjacent St. Joseph's schools, Everton-road, Birkdale, was opened by Bishop Whiteside on Sunday. The church has been built at the sole cost of Mr. C. J. Weld-Blundell, the lord of the manor, who also gave the site.

At their last meeting the town council of Cardiff decided, on the recommendation of a committee who had been in consultation with the architects for the new municipal buildings in Cathays Park, Messrs. Lanchester, Rickards, and Stewart, to make additional provision for future requirements by adding two wings to the main library. Messrs. Young and Brown, of Southampton-street, Bloomsbury, were appointed as quantity surveyors.

A second edition of the Descriptive and Historical Catalogue of the Pictures and Sculptures in the National Gallery of British Art (Millbank), with biographical notices of deceased artists, is in course of preparation, and will soon be published.

Mr. Harrison, of Newport, Mon., has been appointed surveyor to the St. George's Vestry, South-wark.

In the parish of Chilvers Coton, Nuneaton, a mission church is to be erected, at a cost of £450, to meet the requirements of an increasing industrial centre. Mr. F. C. Penrose, F.R.S., LL.D., is preparing plans. The building will be of brick, and capable of seating upwards of 200 persons.

The dissolution is announced of the partnership heretofore existing between S. F. Green and E. K. Woodhouse, surveyors, architects, and valuers, Bolton, under the style of Green and Woodhouse.

In the case of John Parr, of Cathles-road and Gaskarth-road, Bisham Hill, S.W., builder, the order for discharge from bankruptcy has been suspended for three years, ending July 11, 1901.

Among the votes agreed to in Committee of Supply in the House of Commons on Friday night were those to complete the sums of £162,280 for the British Museum and the Natural History Museum; of £16,274 for the National Gallery and the National Gallery of British Art (Millbank), &c.; of £6,025 for the National Portrait Gallery; and of £5,927 for the Wallace Gallery (Hertford House).

Mr. R. Clay, the purchaser of St. George's Hall, Llandudno, has decided to erect a modern-planned theatre on the site of the present hall, to accommodate about 1,000 persons, and has instructed Mr. Frank Matcham, Holborn, W.C., to prepare the plans forthwith.

Mr. A. T. Ritchie, C.C., J.P., has been appointed the deputy chairman of the ironfounders' trade section of the London Chamber of Commerce.

The Ipswich Board of Guardians met on Friday, for the first time, in their new offices in Tower-street in that town. The premises were, till recently, a private house and solicitor's office, and have been purchased of Mrs. N. F. Cobbold for £3,500. The new workhouse on Woodbridge-road, in course of erection for the same town, is approaching completion. Mr. P. Adams, of London, is the architect, and the builders are Messrs. George Greenwood and Sons, of Sudbury and Ipswich.

Fifty labourers, engaged on the construction of the new Yarmouth Waterworks, are on strike for a rise from 4d. to 4½d. per hour. About two months since they received an advance from 3½d. to 4d.

The Emperor William has conferred the large gold medal, for excellence in art, on the sculptor Herr Charles Van der Stappen, of Brussels, and on Herr Schmidz, architect, of Charlottenburg.



## Building Intelligence.

**BELTON.**—The parish church of St. Peter, Belton, Rutland, after being closed for several months for restoration, was re-opened on Tuesday week by the Bishop of Peterboro' (Dr. Carr Glynn) with the usual ceremony. Standing on the slope of a hill rising off the main road from Uppingham to Leicester, the fabric is a stone building of the Decorated style, consisting of chancel, nave, south aisle, south porch, and square embattled western tower containing four bells. For many years the building has been in a dilapidated condition, the roof being unsafe, the west arch blocked, the porch much out of the perpendicular, while the windows on the north side had lost their tracery, and there was a west gallery obstructing the arch. The church was repewed in 1841, and it has now undergone internal and external restoration at a cost of £2,000. Mr. W. Talbot Brown, Wellingborough, was the architect, and Messrs. Roberts Bros., Weedon, were the contractors. The east window and side window in the chancel have been filled with stained glass.

**ECCLEFECHAN.**—Kirke Church, Ecclefechan, was opened on the 3rd inst., after having been closed for alterations for a year. The building was built as a chapel-of-ease in 1830, in the plain Gothic style of the day. Nothing has been left of it but the walls, and considerable additions have been made. The old plaster ceiling has been replaced by a timber ceiling open to the ridge. A tower 65ft. high and two exit porches are added at one end, and a chancel 20ft. by 22ft., with organ-chamber and vestry, at the other. The opening to chancel is by a wide and lofty arch in chiselled stone, carried partly on twin corbel pillars. Two steps lead up to the chancel floor, which, with the organ-chamber, is paved with encaustic tiles. The pulpit is also one side of the chancel arch, and the seating, of pitch-pine, is arranged in three divisions. The vestibule and porches are also paved with encaustic tiles, and from it a light wood stair leads up to the floor under the ringers' loft. The church is heated with hot water. One of the large side windows has been filled with a memorial window of stained glass, the subject being "Christ the King of Kings." The alterations, which have cost £1,600, have been carried out by local tradesmen, from plans by Messrs. Hardy and Wight, architects, Edinburgh.

**MALMESBURY.**—The Bishop of Bristol has this week held a conference with the vicar and churchwardens of Malmesbury and the mayor of the borough, on the subject of the Abbey Church. The unanimous opinion was that the restoration of the ancient fabric must be taken in hand without delay. The work will be to make quite sound the fabric of the six bays of the nave which form the parish church, to make the interior more dignified as a place of worship, and to protect the ruined parts as far as possible from further decay. The ruins are the result of accidents before the Reformation. The central tower fell in consequence of a lofty and heavy spire being placed upon it in the later Middle Ages, and only the west and north arches of the tower and a small part of the transept walls are now left. At the west end, the north half of the great western façade and the north side of the three western bays of the nave fell long ago. The southern half of the front and the south walls of the three western bays remain fairly complete; but decay has set in to such an extent that the ruins, it is believed, will not long remain as they are if not attended to. The bishop has undertaken to obtain a preliminary survey of the fabric from an antiquarian point of view, to be followed eventually by a complete report. It is suggested that the chancel should be rebuilt, and also the three western bays of the nave.

**MANCHESTER.**—The first section of the new Deansgate goods depot of the Great Northern Railway Company has been opened for the reception of traffic. It will, when completed, be one of the largest depots of the kind in this country. It adjoins the Manchester Central passenger station, and is bounded on the west by Deansgate, on the north by Peter-street, and on the south by Great Bridgewater-street, from all of which streets it has entrances. Starting from a junction with the four-track road which runs into the Central passenger station, the rails communicating with the new goods station are carried by a girder bridge over Deansgate, and they enter

the site of the depot at a considerable height above the ground level. The approach road, which is about 300 yards in length, immediately spreads out into six tracks carried on an upper floor supported upon steel stanchions, at the base of which stands a very large shed for use in loading and unloading trucks. Above this shed a warehouse of three more floors, 80ft. in total height, is in course of construction; and upon each side of the shed branch lines run down at a moderate gradient to the ground floor of the depot, which, like the upper floor, is laid out with tracks and banks for the shunting, marshalling, loading, and unloading of trucks. Thus the area of the site, which is nearly seven acres, is utilised twice over for the purposes of a goods terminus, whilst it also provides the foundation for extensive warehouse accommodation. Arrangements have been made to light the depot throughout with the electric light. A full equipment of hydraulic cranes and capstans is also provided. The whole work, which has many admirable engineering features, has been carried by Messrs. Robert Niell and Sons, of Manchester, under the supervision of Mr. A. Ross, the Great Northern Company's engineer-in-chief.

**WINCHESTER.**—The Chantry Chapel of Winchester College has just been enriched by several gifts. The old east window, which at the time of the Reformation was taken out and placed in Thurburn's Chantry, and afterwards replaced in Fromond's Chantry in a haphazard style, has now been restored to its original design, as far as that was possible after such a lapse of time. The cost of this work has been borne by Dr. Fearon, the headmaster of the college, who has also given two carved figures of Gabriel and Michael to the chantry. Besides this, Dr. Fearon has presented four new side windows, and has, in addition, defrayed the expense of re-decorating the richly-groined roof. The Rev. W. P. Smith, one of the college chaplains, has placed a brass lectern in the chantry, and these gifts, following on Dr. Freshfield's reredos, have completed one of the finest interiors in the city.

**WOKING.**—The Albion Hotel, Woking, which has long been inadequate to meet the requirements of the growing district, is about to be pulled down and rebuilt on an enlarged scale, from the designs of Mr. Clamp, of Woking. The new building will be set back some distance from the present frontage, and in order to allow of business being conducted during the reconstruction, will be erected in two sections. The first portion will consist of the general bar (44ft. by 18ft.), and the apartments for the working staff, and the second the hotel proper, comprising saloon and private bars, coffee-room, smoke-room, club, and commercial room, the latter whereof being 33ft. by 21ft. 6in. The new building will be faced with red Surrey or Somersetshire bricks with Ancaster stone dressings, and will be provided with all modern hotel appliances. The contract, exclusive of stabling (to be built later), has been let to Mr. A. A. Gale, of Woking.

**YORK.**—In a report on the state of the fabric of York Minster, the Dean says: The work on the south side of the nave has been completed, and the grand pinnacles restored in all their pristine beauty. This has been most carefully carried out, all existing details have been preserved, and those which have crumbled away as far as possible accurately reproduced. The cost has been very heavy, but the additional outlay has in some degree helped to provide for the outlay. Now the scaffolding has been removed to the east end, and another equally expensive and necessary work begun. The work at the east end will be completed in about twelve months, then we shall commence a similar work at the west end, where immediate attention is required to the ornamentation thereof, much of which is in a dangerous condition. Several portions having lately fallen, a rail has been fixed round the west end, and all persons are advised to go within it as little as possible.

The Prince Henry Memorial Rooms, at Carisbrooke Castle, Isle of Wight, were opened yesterday (Thursday) afternoon by the Princess Henry of Battenberg, Governor of the Island, who was accompanied by the Duke of Connaught.

It was reported to the city council of York, on Monday, that the fresh by-laws as to the width of new streets were now in force, and in future streets in that city under 100 yards long would have a minimum width of 30ft.; over 100 yards and under 200 yards, of 36ft.; and over 200 yards, of 42ft.

## Engineering Notes.

**MIDDLESBROUGH.**—Work has now been commenced in earnest on the dock extension. The dock was opened so long ago as May, 1842; it was leased to the Stockton and Darlington Railway in 1849, and eventually became the property of the North Eastern Railway. Since then two enlargements have been made, and this time the area will be increased from 16 to 26 acres. In the first half of this year, the North-Eastern Railway spent £3,717 on the dock extension works, largely in preparation for the more rapid progress that is now anticipated. At the western side of the dock, where operations have been commenced, steam navvies and a considerable number of men are engaged in preliminary excavation. It is officially anticipated that in the current six months there will be expended no less than £62,000; whilst the further expenditure after the end of 1898 is stated at £319,320; so that the estimate brings the cost up to the large total of £385,000. From the Tees there is the entrance channel about 1,200ft. long, which will be deepened and widened to 80ft., while the batter or slope of the walls, will be removed. The extension of the area of the dock has already been indicated; the depth will be increased, and there will be a considerable increase of the quays in the dock, and also by the making of the two additional arms from the western quay, so that there will be an addition of not much short of 3,000 linear feet of wharfage. The contract is in the hands of Mr. John Scott, of Cothelstone, and the plans were prepared by Sir John Wolfe Barry, consulting engineer to the North-Eastern Railway Company.

**THE LYNNMOUTH LIGHT RAILWAY SCHEME.**—An inquiry was opened at Minehead, Somerset, on Tuesday, by the Earl of Jersey, Mr. R. Vesey-Fitzgerald, and Major-General Boughiey, Light Railway Commissioners, relative to an application for powers to construct a light railway from Minehead Pier along the coast to Lynmouth. Strong opposition was offered on behalf of various landowners, and Mr. Poynter, the secretary, appeared for the National Trust for Places of Historic Interest and Natural Beauty. Mr. Thomas, Q.C., for the promoters, said the whole outcry against the scheme was due to the supposition that the railway would spoil the natural beauty of the district; but if the commissioners examined the route they would come to the conclusion that these fears were wholly imaginary. Roughly speaking, the line would cost £87,000. Sir James Szlumper, the engineer to the line, said its length would be twenty miles three furlongs. One in 40 was the steepest gradient. The route was the only one practicable. In cross-examination the witness said that 13 of the 20 miles of the line would be on a gradient of one in 40; but this covered the journey to and fro. Other witnesses were called, and the promoters' case having closed, the inquiry was adjourned till Wednesday, when Lord Jersey announced that the Commissioners could not recommend the scheme, which therefore falls through.

**PROPOSED INDEPENDENT GOODS RAILWAY BETWEEN LIVERPOOL AND MANCHESTER.**—The special committee, consisting of representatives of the Liverpool Chamber of Commerce, the Mersey Docks and Harbour Board, the Liverpool City Council, and other public bodies, appointed to consider the question of cheapening the transit of goods between Liverpool and Manchester, and the manufacturing districts generally, issued their report on Monday. The labours of the committee have extended over a period of two and a half years, and during that time they have considered a variety of schemes put before them as the most likely to effect the object in view. The commercial community of Liverpool consider that the city has been unfairly treated in the manner of rates by the different railway companies, and this fact, together with the refusal of the companies to concede better terms, was largely responsible for the committee being called into existence. The four principal schemes which have occupied the attention of the committee are Mr. Alfred Holt's platway scheme, Mr. Calthrop's platform carrier railway, Colonel Holmes' goods railway scheme, and Mr. John Wood's tramway scheme. The committee state that they are unanimously of opinion that Colonel Holmes' scheme for a goods railway between Liverpool and Manchester contains



greater promise as a thoroughly economical and otherwise satisfactory means of conveying merchandise between those centres, as well as between other places in the vicinity of the line, than any of the other schemes submitted to them. The cost of construction, equipment, working, and maintenance of such a railway would be much less than that of the existing lines, and goods could be conveyed on such a railway at rates not only far below those now charged, but which would leave a loss to the present lines. The committee finally recommend that Colonel Holme's revised scheme for a goods railway should be carefully examined, and, if approved of, should be adopted, and that steps should then be taken to obtain the effective support of the commercial community to the undertaking. In order to insure success, it is important not only that the necessary capital should be obtained at the lowest possible cost, but also that the railway should not, when completed, fall into the hands or under the control of the existing companies, and to this end it is suggested that the scheme adopted should be placed before the Liverpool and Bootle corporations and the Mersey Docks and Harbour Board, and their co-operation obtained in guaranteeing the interest on the necessary outlay, and in taking measures to insure the maintenance of the line as an independent concern. Colonel Holme estimates the cost of constructing and equipping the proposed goods railway at £1,610,876.

**EAST FIFESHIRE CENTRAL RAILWAY.**—The first portion of this undertaking, some 14½ miles in length, was opened on Friday. The line branches off from the Leven and East of Fife section at a point between Cameron Bridge and Leven, and passes through a most picturesque piece of country—running past the village of Kennoway, then through the estates of Mr. Christie, of Durie, and Sir John Gilmour, on by the village of Largoward to the present terminus, Lochty Farm, being about 3½ miles from Stravithie, and six south of St. Andrews. This line, which is now the property of the North British Railway Company, will eventually be extended to Stravithie, and a branch may also be run on to Dairsie, which district abounds in white free sandstone. At its starting point it is about 65ft. above sea-level, and where it terminates it is 545ft. The contractor was Mr. Howard, London, and it has been constructed under the supervision of Mr. Clark, C.E., Kirkcaldy, and Mr. Nominco.

**GLASGOW.**—Highly satisfactory progress continues to be made with the reconstruction of Glasgow Bridge. The first five arches from the Jamaica-street end are completed, and a sixth will be finished next week. There will then only be one more arch to build, and a week or so will see all the mason work of the piers above high-water complete. At present the workmen are chiefly engaged in laying iron troughs beneath what will be the pavement. Upon these arched troughs will be laid heavy gas and water cast-iron pipes. In case of a gas leakage or burst water main, the pipes will very easily be got at, and without the slightest detention of vehicular traffic. The pipes lying on these troughs will also be better preserved. A substantial job is being made of the filling in of the spandrels, the best cement being used in the concrete. All the materials for the seventh and last arch is ready for placing, and nearly all the granite for the finishing of the bridge is stored near by. If nothing unforeseen occurs, the structure is expected to be out of the contractor's hands just about the estimated time—early in spring.

**BUDE AND HOLSWORTHY RAILWAY.**—Mr. Wyndham Portal, Chairman of the London and South-Western Railway Company, opened, on Wednesday, the new line to Bude, in continuation of the branch railway from Okehampton to Holsworthy. Immediately after leaving Holsworthy the line crosses the Deer Valley, over which it is carried by a viaduct of nine arches, each of 50ft. span, the height from the permanent way to the valley being 89ft. At Woolston there is a second viaduct of similar design, but not more than 60ft. high, and both viaducts are built entirely of concrete, which has never before been adopted for such structures. The site of the terminus in Bude is close to the junction of the Bude and Stratton main roads, half a mile from the centre of the former town. A branch line for goods traffic has been laid to the basin of the Bude Canal, and another branch may eventually be carried to Marhamchurch,

within easy reach of Widemouth Bay, which may in time become a popular watering place, with its fine stretch of sand. The railway from Holsworthy to Bude consists, in the first instance, of a single pair of rails; but land has been taken, and viaducts have been constructed, so as to permit of the introduction of a second set of metals. The railway has been constructed by Messrs. John Aird and Son in little more than 18 months. The railway was designed by Mr. W. R. Galbraith, the consulting engineer of the London and South-Western Company, and carried out under his personal supervision and that of his partner, Mr. R. F. Church.

#### CHIPS.

The town council of Ossett decided, on Monday, to extend the drainage of the Gawthorpe portion of the borough in accordance with plans prepared by Mr. Sam Shaw, C.E., and application was ordered to be made to the Local Government Board for sanction to a loan of £4,000 for the purpose.

The Artists' Guild tenth Amateur Art Exhibition (open to all amateurs) will be held at the Imperial Institute in November. The exhibition is under the immediate patronage of Princess Christian, who offers prizes for embroidery. Other prizes are offered for painting, photography, and all kinds of art work. Particulars from Lieut.-Colonel Bacon, the Artists' Guild, Exhibition-road, S.W.

The new reservoir on Ringstone Hill, near Brierley, which has been constructed for the supply of Hemsworth and district with water from Barnsley Corporation, was formally opened on Wednesday week. The work has been carried out under the supervision of Mr. J. H. Taylor, C.E., borough surveyor and waterworks manager, of Barnsley, and 17 miles of mains have been laid between Ingbirchworth and the new reservoir. The latter is 81ft. long by 51ft. wide, and 13½ft. deep, with a holding capacity of 270,000 gallons. The walls are of brick, the floor of concrete, covered with "puddle" and bricks, and the roof of concrete carried on steel girders, supported by brick piers. The total cost of the reservoir, pipes, and land, has been £18,000.

The contracts for a new Roman Catholic chapel-school at Millburn, Renton, in the Vale of Leven, have been accepted. The total cost is to be £6,500. The chapel will accommodate 750 persons, and the school 380 children. Mr. Joseph Cowan, Glasgow, is architect, Mr. R. Bileland, Alexandria, builder, and Messrs. Graham and McLaren are the joiners. The first sod was cut on Saturday, by Mr. W. E. Gilmour, of Woodbank.

The valuer of the London County Council, Mr. Young, and the secretary of the London Tramways Company, Mr. W. H. Andrews, have come to terms, and all that remains is for the bargain to be ratified. The property, plant, stock, &c., belonging to the company will pass over to the council for £850,000, and on January 1 next the council will begin working the lines.

Mr. H. P. Boulnois, Local Government Board inspector, held an inquiry at Westbury-on-Trym, on Friday, into an application by the rural district council of Barton Regis to borrow money for purposes of sewerage and sewage disposal for the parish of Westbury-on-Trym. Mr. Lancaster and Mr. A. P. I. Cotterell represented the Barton Regis District Council, and Mr. Yabbicom and Mr. Wise were present on behalf of the Bristol Corporation.

A memorial to stand upon the grave of the late Mrs. Bale at the cemetery in Pietermaritzburg, has just been made in Devonshire of Dartmoor granite. Her only son, his Excellency the Right Honourable Henry Bale, Q.C., the Attorney General and Minister of Education in Natal, was educated at Exeter Grammar School, and the memorial has been executed by Messrs. Harry Hems and Sons, of Exeter.

In the list of adjudications in bankruptcy, published in Tuesday's *London Gazette*, the name appears of James Frederick Carruthers Bell, of John-street, Bedford-row, W.C., architect and surveyor.

A new bridge at Borrowash, over the river Derwent, constructed at a cost of over £7,000, was opened on Wednesday. The new structure is 700 yards long.

The Godalming Town Council have resolved to purchase the Frith Hill, Godalming, and Farncombe Water Company, and a committee has been formed to arrange all formalities and, if necessary, to promote a Bill in Parliament for the acquisition of the undertaking. According to the terms agreed upon in the negotiations, the corporation's liability in purchasing the concern will be £67,257, involving £2,858 8s. 7½d. yearly. The annual repayment of the borough's existing loans is equivalent to a rate of 2s. 1½d. in the pound.

#### PARLIAMENTARY NOTES.

**SCIENCE BUILDINGS AT SOUTH KENSINGTON.**—Mr. E. Robertson asked the First Commissioner of Works the other night if any decision had yet been arrived at with regard to the site on which the new Science buildings at South Kensington were to be erected; and what reply, if any, had been made to the memorials forwarded by the Presidents of the Royal Society and the Royal Academy to the Prime Minister? Mr. Long, who replied, said: No decision has yet been arrived at with regard to the site for the new Science buildings. The memorials referred to, which were addressed to the Prime Minister, are now under consideration.

**MR. GLADSTONE'S MONUMENT.**—Lord Balcarras asked on Friday the First Lord of the Treasury whether he had decided to whom the commission for the national monument of the late Mr. Gladstone would be intrusted? Mr. Balfour: Mr. Brock, R.A., has been intrusted with the execution of the monument of Mr. Gladstone in Westminster Abbey.

Colonel A. G. Hepper conducted a Local Government Board inquiry at Heywood on the 4th inst., into the application of the town council for powers to borrow £10,000 for gasworks purposes—£1,500 being required for land, £2,000 for new iron mains, £2,000 for prepayment of penny-in-the-slot meters, £3,000 for gas-cooking stoves, £900 for a storeroom, stables, &c., and £600 for a coke-breaking machine and plant. There was no opposition to the application.

On Saturday Sir John Brunner accepted the tender of Messrs. Fowles, Winsford, at about £2,300, for the erection of a Guildhall, which Sir John intends to present to the friendly and trade societies of Winsford, a majority of whom at present meet at publichouses. There are 14 friendly, six trades societies, including four Foresters, two Rechabites, two Oddfellows, three Shepherds, Salt-makers' Union, Boilermakers' Union, carpenters, joiners, and bricklayers.

The restoration of the parish church of Inwardleigh, Devon, was commenced last week by the contractor, Mr. S. G. A. Petrick, the architects being Messrs. Tait and Harvey, of Exeter. The first section of the work comprises a new roof for nave, also a new south wall. The principal beams of nave were in a dangerous state, being quite rotten throughout. The other sections to be carried out are reseating and reflooring, the tower, and chancel.

A brick-and-stone edifice will soon take the place of the corrugated iron structure now doing duty for St. James's Church, Aston, and on Saturday afternoon Sir J. C. Holder, Bart., laid the foundation-stone of the nave of the new building. The architect is Mr. J. A. Chatwin, of Birmingham, and the cost will be about £8,000.

The fifteenth anniversary of the opening of the Dewsbury Infirmary was celebrated on Saturday by the opening of a children's ward, which has been added to the institute. Mr. H. H. Kirk, of Dewsbury, has acted as honorary architect, and has also undertaken to defray the cost of necessary structural alterations, and of fitting up and furnishing the ward, which contains eight cots.

The unexpected and comparatively sudden death occurred at Barnsley last week of Mr. Louis England, of the firm of W. G. and L. England, joiners, sawmillers, and builders, Summer-lane, and youngest son of the late Mr. Councillor George England. Deceased, whose age was only 25 years, had been in delicate health for some time, but was able to attend to business and also to indulge in cycling, &c. Death resulted on Monday from hemorrhage from the lungs. The funeral took place at Barnsley cemetery on Wednesday week, and was attended by the workmen employed by the firm, and a large representative from the Builders' Association.

Mr. Rienzi Walton, Inspector to the Local Government Board, opened a preliminary inquiry at the Town Hall, Bradford, on Monday last, concerning the representation made to the board by the corporation of Bradford, that it is desirable that the boundaries of the city should be extended so as to include the urban districts of Shipley, Baildon, Ecclehill, Tong, North Bierley, Clayton, and Thornton.

At the sixth half-yearly meeting of the Central London Railway Company, Sir Henry Oakley, who presided, stated that from the western terminus of the undertaking at Shepherd's Bush to the Post Office both the running tunnels had been completed, except near Oxford-street (the Davies-street Station), where a large sewer had to be diverted. That had now practically been done. The greatest impediment to the rapid construction of the undertaking had been met with near the Bank Station, where a large number of gas, water, and other pipes had had to be dealt with. These had now been housed in a subway built for the purpose below the public subway which they had had to construct by arrangement with the City. The station tunnels there were in hand, and so were also the lifts.



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## ILLUSTRATIONS.

NEW COLLEGE, SCARBOROUGH.—THE BROKE TOMB, COHAM CHURCH, KENT.—MELTON MOWBRAY CHURCH.—OFFICES OF THE BIRMINGHAM OLD AGE AND SICK BENEFIT SOCIETIES.—HOUSE AT WASHINGTON, U.S.A.—DELMONICO'S, NEW YORK.

## Our Illustrations.

## NEW COLLEGE, SCARBOROUGH.

THIS design shows an enlarged scheme for the New College at Scarborough. The materials used are red brick with Whitby stone, the roofs to be covered with red Broseley tiles. The architects are Messrs. Hall, Cooper, and Davis, 21, Old Queen-street, Westminster, and Scarborough.

## THE BROKE TOMB, COHAM CHURCH, KENT.

THIS sheet of admirable drawings of this exquisite specimen of the English Renaissance has been reproduced from the originals, for which the late Mr. Reginald J. Beal, of Rochester, was awarded a National Silver Medal. Of the tomb itself little need be said here, as we gave a long account of the work in the BUILDING NEWS for Jan. 18, 1895, when a view appeared from the pencil of Mr. E. J. Lambert, whose drawing hangs in the Architectural Gallery at South Kensington Museum. Mr. Beal's measured details are most carefully delineated, and besides furnishing a useful record of a grand piece of work, show how excellent a draughtsman Mr. Beal really was.

## MELTON MOWBRAY CHURCH.

ST. MARY'S, Melton Mowbray, is one of the finest churches in Leicestershire. The plan resembles a Latin cross, and consists of chancel, nave, aisles, and transepts, with a tower rising from the intersection of the arms. The Early English style is well represented by the four central piers and arches forming the bottom structure of the tower, the middle portion of the tower, and the very fine western porch, with its ornate doorway and niches. The north transept, nave, and chancel are in the Decorated style, while the Perpendicular is represented by the top portion of the tower and the clerestory. There are several tombs and monuments in the transepts and aisles, also a most interesting collection of chained books. A considerable restoration has been effected in carved stalls, pulpit, &c., and the insertion of stained glass windows, the whole forming a structure of great interest to artists, architects, and antiquarians. A. E. MARTIN.

## OFFICES FOR THE BIRMINGHAM SICK BENEFIT AND OLD AGE SOCIETY.

THE proposed building is in close proximity to the Victoria Law Courts, having a frontage of 16yd. 1ft. to Corporation-street, and 32yd. 1ft. to Coleridge-passage, advantage having been taken of this passage to get offices which will in every respect be light and airy. The treatment will be Free Renaissance in style, and the materials used will be red Kingwinford bricks, with buff terracotta dressings, and red Broseley tiles for roof. The building, as shown by the perspective sketch, will be of an imposing character,

well suited for the purposes for which it is intended, and will vie with any of the erections in its immediate vicinity. The basement will contain two large showrooms, six offices, and heating chamber. The ground floor will comprise two large shops, six offices, with two separate entrances. The first, second, and third floors will have 36 offices, which can be divided into suites of two, or more as required, while the fourth floor contains a photographic studio, with all necessary workrooms, waiting and dressing rooms, together with a suite of rooms for the caretaker. A lift, accessible to every floor, will also be provided. The architect is Mr. J. W. Allen, of 278, High-street, West Bromwich, and the builders Messrs. J. Harley and Son, of Smethwick. The amount of their contract is £9,390.

## HOUSE AT WASHINGTON.

OWING to Mr. Fairley's absence from home, no description of this drawing for a residence, Washington, U.S.A., has reached us.

## DELMONICO'S, NEW YORK.

THIS is an illustration of the new building of the famous restaurant in New York known as Delmonico's. The architect is Mr. James Brown Lord, of New York, and our illustration is reproduced from the *American Architect and Building News*.

## CHIPS.

A Local Government Board Inquiry with regard to the application of the Canterbury Town Council for power to borrow £70,000 for the purchase of the Stone House Estate and the erection of a lunatic asylum is to be held by Lieut.-Colonel Albert C. Smith, R.E., at the Guildhall, Canterbury, to-day (Friday).

Now that this North Wales Railway Improvement Bill has received the Royal assent, the London and North-Western Co. are pushing forward the widening of the Chester and Holyhead Railway. One of the most important contracts is the widening of the bridge at Rhyl over the River Clwyd, which has been let to Mr. Bevin, Manchester. The structure will be of iron, and will rest on steel pillars driven 25ft. below the bed of the river.

The new line from Waterloo to the Mansion House was successfully opened on Monday, and the traffic, estimated at 16,000 passengers, is said to have exceeded the expectations of the promoters.

Although the city of Gloucester was at one time noted for its bell founding it had up to recently no church which could boast a full peal of ten bells. The peal of St. Michael's has, thanks to the generosity of the Mayor and Corporation, now been increased from eight to ten, and the two new bells were dedicated on Monday by the bishop of the diocese.

A large clock has just been erected in St. Margaret's Church, Leicester, by John Smith and Sons, Midland Clock Works, Derby. It shows the time on four dials, and plays the Westminster chimes.

A public shelter has been erected on the South Cliff at Felixstowe at the cost of the urban district council. The outlay has been about £2,000, and the contractor was Mr. Philip Banyard, of Felixstowe. Pleasure-grounds are also being laid out near Wolsey-terrace.

The town council of Glasgow have remitted to the finance committee to prepare a scheme of municipal insurance in accordance with the powers conferred on the Corporation in the recently-passed Sewage Act.

The county council of Lancashire have appointed Mr. William Harold Radford as county-bridge master, in succession to his father, at a salary of £1,000 per annum, with travelling expenses and staff, the whole time of Mr. Radford to be given to the work, and his offices to be in the county buildings at Preston. Mr. William Higginson Schofield, the senior district surveyor, was at the same meeting appointed as county surveyor at a salary of £500 per annum, with travelling expenses.

The town council of Crewe decided at their last meeting to raise the salary of Mr. Geo. Eaton Shore, the borough surveyor, from £300 to £350 a year.

The Bristol Town Council have adopted a recommendation of the Docks Committee in favour of going to Parliament for powers to construct a new lock and other works at Portishead Dock, so as to provide accommodation for the largest classes of steamers afloat or building. The estimated outlay is £350,000. An amendment to the effect that the "dockisation" of the River Avon was the best scheme was defeated by forty-one votes to twenty-one.

## PROFESSIONAL AND TRADE SOCIETIES.

INSTITUTION OF JUNIOR ENGINEERS.—The members of this Institution, which was formed in 1884, are this week holding their summer excursion in Liverpool, and have made the Adelphi Hotel their headquarters. The party, to the number of about 30, arrived at the Adelphi on Monday evening, having left London on Friday. They spent Saturday and Sunday at Buxton, and then journeyed on Monday morning to Horwich, where they visited the Lancashire and Yorkshire Railway Locomotive Works, under the guidance of the chief mechanical engineer, Mr. John A. F. Aspinall, who is the president of the institution for this year. Having lunched at the Mechanics' Institute in Horwich, the company took train for Liverpool, and on arrival at once proceeded from Exchange Station to the Adelphi. On Tuesday, a visit was made to the works of Messrs. Laird Brothers, at Birkenhead, and afterwards to the Sunlight Soap Works at Bebington. In the evening, Dr. H. S. Hele-Shaw, who is an honorary member of the institution, held a reception at the Walker Engineering Laboratories, University College. Visits were made on Wednesday and yesterday (Thursday) to the electric generating station of the Overhead Railway, the Liverpool Waterworks pumping stations, the Corporation electricity works in Paradise-street, and the docks grain storage works. The summer dinner took place on Wednesday evening at the Adelphi Hotel, and last (Thursday) evening the Liverpool Engineering Society entertained the visitors at the Alexandra Hotel. The president-elect of the institution is Sir William Henry White, of the Admiralty.

The corporation of Richmond, North Riding, have referred to a committee the consideration of the desirability of pulling down the existing town hall and of building a new and more adequate group of municipal buildings.

At the half-yearly meeting of the Cambrian Railway Co., held on Saturday, it was reported that Mr. Collin, the engineer, had lifted the permanent way 6in. for a distance of about eighty-five miles, both on the main line, coast, and Mid-Wales sections, and the ordinary staff are still being employed in this way, and, with very little expenditure to the company, they will soon have an excellent permanent way.

An inquest was held at Garwick, Isle of Man, on Monday, concerning the deaths of Thomas E. Nettle, timber merchant, of Newby-street, Liverpool, and Edward L. Evans, of The Hollies, Anfield, Liverpool, retired builder, two of the five victims of the boating disaster off Douglas last week. The medical evidence was that death was due to drowning, and a verdict of accidental death was returned.

The Leominster Hospital Committee have decided to erect a new college hospital and nurses' home in South-street, Leominster, the accommodation allowing for five beds, and a separate building is provided for the matron and nursing staff. Mr. Ernest G. Davies, M.S.A., of Hereford, is the architect, and the work is to be put in hand forthwith.

The interesting mansion known as Wester Livlands, near Shirling, is about to be demolished to make way for a new house to be re-erected on its site. Livlands is famous in local history as being the residence of General Monk during the siege of Stirling Castle by Cromwell. The most interesting thing about the house that has yet been discovered is a series of panels showing paintings of the Sybils with prophetic verses of the life of Christ in a curious mixture of Gothic and Roman lettering.

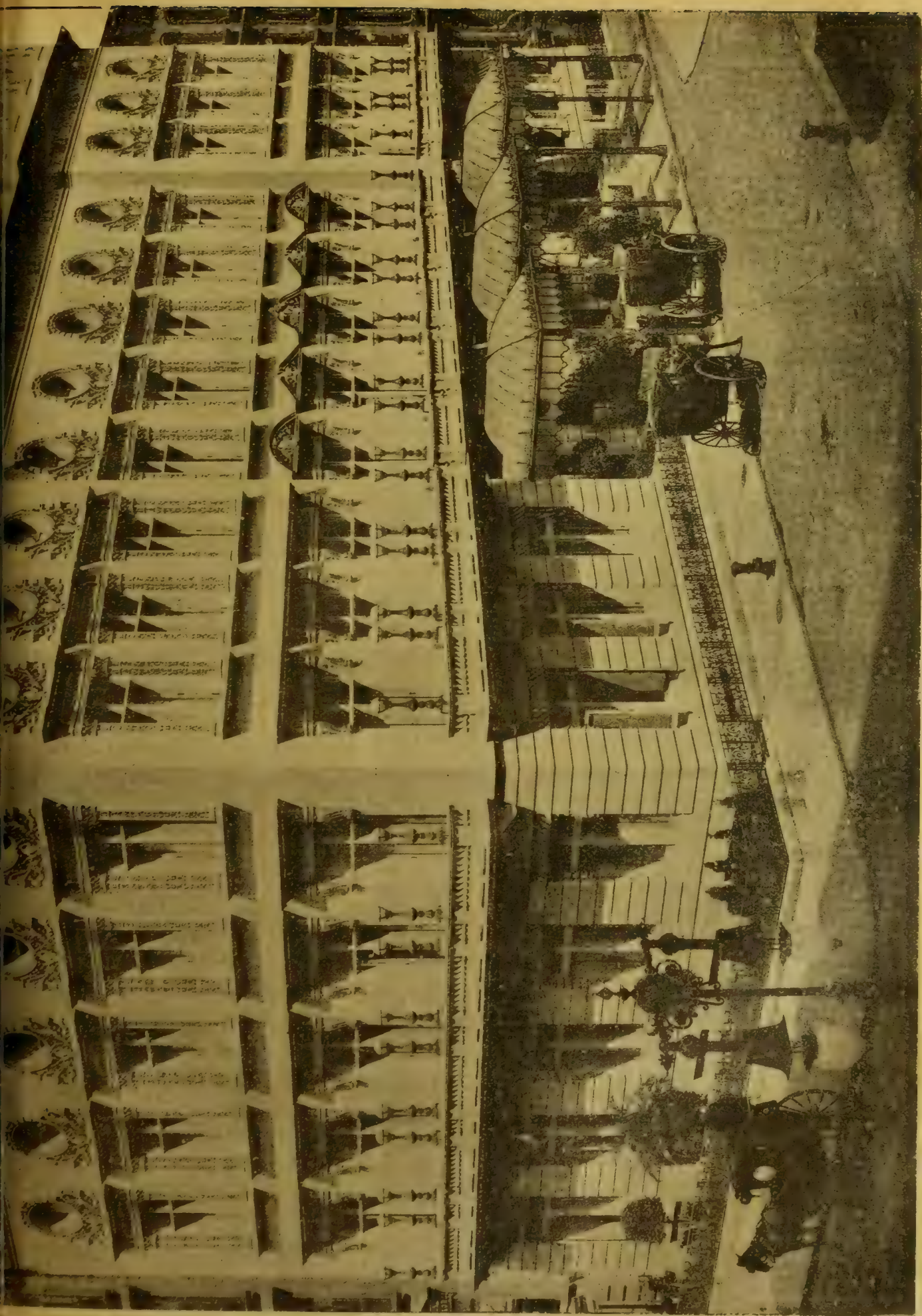
Good progress is being made with the building of King Arthur's Castle Hotel on the hillside opposite the castle ruins at Tintagel. Mr. Silvanus Trevail, J.P., of Truro, is the architect; Mr. Carkeek is the builder; the sanitary fittings are by Messrs. Jennings and Messrs. Doulton, of Lambeth; and the furnishing contract has been taken by Messrs. Waring and Co., of London and Liverpool. The hotel and grounds occupy  $7\frac{1}{2}$  acres of land.

The electric tramways from Douglas to Laxey, opened in 1894, has been extended a further distance of eleven miles to Ramsey, running close to the edge of the cliffs throughout the greater part of the way. The line, which has now a length of eighteen miles, was formally opened last week. The gauge is 3ft.; the conducting wires are carried overhead on steel columns placed in the centre track, with projecting arms supporting a wire over each line. For the supply of electricity there are three generating stations, one at Douglas, one at Laxey, and the third half-way between that place and Ramsey, and there is a large accumulator station at Groudle.









DELMONICO'S, NEW YORK.—JAMES BROWN LORD, *Architect.*



## COMPETITIONS.

**BIRMINGHAM.**—Competitive plans are being prepared with a view to the construction of the Midland Hotel, New-street, Birmingham, which was erected about 25 years ago by the late Mr. Isaac Horton. The whole of the interior will be reconstructed, and various alterations will be made, at a total cost of from £50,000 to £60,000. The present arrangement of the floors and of the internal communication, which has been found to be inconvenient, and which has been militated against the success of the hotel, will be superseded, and the building will be made in all respects a first-class hotel on modern lines. At present the competitive plans which Messrs. Horton have invited from a number of architects have not yet been sent in. The matter, however, will be pushed on in order that the proposal may be submitted for preliminary approval at the coming licensing sessions. It is intended to put in a new stone staircase and a modern lift, and, if the magistrates approve, to construct a large bar in Burlington-Passage. When reconstructed, the Midland will have about 250 bedrooms, an increase of 150 on the present accommodation; and several new features, similar to those of the Grand Hotel, Colmore-row, will be added to secure the comfort and convenience of the guests, and increase the general public usefulness of the hotel. The buildings on the other side of Burlington-passage, part of which are already in the licensed area, will be more fully utilised, especially the portion facing Stephenson-place, known as Peel-buildings.

**LEYTON.**—At the last meeting of the urban district council for Leyton, the baths and wash-houses committee reported that, pursuant to the authority given to them by the council, they had selected three architects to prepare and submit plans for public baths—viz., Mr. J. W. Dunford, M.S.A., F.I.Inst., 100c, Queen Victoria-street, E.C., and Walthamstow; Messrs. Gordon, Lowther, and Gunter, Finsbury House, Blomfield-street, E.C.; and Messrs. Harrap and Duffield, 34, Queen-street, Cannon-street, E.C.—and had appointed Mr. Rowland Plumb, F.R.I.B.A., of 13, Fitzroy-square, W., as assessor. Instructions had been forwarded to the architects named to the effect that the cost of the building, machinery, and well is not to exceed the total sum of £13,000, and that the plans are to be received by the 10th October next. The report was adopted.

**PLYMOUTH.**—The borough of Plymouth invites designs for the erection of shops and dwelling-houses fronting Tavistock-road. The designs are to be delivered not later than September 24 next. Each set of drawings, with accompanying description, must be marked with a motto or device which has not been previously used by the competitor, and be accompanied by a sealed envelope bearing the same motto or device, and containing the name and address of the author. The committee offer a premium of £250 for the design selected as the best. The award of the premium will be made by a professional assessor. The following drawings will be required:—

(a) A block-plan, showing the whole of the buildings with the position of the drains, and the extent of open space attached to each building. (b) Complete plans of each floor of the buildings at each end of the site and of the intermediate buildings, and where any change in the arrangement of the plan takes place, having the sizes of the various rooms figured thereon. (c) Sections of the intended buildings, showing the height of the various stories, the height of the buildings in front, measured from the level of the footway to the eaves, and from the level of the open space at the rear to half the vertical height of the main roof of the building. (d) Complete elevations of the whole facade, including Tavistock-place, to be drawn to a scale of 16ft. to an inch, with large-scale elevations of the buildings at each end of the site and of the intermediate buildings, more particularly where variations in level or character take place, drawn to a scale of 4ft. to an inch.

The buildings to be four stories in height, exclusive of basement. The main elevations to be, as far as practicable, constructed of local materials. The whole of the buildings to be designed so as to comply with the by-laws now in force in the borough relating to new streets and buildings. The premises plans to become the property of the corporation. It is proposed only to exhibit publicly the elevations of the whole facade, including Tavistock place, so that no opportunity will be given to unscrupulous persons to take advantage of the labour of competitors. The designs of unsuccessful competitors will be returned to them. Competitors should submit designs of premises which will command a rental

of about £100 per annum, with the exception of the two end sites, which should be specially treated. The architect whose design may be accepted will be required to supply from time to time such detail drawings as may be required without any additional cost beyond the amount of premium. The Devon and Exeter Architectural Society, at a meeting held on Thursday evening in last week, considered the published correspondence between the architects of Plymouth and the corporation relative to the Tavistock-road competition. A resolution was passed approving of the action of the local architects, and expressing regret that the corporation were unable to accede to their suggestions. Considering that there are 53 sites, taking one to each frontage, or 28 if to only one street, and that the total cost of the buildings can hardly be less than £50,000, the liberality of the borough of Plymouth is phenomenal!

**WELLS, SOMERSET.**—In a limited competition for new Blue Schools for girls, to be erected by the governors of this foundation, the designs of Mr. H. Dare Bryan, architect, of Bristol, were selected. The scheme, which has been approved by the county council education committee, includes a cookery school.

## CHIPS.

At a meeting of the finance committee of Dundee Harbour Board on Monday, it was agreed to grant an increase of £100 to the salary of Mr. G. C. Buchanan, harbour engineer, thus raising it to £500.

On Thursday in last week Mr. Robert H. Bicknell held an inquiry at Mountain Ash, Mon., on behalf of the Local Government Board into the application of the urban district council to borrow £20,700 for the purpose of carrying out a sewerage scheme for the Abercynon portion of the district.

The sudden decease occurred at Menai Bridge on Monday of Mr. Robert W. Collin, a well-known builder and contractor in Warrington. The primary cause of death was hemorrhage on the brain. The deceased was 62 years of age.

The Board of Trade have confirmed an order authorising the construction of a light railway between Elvanfoot Station and Wanlockhead, in the counties of Lanark and Dumfries.

The death occurred in Paris on Tuesday, at the age of 73, of M. Eugene Boudin, the sea painter, the last survivor of the school of 1830.

On Saturday, Lady Meyrick laid the foundation-stone of a new church at Llantrisant, Anglesey. The church will be built in the Perpendicular style, from designs by Mr. P. Shearson Gregory, architect and diocesan surveyor, Bangor. It will cost about £1,000.

A commencement will be made in the course of a few days with the execution of the repairs which it has been found necessary to carry out at the Hancock Museum at Barras Bridge, Newcastle-on-Tyne. The work has been intrusted to Mr. Nicholas Maughan, builder, Westgate-road, Newcastle, and the cost, as estimated by the architect, Mr. F. W. Rich, will be about £2,500.

Mr. Charles Hull, estate agent to the London and North Western Railway Company, died on Saturday at his residence, 2, Albert-road, Regent's Park, aged 67.

At the Sun Hotel, Chatham, the Light Railway Commissioners held an inquiry last week with reference to an application of the Chatham, Gillingham, and District Electric Railways Co., for powers to extend the line in High-street (East), Chatham—approved in the original scheme—from the Luton Railway arches up Chatham-hill to the Jezreelites' College, thereby connecting Chatham with Gillingham. Mr. Frazer, engineer to the promoters, gave evidence in support of the proposal.

The London Technical Board has appointed Mr. Robert Catterson-Smith as assistant art inspector. Mr. Catterson-Smith is a lecturer at the Central School of Arts and Crafts, and is a member of the Art Workers' Guild and the Arts and Crafts Exhibition Society.

At the last meeting of the town council of Wolverhampton, Mr. Shawfield, assistant engineer of the corporation electric-lighting works, was appointed chief engineer, in succession to Mr. F. H. Lewis, resigned, at £200 per year.

Dr. J. C. Thresh, medical officer of health to the Essex County Council, has been appointed lecturer on public health at the London Hospital Medical College. The new laboratories and public health museum now being provided at this college will be ready by the commencement of the winter session.

Extensive alterations and additions have been made to the shire hall at Worcester, at a cost of £6,500. The architect was Mr. Rowe, jun., son of the county surveyor for Worcestershire.

## WATER SUPPLY AND SANITARY MATTERS.

**LEICESTER.**—The corporation have unanimously adopted the scheme of their borough engineer, Mr. E. George Mawbey, M.I.C.E., for 34 miles of new tributary sewers. Some 29 miles of these are to replace brick sewers mostly laid 43 years ago, and three miles are to replace some of the earliest earthenware pipe sewers laid in the town which were found to be very defective. The estimated cost of the whole scheme is £128,300, and the work is to be carried out in four sections, the first of which (estimated to cost £30,229) is to be proceeded with as soon as the sanction of the Local Government Board is obtained.

**SHIPLEY MAIN DRAINAGE.**—At a meeting of the Shipley Urban District Council, held on July 28th, contract plans of their proposed bacterial filter-beds, together with an estimate of cost, were submitted by Mr. Malcolm Paterson, M.Inst.C.E. The beds will be constructed of brick in cement, and will cover an area of 6,133 square yards, there being four each of the rough and fine filters. The total estimated cost, exclusive of contingencies, is £5,400. The volume of sewage to be treated will be 800,000 gallons daily, and the treatment will be on the system advocated by Mr. Dibdin, who has settled the capacity and arrangement of the beds. The plans were unanimously adopted without modification, and it was resolved to advertise for contracts. It is not proposed to treat trade refuse, and the sewage will pass through grit-depositing tanks before flowing on to the beds.

A new bridge over the Harlem at New York, which has been building for six years, and which has cost over £600,000, was formally opened on July 4; but as it is not completely finished, traffic will not be commenced for several weeks.

At the Nuneaton Urban District Council meeting on Wednesday, plans were submitted by the Midland Building Estate Company for the developing of a new estate recently acquired. The property is situated on the north side of Midland-road, and is adjacent to the Midland station. The area is 16½ acres, and it lies between the London and North-Western and Midland railways. Plans are now being prepared by the surveyor to the Nuneaton Rural District Council, Mr. Arthur Moreton.

On Tuesday week the new light goods railway from Benwick to the Three Horse Shoes siding, which is located on the G.E. Railway line from Peterborough to March, near Whittlesey, was formally opened. It is 5½ miles in length, and has been constructed by the Great Eastern Railway Company.

The directors of the Highland Railway Co. have appointed Mr. Alexander Newlands, A.M.I.C.E., to be chief engineering-assistant, in succession to Mr. Batchen, now engineer to the Irish Board of Works.

Mr. John Bourne, at present surveyor of Little Woolton, has been elected surveyor to the urban district council of Neston, Cheshire.

A plan for converting the unsightly mud fore-shore at Southend-on-Sea into a sand parade has been submitted for approval. The proposal is to fill in the space—which is at present useless for sea or land purposes—to above high-water mark, so as to be available at all times of the tide. It is stated there are no engineering difficulties to overcome and little more than unskilled labour would be necessary, so that the cost would be small for making one of the finest seaside promenades in the kingdom.

The new central sanitary depot, upon which the Leeds Corporation are spending over £30,000, is nearing completion, and will be formally opened early next month. The site is in Dock-street, to the south of Leeds Bridge. Stabling accommodation is here provided for 168 horses, and offices, store-rooms, and sheds for the many vehicles that are used in the scavenging and water-cleansing department are also being built. The land on which the new depot is built has cost about £20,000, whilst the buildings will necessitate an expenditure of about £13,000. About a thousand yards of the site are being utilised to widen Dock-street and the other thoroughfares bounding the area.

A new pavilion, recently erected by the directors of H.M. Convict Department, for the use of the Dartmore Prison officers and their families, was formally opened on Bank Holiday. The building is spacious, lofty, and built of Dartmoor granite, corrugated iron roof, with four rooms and a verandah in front, 35ft. by 6ft. The large room is 22ft. by 18ft., the dressing-room, 10ft. 6in. by 9ft. 6in.; lavatory, 10ft. 6in. by 5ft. 6in. A spacious and well-kept cricket-pitch can be seen from the verandah, and there will shortly be added a tennis-court and bowling-ground. The whole of the work was done by convict labour, from a design by Mr. G. H. Gordon, foreman of works at Dartmoor, which was carried out by Messrs. E. M. Williams and R. W. Hodge, instructors.







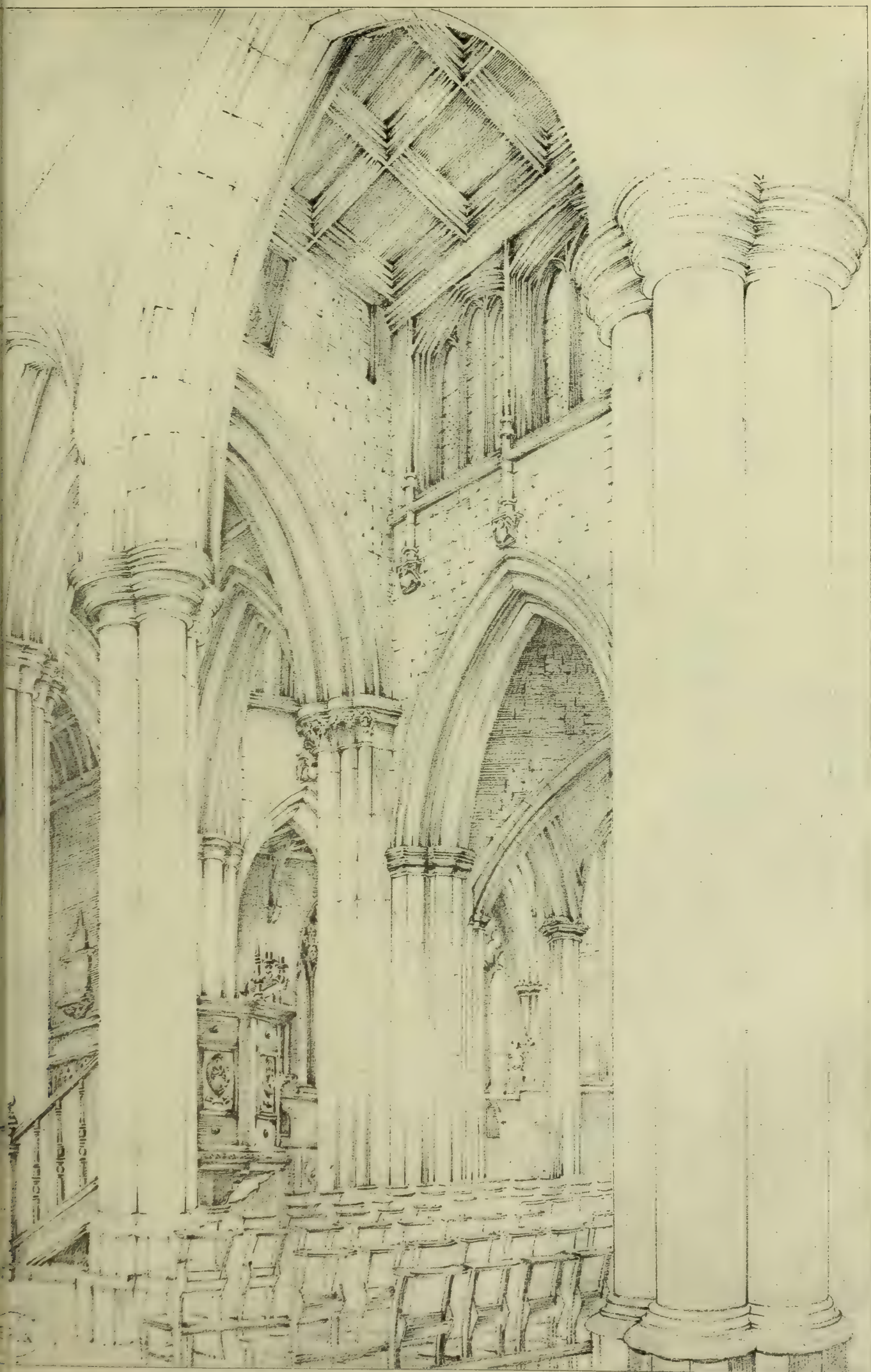
MELTON · MOWBRAY · CHURCH  
NATIONAL · BRONZE · MEDAL · AWARDED · A · E · MARTIN ·



ES. 1



AUG. 12, 1898.



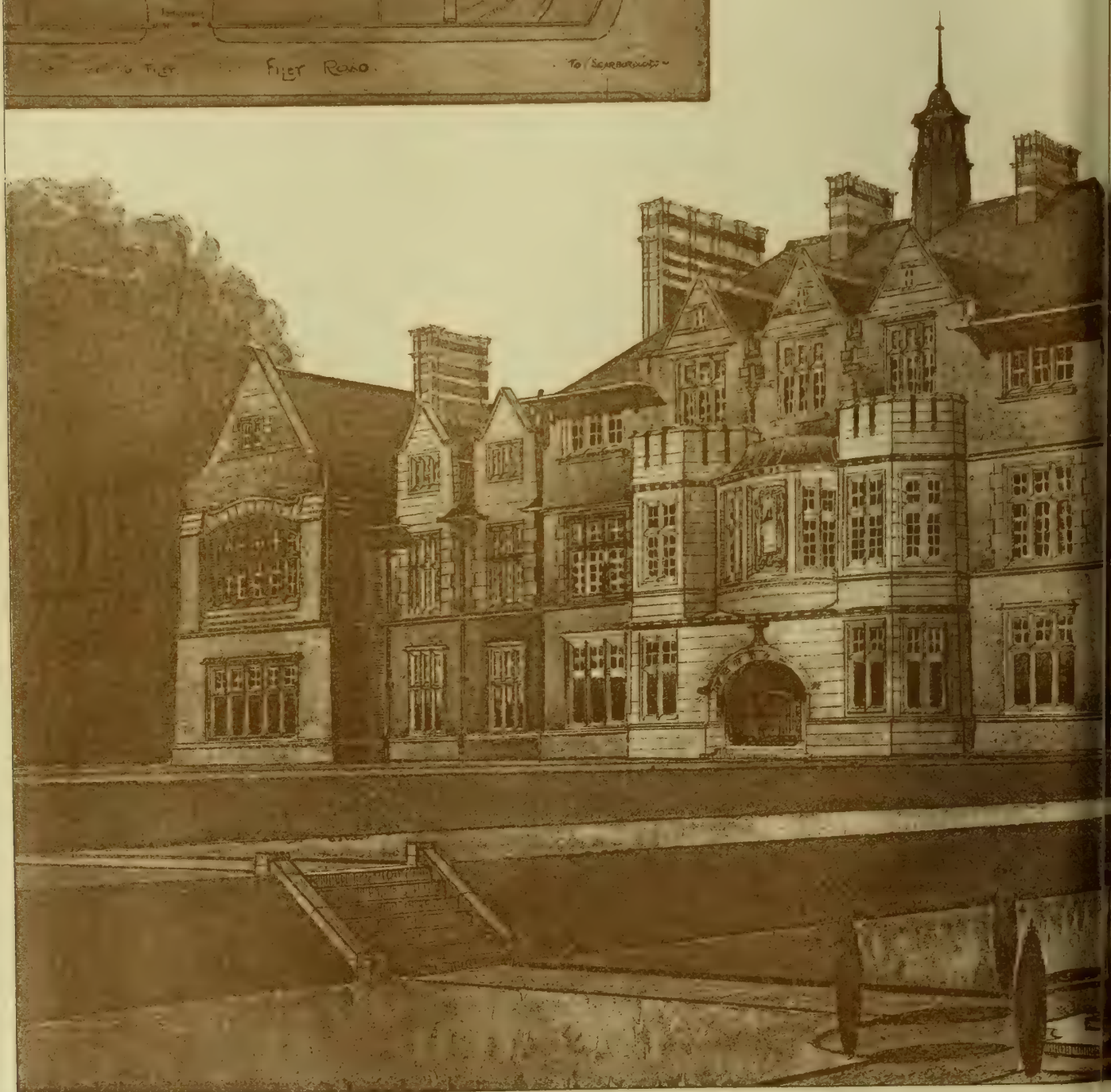
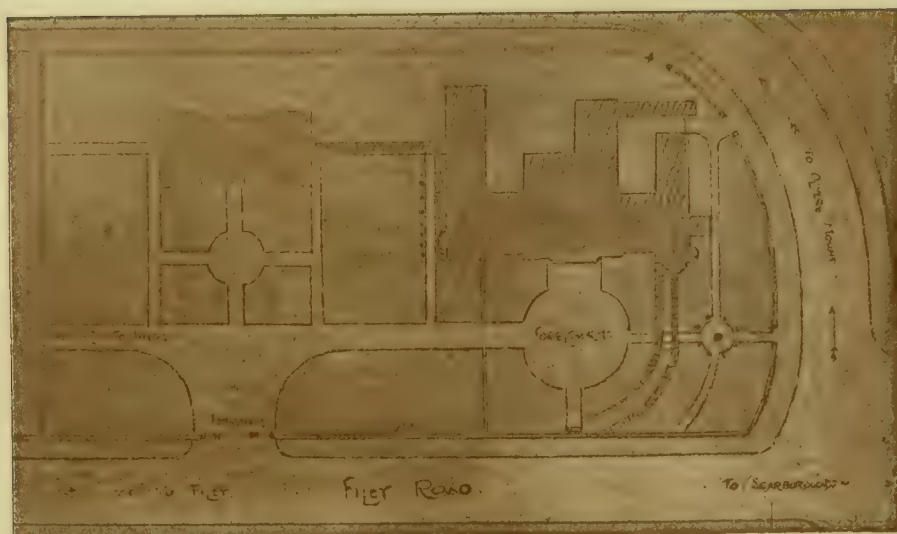














AUG. 12. 1898.

NEW.  
COLLEGE  
SARBOROUGH  
YORKS.

HALL COOPER AND DAY  
ARCHITECTS

SARBOROUGH  
AND  
WESTMINSTER



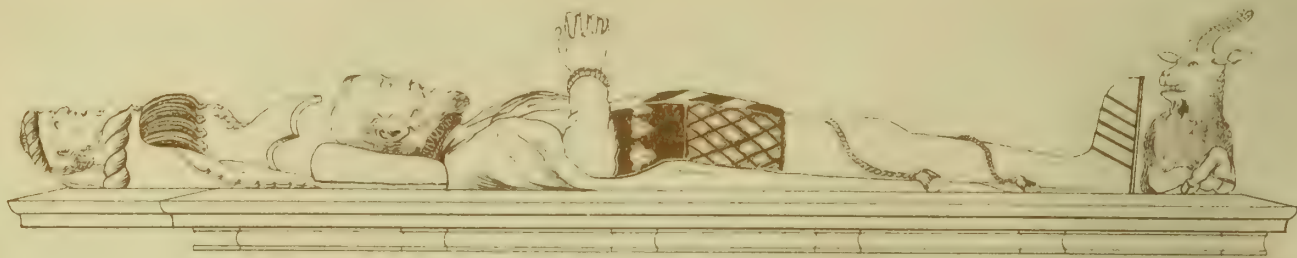








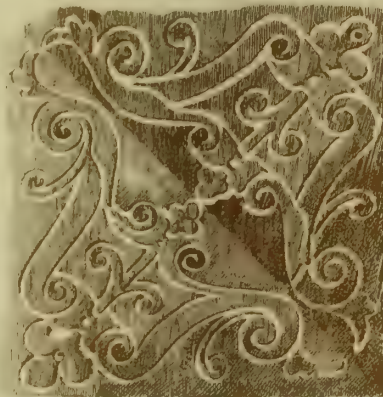




PLAN OF TOMB



INLINED ORNAMENT  
FROM D

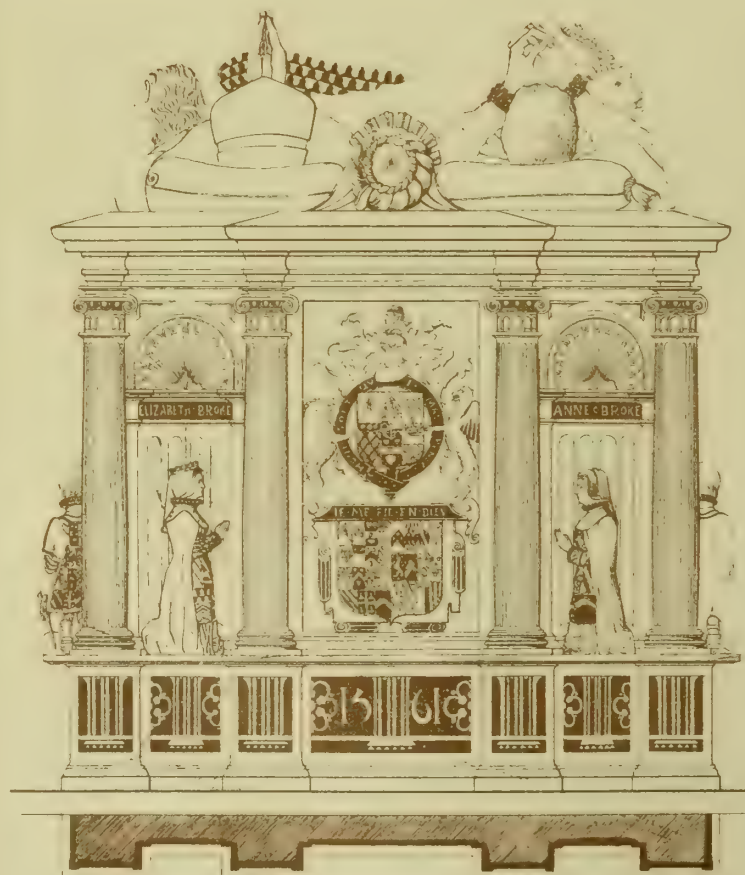


INLINED ORNAMENT

FROM A

### THE BROKE TOMB, COBHAM CHURCH, KENT.

NATIONAL SILVER MEDAL DRAWINGS BY THE LATE REGINALD J. BEAL

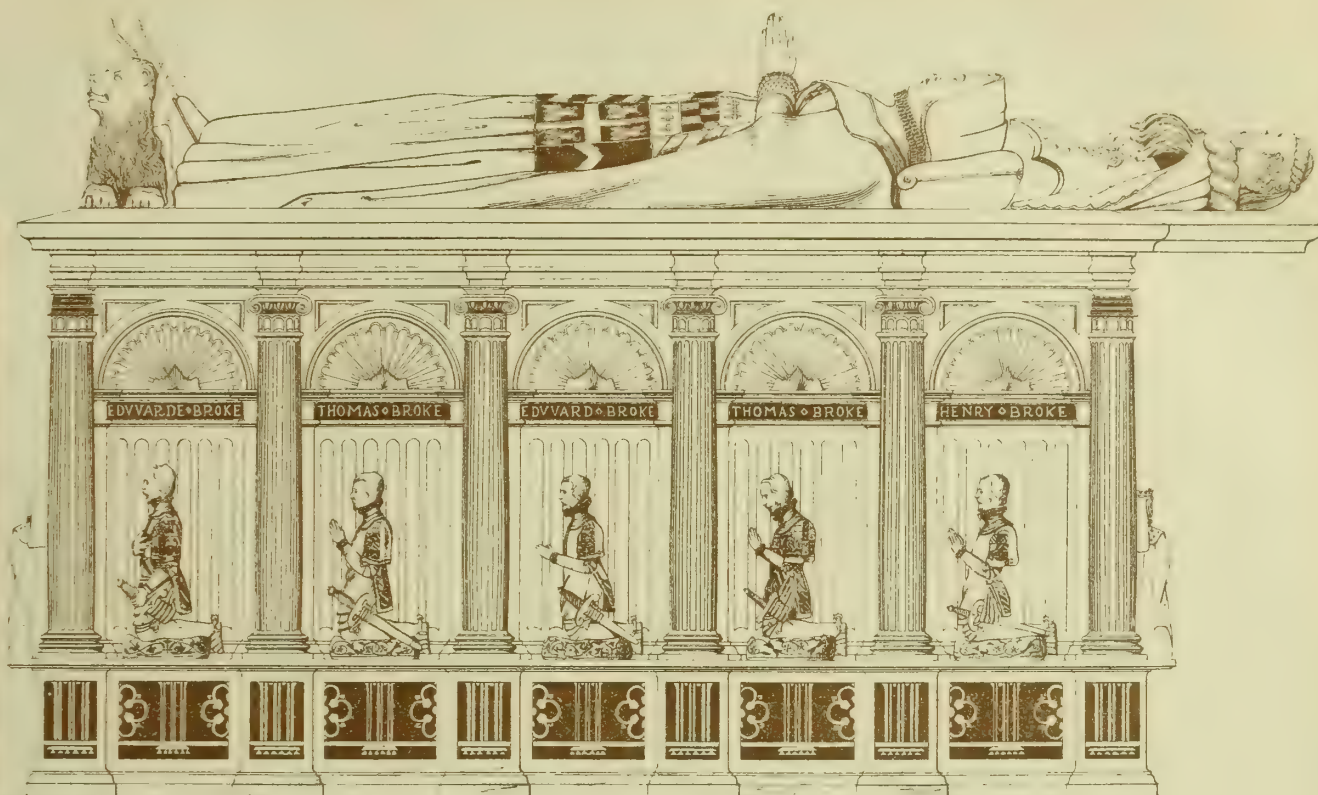


WEST ELEVATION.

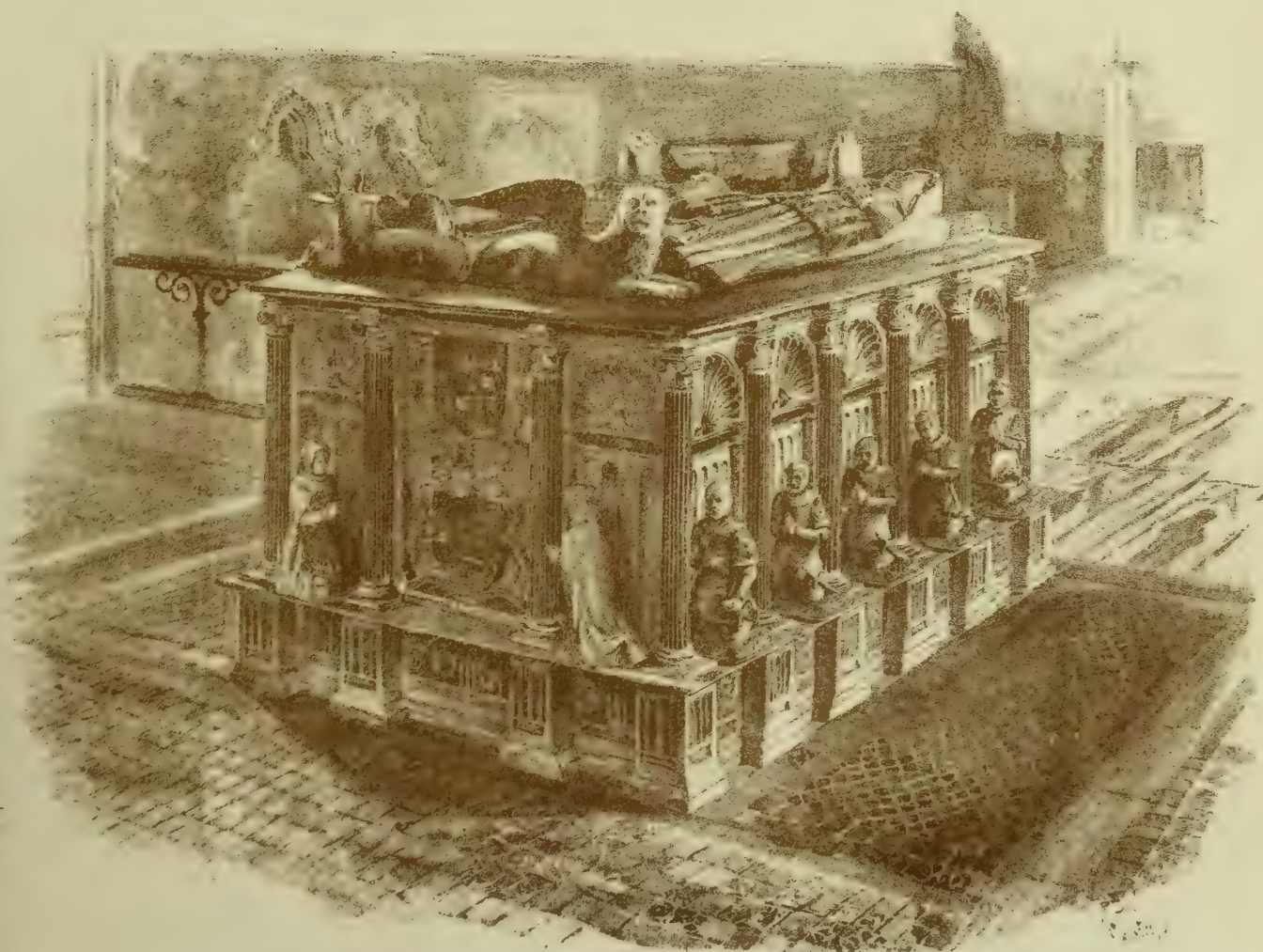


EAST ELEVATION.





BROKE TOMB COBHAM CHURCH KENT. CONSTRUCTED ENTIRELY OF MARBLE. THE COAT OF ARMS ON FIGURES SURROUNDING & ON TOMB BEING IN COLOURED WAX. DARK PARTS REPRESENT BLACK MARBLE ALSO FLUTING OF COLUMNS.









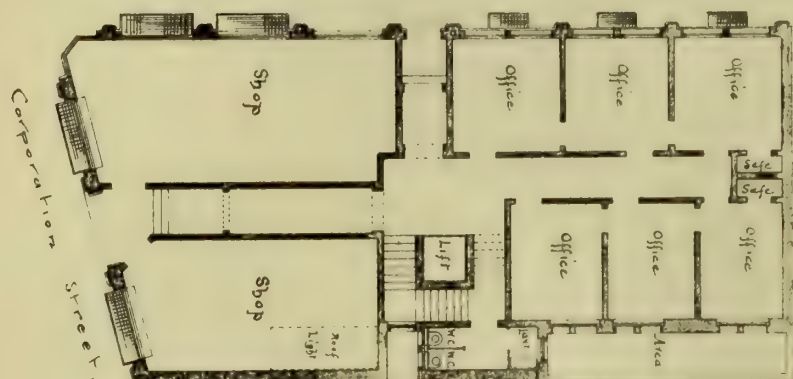




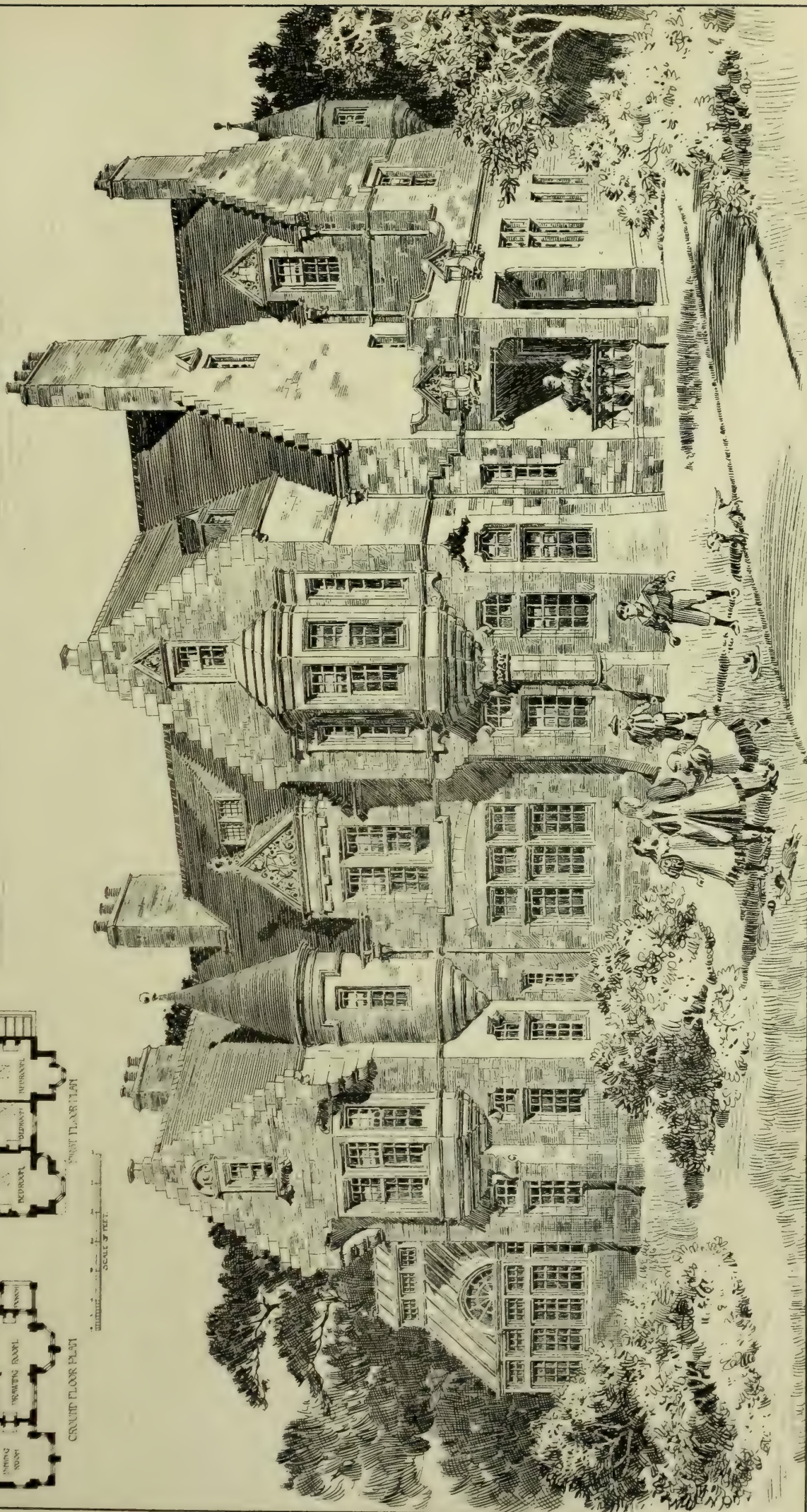
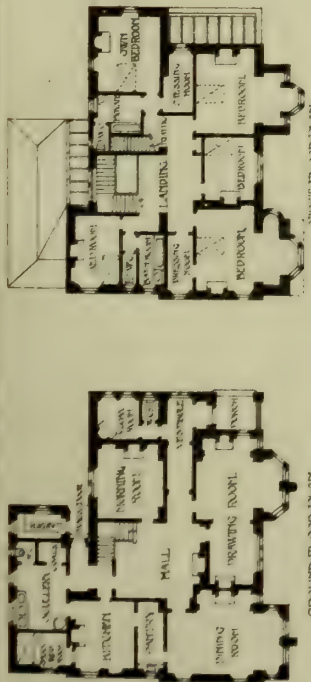
OFFICES FOR THE BIRMINGHAM SICK BENEFIT & OLD AGE SOCIETIES, CORPORATION STREET.

J. W. ALLEN, ARCHITECT

Coleridge Passage







HOUSE AT WASHINGTON, U.S.A.

J. GRAHAM FAIRLEY, F.R.I.B.A. ARCHT.







# Correspondence.

"A.S.I."

To the Editor of the BUILDING NEWS.

SIR,—I should like to point out to men who are Associates of the Sanitary Institute, that it is not correct to style themselves A.S.I., as this appendage to one's name generally means that they are Associates of the Surveyors' Institution, which is rather different to the Sanitary Institute of Margaret-street, W. Several times lately I have come across the letters A.S.I. after men's names who I know are not members of the Surveyors' Institution, and therefore the letters are misleading. It may have been an unintentional oversight on the part of those who have so styled themselves; but I would like to remind them that the by-laws of the Sanitary Institute says that an Associate may style himself Ass.San.Inst., and this can in no ways be confusing to the uninitiated, and plainly says that one deals with sanitary matters, though, of course, he may be a surveyor as well; but this does not by any means follow. I know we can put any letters we like after our name, such as C.E. for Civil Engineer, &c.; but it is morally wrong to use letters that may mislead clients as to one's ability or profession. I may add, in conclusion, that I am not a member of the Surveyors' Institution, and so do not write from jealousy, but rather to point out something that may have been overlooked.—I am, &c.

LOUIS ERWOLD.

## THE BRISTOL SOCIETY OF ARCHITECTS AND THE WORKMEN'S COMPENSATION ACT.

SIR,—A paragraph on page 197 of your last issue contains an erroneous statement with reference to the Bristol Society of Architects and the Workmen's Compensation Act. This society has never assented to an amount being included in specifications and quantities to meet the contractors' liability under this recent Act in a similar manner to fire insurance—the cases are by no means parallel ones; the building owner is vitally interested in seeing that, in the event of fire, proper provision is made for replacing a building for which he has paid; but, to include a special amount for insurance against this Act would tend to confuse the issue as to who is the actual employer of an injured workman. The Bristol Society of Architects contend that this responsibility is the builder's, and should remain so.

Doubtless the cost of insurance will indirectly be paid by building owners; but the method proposed by the Builders' Federation would be objectionable in practice, and very difficult to satisfactorily apply, as may be gathered from my letter sent the secretary of the Federation, a copy of which is inclosed herewith for publication in your journal. In the face of this letter I am quite at a loss to understand how a statement so incorrect could have been published.

The matter is one that as time goes on will be found to be of great importance, and perhaps now that correspondence on the subject is opened some valuable opinions may be elicited.—I am, &c.

H. DARE BRYAN.

Bristol Society of Architects,  
Fine Art Academy, Clifton.

[COPY.]

38, College Green, Bristol, May 11.

DEAR SIR,—In further reply to the letter of your Federation's Employers' Liability Clause, I have to inform you that the question was again brought up and considered at a Council Meeting held on Monday last, and as a result of the debate I was instructed to convey to you that:—

"This Society was of opinion that until it had been decided as a point of law that the building owner was liable for compensation to the injured workman, it was undesirable that any clause should be inserted tending to throw such responsibility upon the building owner; at the same time the Council saw no objection to a clause being inserted as a reminder of the risk to be provided for by the contractor, and which he could price out or not at his own discretion.

"The question was also raised as to whether the contractors would insure against their liability under each separate contract, or how they propose to apportion the amount of insurance for the several contracts."—I am, Dear Sir, yours very faithfully,

H. DARE BRYAN, Hon. Sec.

H. J. Spear, Esq., Secretary W. of E. & S. W. Federation of Building Trade Employers.

## WOODCARVING MACHINES.

SIR,—In one part of the world and another I have seen, at least, three different varieties of so-called woodcarving machines. At Pulman's

Palace Car Works at Pulman, near Chicago, Ill., U.S.A., during the year of the World's Fair, we saw some dozens of them at work at once, and they appeared to reproduce the flat panel-carvings required for carriage-work in a fairly excellent manner. Perhaps the at once best, and best known, instrument of the sort is "Moore's Universal Carving Machine." Mr. Moore is, or was, a native of Minneapolis, in the United States. The machine is admirably adapted for the purely mechanical process of sinking ground-work in hard wood; although, if the cutters were larger, and the metal made to resist the great heat caused by the friction of so many thousand revolutions a minute, its work would be carried out much more expeditiously.

One is led to make these remarks as a suggestion that nothing new exists under the sun. Perusing, just now, an admirably-preserved copy of the first issue of *The Daily News* (London), dated Wednesday, January 21, 1846, amongst the advertisements occurs the following:—

### CARVING IN WOOD.

THE important reduction in the price of solid carving in wood, executed by the patent process, enables the proprietors to encourage the prevailing taste by supplying the most exquisite specimens of genius in the Gothic, Elizabethan, French, and Italian styles, adapted to all architectural purposes, and every possible variety of elaborate and ornamental decoration. The proprietors solicit an inspection of the specimens executed by this simple and beautiful process at their offices, No. 5, Henrietta-street, Covent Garden, or at their works, Ranelagh-road, Thames Bank. Just published by J. Webb, 59, Holborn, Parts I., II., III., and IV., price 5s., each containing specimen drawings of elaborate carvings in wood produced by the "Patent Wood-Carving Co., 5, Henrietta-street, Covent Garden."

This advertisement, dated 52 years ago, suggests that the so-called American invention, or something much like it, may possibly have been utilised in England before the Minneapolis "inventor" was born!—I am, &c.,

HARRY HEMS.

Fair Park, Exeter, Aug. 10.

## THE EXETER, TEIGN VALLEY, AND CHAGFORD RAILWAY.

SIR,—One of your constant readers has drawn my attention to the short notice you are good enough to give of the 29th with reference to this railway, as to which it occurs to me to call your attention to the fact that the railway is from Exeter to Christow, near Teign House, Devon.

Will you allow me to add that the prospects of the early completion of the line are most satisfactory, for the balance of capital has now been raised, with the exception of a small sum, which we hope to place in the course of the next few days. When this is done the contractors assure us that the line can be finished within twelve months.—I am, &c.,

THOS. S. MORTIMER, Hon. Sec. Local Com.  
August 10.

The Halifax Town Council are about to extend the electric tram system by constructing new lines at an estimated cost of £31,000, and also to purchase four new tramcars at a cost of about £500 each.

To retard the disintegrating of stone monuments—such as tombstones, &c.—without painting them and covering up the natural colour of the stone, it is recommended to dissolve one part blond shellac (as pale as possible) in eight to ten parts wood alcohol, applying it with a rose sprinkler.

Mr. Angus Maclean, master builder, Inverness, has died in the infirmary of that city as the result of an accident some days ago. He and his workmen were excavating a bank when a mass of earth fell and covered him so completely that he had to be dug out. A leg and three ribs were fractured. Mr. Maclean was forty years of age, and leaves a widow and six children.

The Bournemouth Town Council recently appointed a committee to take the preliminary steps towards converting the borough into a county borough, the population having risen to over 50,000. At the same meeting tenders were accepted for carrying out a scheme for lighting the lower pleasure gardens, pier, and winter gardens by electricity, and it was decided to hold a special meeting to consider the desirability of applying for a provisional order empowering the corporation to adopt a scheme for lighting the town generally by electricity.

A luncheon was given at the Royal Pavilion Hotel, near the pier and harbour at Folkestone, on Saturday, to celebrate the completion of the reconstruction and extension of the hotel from plans by Col. R. W. Edis, F.S.A.

# Intercommunication.

## QUESTIONS.

[12001.]—**Framing of Fleche.**—Can any of your readers inform me if there are any details of fleche construction published showing the framing?—L.

[12002.]—**Window Fastenings.**—I should like an experienced reader's opinion as to the best fastenings for sash windows, and where they can be obtained!—A. BUILDER.

[12003.]—**Hard-Woods.**—Are there any moderately-priced hard-woods suitable for floors and panelling? Red birch is recommended by a friend. Can it be obtained of suitable grain or quality? Is not maple a more durable wood for floors? Any other suitable hard-wood that can be polished and made ornamental I should be glad to hear of.—A. T.

## REPLIES.

[11987.]—**Elizabethan Lantern Slides.**—Richard Keene, of Derby, has photographed a number of Elizabethan buildings. Ask him to send you photographs on approval, and he would make slides from same at usual prices. Poulton and Son would do the same. Slides from book illustrations are often unsatisfactory. I have had slides made from measured drawings appearing in *BUILDING NEWS* which were good.—W. E. V. C.

[11995.]—**Ownership of Plans.**—The plans of a building rightly belong to the architect; but according to law, and the decision of the Courts, unless there is a special agreement to the contrary, the client has a right to demand them. The principal case is that of "Ebdy v. McGowan," 1870. The best plan is to stipulate in contract that they are not to become the property of the employer.—G. H. G.

[11995.]—**Ownership of Plans.**—This has been fought for in the law courts, but I cannot remember when or where the report can be found.—L. E.

[11996.]—**Estate Clerks of Works.**—Apply to secretary of the Society. No doubt a member of the Society stands a better chance of appointment in an estate office than one unattached.—H.

[11997.]—**Decaying Stone.**—You will have trouble from those stones which are not laid in the building properly.—L. E.

[11998.]—**Foundations for High Buildings.**—Inverted arches have been used, but the main system is the use of masonry piers carrying girders, or a system of rafts or grids made of steel beams to distribute the pressure. A bed of concrete is first laid, and the iron beams are filled in with concrete. See notices in *BUILDING NEWS*.—G. H. G.

[12000.]—**Curved Timbers.**—As remarked by the writer of "Model Specifications" in the last issue of the "B. N.," books on roof-construction seldom go much beyond king- and queen-post trusses; very few of the ornamental roofs are described.—LOUIS ERWOLD.

## CHIPS.

The foundations for a three-story hotel, which is being built in Fore-street, Winkleigh, Devon, are being laid this week. Messrs. Fisher Bros., of Northtawton, are the contractors.

Arrangements have just been made for the erection of a new station on the Dundee and Arbroath Joint Railway line at a point at the east end of Dundee. Five acres of ground have been acquired, and the station will be for both goods and passengers.

The Leicester Corporation have determined to promote a Bill in Parliament next Session for a water scheme which will involve an outlay of £3,000,000. It is proposed to combine with the authorities of Derby, Belper, Nottingham, and probably Sheffield, to secure the whole of the waters of the Upper Derwent, with the vast area of collecting grounds, and convey the water to Leicester, a distance of sixty-six miles.

The second annual meeting of the Bradford Building Trades and Stone Exchange took place at the Exchange, Bradford, on the 4th inst., Mr. Ellis Robinson in the chair. It was reported that the first year had been a uniformly successful one, the membership now numbering over 600. The report and balance-sheet were passed, and the following gentlemen were elected members of the committee:—Messrs. Julius Whitehead, Robert Roper, W. H. Vickers, Phineas Drake, and Joseph Baxter.

The Bishop of Salisbury consecrated, on Saturday, a new church at Braynstone, which Viscount Portman has, at his sole cost, provided for the parish. His lordship also bore the expense of furnishing and fitting up the church, as well as an electric organ and a peal of six bells. The church, dedicated to St. Martin, is erected in memory of the first Baron Portman and his wife, the present Viscount's parents.

A memorial has been placed in Christchurch, Folkestone, to the memory of the late Rev. Claude Bosanquet, M.A., who for 24 years was vicar in the parish. It consists of a portrait medallion in statuary marble set in an elaborately carved architectural framework in alabaster. The work was executed by Mr. J. Nesfield Forsyth, of Finchley-road, the architecture having been designed by Mr. W. A. Forsyth, A.R.I.B.A.



## LEGAL INTELLIGENCE.

**ACTION FOR SLANDER BY A SURVEYOR.**—**CLARE V. WILLSON.**—In our report a fortnight since (p. 160) of this case, heard before Mr. Justice Lawrence at the recent Lincolnshire Assizes, and in which Mr. Jesse Clare, architect and surveyor, of Sleaford, sued Mr. R. W. Willson, of Raauceby, for a slander alleged to affect him in his professional business, we should have said that on the morning after the trial his Lordship announced that he should allow plaintiff his costs, including those of a special jury.

**COLLAPSE OF PROPERTY AT MARYHILL.**—The hearing of a case regarding the fall of a property in New City-road, Maryhill, occupied three days in the Glasgow Appeal Court before Sheriff Berry, and his judgment has now been issued. The Sheriff Substitute (Strachan) found that the collapse of the building was caused by the negligence and want of skill on the part of the pursuers, after the contract had been given up by the defender, in placing three columns supporting the longitudinal beams on which the upper stories principally rested on a retaining wall of common rubble masonry, which was entirely insufficient for the purpose, and by failing to put in certain supports. The Sheriff Substitute therefore absolved the defender with costs. On appeal, the Sheriff adhered to the interlocutor of the Sheriff Substitute, and gave additional expenses. The following is the note:—A consideration of the full argument in this case, and of the proofs and productions, leaves no doubt on my mind that the conclusion of the Sheriff Substitute is the right one. It seems to me impossible to hold that liability for the fall of the pursuer's building has been brought home to the defender. The connection the defender had with the building was very short. After the ground had been excavated he proceeded under a contract with pursuer to lay a concrete foundation for the contemplated building and to build the lower walls. When, however, it had been proceeded with but a short way a difference in regard to payment arose between the parties; the defender gave up the contract and the pursuer himself took up the work, and went on with the building. At the time (May, 1896) when the pursuer took the building into his own hands, the area wall had been built as well as part of the back wall. On 30th November, when the building was nearly completed, a large portion fell, and for that fall and its consequences the pursuer seeks to hold the defender liable. The ground of liability on which the pursuer relies is the alleged responsibility of the defender for the foundation of the east cube butt, which certainly had an important relation to the stability of the eastern portion of the building, which ultimately fell. The defender had left the building before the construction of the butt was commenced, but he had had the laying of the concrete for its foundation, and it is said that the composition of the concrete used by him was not in accordance with contract, and was defective and weak; and that it was not evenly and properly laid, the result of these defects being, it is contended, that the foundation cracked, the butt tilted to the side, dragging with it certain iron columns with which it was connected, and causing the structure to collapse. On the question as to the composition or quality of the concrete there was not much argument addressed to me. I concur in the Sheriff Substitute's conclusion "that the pursuer's allegations as to the defective quality of the concrete are entirely disproved." I hold that the fall cannot in any way be accounted for by insufficiency of the concrete. A more serious argument was rested on the mode in which it was said that the concrete had been laid by the defender. It was laid in two courses, and according to a sketch produced by Mr. Forman, who appeared as a skilled witness for the pursuer, the upper layer was not placed evenly above the lower, and the centres of the two did not correspond, and the butt was built so as to rest for the most part on the upper layer alone, a small portion only resting on both layers. In considering how far the appearance presented in this sketch is to be relied on, one has to contrast it with another, also prepared by Mr. Forman, and produced at a previous stage of the case. This previous sketch corresponds much more closely with a pencil sketch subsequently made on the spot by Mr. Bryden, an architect adduced for the defender, than it does with that first named. According to Mr. Bryden's sketch, as much as seven-eighths of the base of the butt rested on the place where there were two layers of concrete, and only an eighth on the part where there was a single thin layer. The accuracy of this sketch of Mr. Bryden has been accepted by the Sheriff Substitute, and with reason. His reference to the witness Gascoigne as giving independent support to it has been adversely commented on, on the ground that Gascoigne left the job when the defender left it, and that he cannot, therefore, have been present when the building of the butt was commenced, as he says, at a place 3ft. out of the position originally intended for it. I am not sure that this criticism on his evidence is effectual. I regard it as clear from the proof that the foundation of the butt

had not sunk or been disturbed, but remained level up to the time of the fall, and, indeed, afterwards. Mr. Bryden made a careful examination of the place on Jan. 4, and he tells us that, while the butt itself was off the plumb, "the foundation of the butt showed no signs whatever of any subsidence." Mr. Whyte, the master of works for the city, who examined the building officially when the fall was reported to him, said, in answer to the Court:—"Supposing it was leaning off the perpendicular in consequence of the weakness of the foundation, I do not think that would have been sufficient to account for the collapse of the building." There is other evidence of a similar nature which places it beyond doubt that it was in no degree to the butt being off the plumb that the fall of the building can be attributed. That is enough to relieve the defender from liability. What it was that caused the fall it does not lie on the defender to show. But if a conjecture is to be hazarded, I think the two causes assigned by the Sheriff Substitute may be regarded as having materially contributed to it. The three columns specially referred to in the course of the case were made to rest on a rubble retaining wall, and notwithstanding the opinion regarding the sufficiency of that support, strongly insisted on by Mr. Forman, the weight of authority is, in my view, contrary to his opinion. Then the omission of supports shown on the plans submitted to the Dean of Guild Court until a very late stage in the building may well be held as having been a grave cause of weakness. The Sheriff Substitute has commented, and, I think, with justice, on the want of trained skill on the part of the pursuer, who took in hand the construction of this building, with the aid of persons who had little, if any, better qualification for the work than himself. Of skilled knowledge there was a conspicuous absence, and one is not surprised at the result. The attempt to saddle the defender with responsibility for the fall has, in my opinion, entirely failed.

**THE RIGHTS OF WATER COMPANIES.**—**SOUTHWARK AND VAUXHALL WATER COMPANY V. THE WANDSWORTH DISTRICT BOARD OF WORKS.**—In the Court of Appeal, on Monday, the Master of the Rolls and Lords Justices Chitty and Collins gave judgment in an appeal by the defendants from an order made by Mr. Justice Kekewich on an interlocutory motion restraining them till the trial or further order from lowering the surface of the footway of a street in their district under which were pipes or mains of the plaintiffs, without first sinking the pipes or mains to a depth which would protect them. The Wandsworth District Board of Works, being the statutory authority for dealing with the roads in the locality, proposed to lower a footway on one side of West Hill-road, Wimbledon, for the purpose of levelling it for the public convenience, and that work was carried out on June 16. Under the pathway were 3in. water-pipes running out of a 6in. main, and this action was brought on the 20th of June to compel the defendants in effect to let the plaintiffs' water-pipes down to the same depth from the surface that they were before. On the hearing of the appeal, it was agreed to treat the motion as the trial of the action. Mr. Renshaw, Q.C., and Mr. Chubb, for the appellants, argued that the district board, being empowered to raise or lower the level of the roads in their district, if any injury was caused to the waterworks company their remedy would be by an action for damages, and that there was no ground for a mandatory injunction to compel the board to put the company's pipes at a particular depth. Mr. Warrington, Q.C., and Mr. F. Gore Browne appeared for the plaintiffs, and contended that the district board, having a statutory right, were under a common-law obligation so to exercise it as not to injure their neighbours. The Master of the Rolls said the Metropolitan Management Act conferred a power, but imposed no duty upon the local authority to alter the position of the plaintiffs' pipes. There was no warrant for the assumption that the water company were entitled to have a certain depth of soil over their pipes. They paid nothing for laying their pipes under a public road, and they ran the risk of the road being raised or lowered in the exercise of the powers of the district board. The appeal motion having been treated as an appeal from a final judgment, the order appealed from must be discharged, and judgment entered for the defendants with costs in this Court and in the Court below, the costs to be taxed as between solicitor and client. The Lords Justices concurred.

**DEFECTIVE DRAINS.**—**WHO IS RESPONSIBLE, TENANT OR LANDLORD?**—At the City of London Court, before Mr. Commissioner Kerr, on the 3rd inst., the case of Ockerby v. Legg was heard. Mr. Horace Ockerby, 114, Queen Victoria-street, sought to recover the sum of £15 18s. 8d. rent due from the defendant, Mr. I. J. Legg, 63, Station-road, Camberwell. The defendant did not dispute that the rent was owing, but raised a counterclaim for money which he had had to expend in doing repairs to the drains of the house. The drains, he said, at the adjoining premises were defective. The plaintiff was the landlord of both houses. The drains next door were a long time being repaired, and when

they were finished it was found that one of the pipes running under a wall dividing the premises was defective. The sanitary inspector called, and inquired who was the owner, and he told him. Then the sanitary inspector served notice on the landlord requiring him to do the repairs. The plaintiff sent him a note saying that he was responsible for the work, but he did not accept that position. One foolish thing he did was to tell his own builder to put one of the pipes right, considering the time the neighbours were inconvenienced. When the drains were opened up it was discovered that they were laid beneath the wall of the house, and that was condemned by the sanitary inspector. The relaying of the drains came to £15 18s. 8d., and that sum he now asked the landlord to pay. The learned Commissioner said the question was, Was the landlord bound to make good the cost? The plaintiff's solicitor said the lease would put the defendant out of court. The repairs were done to the defendant's own drains and by his own builder. There was also a covenant to repair the drains on the part of the tenant. The defendant said his view was that the work did not consist of repairs. His Honour said he was afraid that would not do. The defendant: The work was necessitated by the builders whom the plaintiff employed. His Honour said that there must be judgment for the plaintiff on the claim, but the counterclaim would be excluded. The defendant could then consult a solicitor, and if he thought it was desirable to bring an action for damages on the ground raised, he might do so. There might be something in it. The defendant would not be affected by the judgment.

**THE PARLIAMENT-STREET IMPROVEMENT.**—At the Town Hall, Westminster, on Friday, Mr. Troutbeck and a special jury heard the case of "The Actuated Bread Company (Limited) v. Her Majesty's Office of Works," a claim for about £20,000 compensation in respect of their leasehold and trade interest in Nos. 31 and 32, Parliament-street, and No. 17B, St. George-street, Westminster, used as a refreshment depot on the ground floor and basement. The jury viewed the premises. The first witness, Mr. Edward Tewson (Messrs. Debenham, Tewson, Farmer, and Bridgewater), stated that the premises in question were let on lease for a term of which ten years were still unexpired at a rental of £950, and that they were now worth £1,600 a year, showing a profit rental of £650 a year. He capitalised that on the 5 per cent. table (7·7 years' purchase) £5,005, and added the customary 10 per cent. for compulsory sale, £500, making together £5,505. The net profits of the depot were £3,260 per annum, and, after deducting the profit rent, £650, and adding £300 for underlettings of the upper part of the premises, he arrived at a profit of £2,910, which should be capitalised at five years' purchase, £14,550, to compensate the company for loss of the business. His total was thus £20,055, to which he added an agreed sum of £410 in respect of the fixtures, making altogether £20,465. Mr. Henry Charles Trollope (Messrs. Trollope and Sons) confirmed Mr. Tewson's evidence. Mr. James Harris, chartered accountant (Mr. James Harris, Sons, and Co.), proved that the net profit of the depot in question was £3,260 last year, and he was of opinion that five years' purchase should be given. The case was adjourned. Mr. Troutbeck resumed the hearing of the case on Tuesday, when Sir John W. Ellis, on behalf of the claimants, stated that the premises, which were held on lease for a term having about ten years to run at a rental of £950 per annum, were now worth £1,600 a year, showing a profit rental of £650. This, capitalised on the 5 per cent. table, with 10 per cent. added for compulsory sale, equalled £5,505. The net profits of the depot were £2,910 per annum, which should be capitalised at five years' purchase, making altogether £20,055 as the compensation which should be paid to the company, in addition to £410, the sum agreed upon for fixtures. On behalf of the Crown several expert witnesses were called, including Mr. Robert Vigers (president of the Surveyors' Institution), Mr. Horne, Mr. James Green, and Mr. Ryde, whose valuations of the leasehold interest, including two years' purchase of the net trade profits of the depot, which were put at £1,255 per annum, varied from £4,420 to £4,037. The jury awarded £9,490 compensation.

**DAMAGES UNSUCCESSFULLY CLAIMED FOR BLOCKED STREETS.**—**MARTIN V. LONDON COUNTY COUNCIL.**—This case, the trial of which, before Mr. Justice Kennedy and a special jury, was reported in the BUILDING NEWS of the 15th ult. (p. 65), came on upon a motion by the defendants for judgment. The motion was heard on July 30 and the 5th inst., and his Lordship gave judgment on Saturday last. The action was brought against the County Council for unnecessarily and negligently blocking and obstructing Wellington-street, Deptford, and other thoroughfares leading to that street, in which the plaintiff resided as a leaseholder. It was alleged that in 1897, whilst making a new road cutting Wellington-street diagonally under their statutory powers, the County Council were guilty of unreasonable delay and of obstructing the approaches



to the street at more points, in greater degree, and for a longer time than was needful—namely, over six months—with the result that the receipts of the plaintiff in his business fell off to such an extent that he had to give up the premises, and lost his interest therein and the goodwill of his business as a greengrocer, after incurring extra expense and labour in getting his goods to his shop and from his shop to his customers. It was asserted that for some months the High-street ends of Watergate-street and Wellington-street were blocked up entirely (save for a narrow gangway), and a board put up marked 'No thoroughfare'; that at the other end Wellington-street was blocked up as far as Armada-street, and a similar board placed there; that the gangway which had been left for foot passengers was almost impassable owing to piles of sand and rubbish which had been heaped up close to it; and that the whole roadway was needlessly blocked by road-making material. The blocking of the High-street end continued from July, 1897, to January, 1898. The plaintiff's shop did not overlook the blocked part of the roadway, being beyond Armada-street; but he complained that he had been damaged by the blocking of the access from High-street. The workmen on the job were only half the number plaintiff would have expected to see on such work. In March, 1898, he surrendered his lease, which was for 21 years from 1892, and for which he had paid more than £200 by way of premium. In the course of the evidence, it was admitted by the plaintiff that before the work was begun he had written complaining of the falling off in his receipts in consequence of the pulling down of houses in his neighbourhood by the County Council, and that his receipts in some weeks in October were higher than they were in July before the road-making was commenced. The learned judge left to the jury the questions whether there had been unnecessary delay and obstruction, and the amount of the damage to the plaintiff, if any. The jury, being unable to agree, were discharged. The defendants moved that judgment might be entered for them. Mr. Atherley-Jones, Q.C., who appeared for the plaintiff, submitted that the application would not lie. It was in the nature of an application for a nonsuit, which his lordship refused at the trial. Mr. Justice Kennedy overruled the objection. Mr. Dickens, Q.C., then proceeded to argue that the defendants were entitled to judgment. He submitted that (1) even assuming the defendants had been guilty of unreasonable delay or obstruction, and damage had resulted to the plaintiff, no action would lie; (2) the plaintiff had not shown any substantial damage attributable solely to these acts; (3) if there were any evidence of such special damage, it was not so particular to the plaintiff as to give him a cause of action. He referred to the London County Council (General Powers) Act, 1891, 54 and 55 Vic. cap. cxxvi., sections 4, 12, 22, 23; and the London County Council (Improvements) Act, 1884, 57 and 58 Vic. cap. clxxxv., section 43. Under those sections the defendants were entitled temporarily to stop up any carriage-way or footway which they should think necessary to be stopped up. It was not a question as to whether the defendants had acted reasonably or unreasonably. The question was whether they had acted *bona fide* for the purposes of the Acts, and there was no suggestion that they had acted to the contrary. The highest the case for the plaintiff could be put was that it was a claim for nonfeasance, and that would not lie—"Saunders v. Holborn District Board of Works" (1895, 1 Q.B., 64), "Winterbottom v. Lord Derby" (L.R., 2 Ex., 316). There was no evidence of damage suffered by the plaintiff different in kind from that of the rest of the public. "Wilkes v. Hungerford Market" (2 Bing., N.C., 281) had been overruled. "Rickett v. Metropolitan Railway Company" (5 B. and S., 156; L.R., 2 E and I. App., 175) [Mr. Justice Kennedy referred to "Beckett v. Midland Railway Company" (L.R., 3 C.P., 97), "Fritz v. Hobson" (14 Ch. D., 542), and "Benjamin v. Storr" (L.R., 9 C.P., 400) were distinguishable. Mr. Dally submitted, for defendants, that in order to support an action of this kind the damages must be substantial, and there was no such evidence here. Mr. Atherley-Jones, Q.C., for the plaintiff, submitted that the undertakers of any public works authorised by statute were responsible for injuries peculiar to the person or limited section of persons aggrieved, which injuries had been inflicted by an improper or unreasonable exercise of the powers conferred upon them. In the cases cited for the defendants there was no peculiar injury to the plaintiffs. The test of remoteness of damage in cases like the present was, Was the injury common to the public at large? If a public body exercising statutory powers did work in a careless and improper manner, it was liable to a person who had premises contiguous to the works and who was injured by the improper and careless execution of the works. "Rickett v. Metropolitan Railway Company" was only binding upon the particular facts of that case. "Lyon v. Fishmongers' Company" (1 A.C., 662) was not consistent with the former case. [Mr. Justice Kennedy said that the question was whether the fact that the street was rendered less comfort-

able to passengers, and that the plaintiff's business had thereby suffered, was sufficiently direct damage.] It was not necessary to allege or prove damage in the present case—"Rose v. Groves" (5 M. and G., 613); Mayne on Damages, 1894, 446; "Owners of No. 7 Steam Sand-Pump Dredger v. Owners of Steamship *Greta Holme*" (1897, A.C., 596). Mr. Justice Kennedy, in giving judgment, said that the question he had to decide was whether any case had been made out by the plaintiff. The defendants were a public authority authorised by Act of Parliament to carry out improvement works in the district. They were bound to enter on a portion of Wellington-street. By section 12 of the London County Council (General Powers) Act, 1891, a number of powers and duties were prescribed to the defendants, and it was clear that, under that section, very large powers were given to them. They were a public body who had to carry out important works for the public good, and great discretion was intrusted to them with regard to stopping up particular streets and regulating and stopping traffic. It was at least arguable that, assuming that they did nothing in bad faith and that what was done was for the purposes of improvements, no action would lie for mere delay or for the extent to which the street was blocked. But there must always be the reservation that if they did certain classes of damage to the person or property through negligence or want of reasonable care, they might in certain circumstances be held liable. For instance, if, in the present case, they had carelessly left heaps without lights, they would be answerable. But in the present case the complaint was that at Wellington-street, at the other end of the street to that in which the plaintiff's house was, they blocked up more of the road than they need have. It was also said they were two months longer over the work than they ought to have been. It was not contended that the obstruction continued after the making of, or for other purposes than, the improvements. It was not like the case of "Wilkes v. Hungerford Market," where the hoarding was afterwards kept up unnecessarily. The plaintiff became the leaseholder of the shop after the passing of the Act of 1891. The fair result of the cases was that if a private person were injured by works of this description, if they were in the manner or to the extent unauthorised or unreasonable, the injured person would have a claim if, and only if, he proved that, by reason of that which was not authorised by the statute, he had been injured specially, directly, and substantially. By specially was meant an injury not merely common to anyone living in that neighbourhood. That the injury must be direct was shown by the judgment of Mr. Justice Brett in the case of "Benjamin v. Storr." The plaintiff must show an injury special to himself as distinct from the public generally. Was the loss of some custom by the plaintiff a direct injury within the definition? In his opinion it was not. The house itself was in no way obstructed. There was always access to the shop, although by a roundabout way. The house in itself was not rendered less commodious for trading or less healthy for occupation. The case of "Wilkes v. Hungerford Market" could no longer be treated as an authority, having regard to the observations of Lord Chelmsford in "Rickett v. the Metropolitan Railway Company" and Mr. Justice Willes in "Beckett v. Midland Railway Company." The present case was not one under such circumstances as gave a right of action, and there must be judgment for the defendants with costs, except the costs of the special jury. Judgment accordingly. Execution stayed for three weeks, and if a notice of appeal given within that time, then a stay until the hearing of the appeal.

THE VALUE OF LAND NEAR FRITTON DECAY.—On Tuesday week the under-Sheriff of Suffolk (Mr. J. J. Sparke) presided at a court at the Shire Hall, Ipswich, a special jury having been summoned to assess the amount to be paid by the Lowestoft Gas and Water Company to Sir Savile Crossley for some 46 acres of land in the parishes of Lound, Belton, and Hopton, and close to Fritton decay, which they need to acquire for the purposes of their water undertaking. Mr. Cripps, Q.C., in his opening, said the piece of land was part of an estate of 5,000 or 6,000 acres, and to Sir Savile its worth was £100 an acre, to which the usual 10 per cent. should be added for compulsory sale. But further injury would be sustained by Sir Savile, inasmuch as the decay would be injured by the erection of a pumping station and the Decay and Lodge farms would be cut off from access to water, and the cost of providing a supply to the Decay farm would be £130, and to the Lodge farm £635. The sporting rights would also suffer. Mr. G. M. Taylor (Santo Crimp and Taylor, London) and Mr. Walter Hunter, M.I.C.E., were called as to the cost of providing a water supply to the two farms. The former's figures were those mentioned by Mr. Cripps and Mr. Hunter's were £310 for the Decay farm, and £565 for the Lodge farm. Sir Savile Crossley was examined on the general question, and then came the evidence of valuers. Mr. G. K. Rix, agent to the estate, spoke to the value of the property and the sporting rights; Mr. Robert

Vigers, President of the Institute of Surveyors, put the value of the land at £100 an acre *plus* 10 per cent., equal £5,060, the sporting rights would be damaged to the extent of £25 a year, the decay to the extent of £50 a year, and for these and small items he allowed £3,300, making a total of £8,360. Mr. Edward Tewson (Dabenhams, Tewson, and Co.) said if he were advising Sir Savile and he wanted to acquire such land he should say it was worth £200 an acre to him; the decay would be ruined. Mr. C. C. Rix Spelman (Mayor of Norwich) put the value of the land taken at £4,818, and injury to the adjoining land at £2,490, together £7,317. Mr. Balfour Brown, Q.C., for the company, contended that not a tithe of reliable evidence had been given for Sir S. Crossley as to the value of the land. An attempt had been made to induce the jury to believe that the decay would be spoilt; but he was prepared to prove that the company intended to do nothing whatever that would injure Sir Savile Crossley's decay. There were no new works erected by the company, and the existing pumping station, it was admitted, did not injure the shooting or interfere with the sport in the decay. The whole object of the company was not to induce excursionists to visit the place, but to keep them away, because they had purchased the water-shed in order that they should secure the purity of the water supply of Lowestoft. It was significant as regards the value of the land, that when recently the Oak farm, immediately adjacent, was sold by auction, Sir Savile Crossley was not a bidder, though the land, better than any now in question, had been sold for £30 an acre. What was the good of gentlemen from Old Jewry coming down and saying that this bogland on the outskirts of an estate was worth £100 an acre? Mr. T. W. Gaze, valuer, Diss, said he had made valuations in the parishes in question. The rental of this land was £39 4s., and he put the value at £1,176, and added various sums for alterations in fences, new water supply, timber, and sporting rights, which, with 10 per cent. for compulsory sale, brought the total up to £2,308. The Court then adjourned till the following day (Wednesday), when Mr. Robert Flick, auctioneer and valuer, Saxmundham, well acquainted with the locality, put the full value at £2,081 5s.; Mr. D. Watney, senior partner in Watney and Sons, Poulter, London, put it at £2,654; Mr. F. Horner, Norwich, estimated £2,070 to be the sum Sir Savile should receive. Other experts were Mr. W. H. Elwell, surveyor to the War Office, &c., Mr. A. G. Notley, Lowestoft, Mr. G. Durrant, Harleston, and Mr. J. C. Mills, Yarmouth, and their estimates were from £2,140 to £2,674. Mr. T. A. Rising, solicitor to the company, also gave evidence. After the Under-Sheriff had summed up, the jury found that the value of the land in question was £2,348, and the amount awarded as compensation for sporting and other rights infringed was £1,050, making a total award to Sir Savile Crossley of £3,398.

## CHIPS.

At the Roman Catholic church of St. Peter-in-Chains, Stroud-green, a stained-glass rose window over the Lady altar has been unveiled. The subject is the Crowning of Our Lady, and Messrs. Lavers, Barraud, and Westlake were the artists.

The North Sunderland Light Railway, which has been in course of construction during the last two years, has been opened for goods traffic. The line, which is just four miles in length, joins the North-Eastern main line about 100 yards north of Chatham Station. The necessary connections and accommodation at the latter junction are now in course of completion. There are two stations on the line—a small one at North Sunderland and a larger one at the Seahouses terminus.

The partnership hitherto subsisting between E. Gould and H. T. Brand, builders and contractors, High-street, Camden Town, N.W., under the style of Geraud and Brand, has been dissolved.

In the case of William Stanton, of Cranleigh, Surrey, builder, the order of discharge from bankruptcy has been suspended for two years and six months, ending December 9, 1900.

The new board schools, Frinton-on-Sea, are being warmed and ventilated by means of Shorland's patent Manchester stoves, patent exhaust roof ventilators, and special inlet tubes, the same being supplied by Messrs. E. H. Shorland and Brother, of Manchester.

At a meeting of the Archdeacon Scott Memorial Committee, presided over by the Bishop of Shrewsbury, it was resolved to ask the Dean and Chapter for permission to erect a memorial window in the south choir aisle of Lichfield Cathedral.

The Marquess of Granby formally opened, on Wednesday, the Jubilee Baths at Loughborough, presented by Mr. J. Griggs, the first mayor of the borough, to commemorate her Majesty's Diamond Jubilee. The baths are situated at the end of the Queen's Jubilee Park, and include a swimming bath 80ft. long by 30ft. wide, with elaborate accessories.



## Our Office Table.

WE are very glad the Lords of the Committee of Council on Education have followed our recommendation on p. 161, and appointed Mr. Walter Crane to the principalship of the Royal College of Art at South Kensington, vacant by the retirement of Mr. Sparkes. The appointment is a most judicious one, and our only regret is that it probably means a pecuniary sacrifice for Mr. Crane. The salary is only £1,200 a year, and the acceptance of such a position in the Civil Service practically closes the recipient's art career, for by the rules he is permitted to undertake no work other than that for the department without jeopardising his pension. It is even stated that Mr. Crane will have to give up an inspectorship he at present enjoys—a poor return for the acceptance by a distinguished man of a big position with a lean salary attached to it.

HIGHGATE ARCHWAY is now being reconstructed, and the work is estimated to cost £25,000. When completed, the new bridge will have a width of 40ft. between the parapets, 24ft. going to the roadway, and the other 16ft. divided between two footways. There is one respect in which the new fabric will be much less convenient than the old one was for a good many years. It was for one long period of its history a very common resort of suicides, who found nothing to prevent them pitching themselves over into the roadway, 60ft. beneath. Half the bridge was in one parish and half in the other, so that suicides might choose as to which should bury them in the event of their being unclaimed by friends. One parish put up a railing to save their rates, and so they all went over into the other, which was thus compelled to do the same, and there have been no suicides from Highgate Archway of late.

It is to be a steel and cast iron bridge, with concrete, brick, and Portland stone abutments, and so far as possible the old structure is being built into the new. The parapets are to be composed of cast iron standards, with ornamental iron grilles surmounted by revolving chevaux-de-frise, so that in future those who are tired of the world either in Hornsey or Islington will find it impracticable to get out of it by climbing over either parapet. The viaduct now giving way to a more modern and commodious piece of engineering was authorised by Act of Parliament in 1810. In order to carry out this and to run a tunnel through Highgate Hill a company was formed with about £100,000 capital. The tunnel, however, fell in, and the promoters of the scheme gave it up in despair and resolved to make an open cutting.

THE Vestry of Battersea are taking the initiative in a movement for placing district surveyors under the direct control and salaried employ of the London County Council. In consequence of recent accidents on buildings in course of alteration or eviction, the vestry have considered the object of the permanent appointment and tenure of office of district surveyors, and have passed a series of resolutions urging that these officials ought to devote the whole of their time to their duties, that they should be paid a fixed salary by the council, building fees, if continued, to be handed over to the treasurer at Spring Gardens, and further that an office should be provided for the district surveyor at the local vestry hall, so that he may be in touch with the local authority. A copy of these resolutions has been forwarded to the County Council, who will probably consider them at their first meeting after the recess, and in the mean time the Battersea vestry are in communication with other Metropolitan vestries and district boards with a view to strengthening their hands.

UNDER the auspices of the Gresham Committee and the Mercers' Company, Messrs. W. Cubitt and Co., are preparing niches on the walls of the ambulatory of the Royal Exchange for the reception of further mural decorations. The following scenes will form the subjects of the various designs:—William the Conqueror Granting a Charter to the Citizens of London (Mr. Seymour Lucas, R.A.), the gift of the Corporation; the opening of the Royal Exchange by Queen Elizabeth (Mr. Ernest Crofts, R.A.), the gift of the Mercers' Company; the Crown of England being offered to Richard III. at Baynard's Castle (Mr. E. Goetze), the gift of Mr. Carl Meyer; a scene from the Great Fire of London, 1666 (Mr. Stan-

hope Forbes, A.R.A.), the gift of the Sun Fire Insurance Company. These pictures are painted on a new medium termed spirit fresco. The colours ground in this medium are used in a somewhat similar manner to ordinary oil colours on a specially prepared, highly absorbent canvas, which, when the picture is finished, is laid solidly on the wall. It is expected that the Lord Mayor will unveil these panels in September, and it is stated that the cost of each is upwards of £500.

ONE of the most interesting houses in London is said to be on the point of conversion and reconstruction. It is the house in the middle of the west side of Leicester-square, where Sir Joshua Reynolds lived from 1760 to the day of his death. It had previously been occupied by Henry Morland, the father of the famous George Morland, and was bought by Sir Joshua for £1,650. He spent another £1,500 in additions and alterations, signalled his house-warming by a ball, and set up a magnificent chariot, richly carved and gilded, to suit his new grandeur. In the dining-room Sir Joshua constantly entertained all the best-known men of his time, including Dr. Johnson, Goldsmith, Garrick, Burke, Sterne, Hogarth, Wilkes, Allan Ramsay, and a score of others, who formed the brilliant Literary Club of which the great painter was the founder.

THE White Horse of Westbury is a landmark well known to those travelling to Weymouth. At the present time (says the *London Daily Mail*) its well-proportioned form on the face of Bratton Hill is undergoing grooming. The chalk exterior has been cleaned, the foundations strengthened, and the stone outlines replaced. It is a quarter of a century ago since the old horse had its last toilette. The colour had begun to run, while the purity of the coat was being marred by the elements. In addition to the edging of stone which preserves the outline, it is intended to have a layer of concrete, to insure a more lasting foundation. The work of handling the stones on such a steep gradient is a difficult one, and they have to be lowered from the summit by ropes. The stone drains which many years ago were introduced at the extremities of the four legs to carry off the water from the surface have long been choked up, and to this was largely due the disfigurement which had set in about the eye of the famous monster, making that essential portion of the anatomy a shapeless mass of rough lumps of almost bare turf. To insure greater protection than hitherto, it is proposed to erect a small wire fence around the outside to keep excursionists and animals, particularly sheep, from straying over the surface. According to the accepted legend the landmark was first carved to commemorate Alfred's victory at Ectandun over the Danes. Originally it measured 100ft. by 54ft., and in its early days it distinctly resembled, as Mr. Pickwick says of the white horse over the hotel at Ipswich, an insane cart horse. In 1878 the animal had become practically obscured, and its resuscitation was accomplished by an agent of the Earl of Abingdon, with the assistance of a local schoolmaster and his pupils. The change the figure underwent was nothing short of revolution. The figure was turned into the representation of an animal of almost Arabian slenderness in limb, and its size was increased to 175ft. by 107ft.

If the surface of a stone is washed clean, and after drying, is painted with one or more coats of boiled linseed oil, and finally with a weak solution of ammonia in warm water, the tints will be more uniform. This method has been tried on several houses in New York City, and the waterproof coating thus produced is found to last four or five years, when it must be renewed. The preparation used in coating the Egyptian obelisk in Central Park is said to have consisted of paraffin containing creosote dissolved in turpentine, the creosote being considered efficacious in preventing organic growth upon the stone. The melting point of the compound is about 140° Fahr. In applying, the surface to be coated is first heated by means of especially designed lamps and charcoal stoves, and the melted compound applied with a brush. On cooling it is absorbed to a depth depending upon the degree of penetration of the heat, in the case of the obelisk about  $\frac{3}{4}$  in.

THE Holding Power of Wood Screws was recently investigated as a thesis subject by Mr. Norris M. Works at Cornell University. His experiments were made with white pine only, and the most important results were the following:—The maximum holding strength of a screw inserted at right angles to the direction of the

grain is obtained when no hole is bored to receive it, or the hole is about eight-tenths of the diameter of the screw at the base of the thread. In the case of screws inserted parallel with the grain, the maximum holding strength is obtained when sunk in a hole about four-tenths their diameter.

THE United States Consul at Marseilles, in a recent report to his Government, calls attention to a law dealing with curio and antique-furniture dealers, which has lately been issued. This law may be of service to the many strangers who visit France with the expectation of buying articles of the above description possessing artistic or historic value. The vital feature of the law is the obligation now resting upon all brokers, dealers in old furniture, linen, clothes, jewels, books, dishes, arms, and other articles, to keep an official register, signed by the commissary of police or the mayor, containing, 'day by day, without blanks or erasures, the name, surname, character, and dwelling of those with whom the said broker has contracted; also the nature, quality, and price of all said merchandise, and said register must be forthcoming on demand.' Penalties are prescribed for violation of the foregoing provision, the object of which is to prevent fraud in the exchange of old and second-hand goods, especially such as are sought by collectors.

UNDER the heading of "Ventilation," a correspondence has appeared in the *Manchester City News* relative to the discomforts of electric-fan ventilation. The following extract is suggestive, and would seem to confirm the complaints which have reached us from time to time with respect to that method of ventilation:—"The mephitic atmosphere of public rooms, committee-rooms, club-houses, lecture halls, churches, and the like has long been a source of disease. The application of the electric fan has up to now done little more than substitute a thorough draught, the which of all discomforts an Englishman will least tolerate. In the circulars of ventilating engineers you find the statement that their particular fan will renew the air of a room so many times, say six times, per hour. This statement is not true. What is true is that sufficient air is extracted whose volume would fill the room six times per hour, and that, of course, an equal quantity of air is sucked into the room; but to infer that all the vitiated air, or half, or a third of it has been disturbed and drawn off is to come to a false conclusion. I could take you to a large smoke-room in town where a fan is at work on one side of the room where it is so draughty no one will sit. At the other side of the room it is suffocatingly hot, with no apparent movement of air. And this ineffective device cost £200 to put in. The main fault consists in localising the extraction. My conclusions, I may add, are based on the study of hundreds of cases."

At Tuesday's meeting of the Rhyl Urban District Council, a lengthy discussion took place with reference to the carrying out of the sea defence works at the east end of the district. It was reported that the Local Government Board had sanctioned a loan of £1,500 for the purpose of the improvements, which is the amount of the estimate prepared by the surveyor. Tenders had been advertised for, and the lowest was that of Mr. Law, Kidderminster, who tendered to do the work for £1,337. The road committee, however, recommended that the council should do the work themselves, and engage Mr. Robert Jones, who has now the charge of similar works that are being carried out at the west end, to superintend the works at the east end also. Ultimately the recommendation of the committee was carried.

A DESCRIPTION of the new main roads being constructed by a Russian company from Enzeli, on the Caspian Sea, through Resht to Cazeen, whence one branch is to run to Tehran and the other to Hamadan, is given by the British consul at Resht in his last report. The company began the road from Resht to Cazeen in 1895; later on the concession was extended, so that now it includes a road from Enzeli to Tehran, with a branch from Cazeen to Hamadan, as well as a narrow-gauge railway on the low lands lying between Enzeli and the foot of the hills, a distance of 40 to 50 miles. The work has of late made considerable progress, and it is estimated that 3,000 to 4,000 men are employed on it, many Greeks and Italians having been engaged for the work amongst the mountains, the natives not being sufficiently energetic or skilful for this part of the work. Between Rudbar and Menjil the road has to be cut through the solid rock, and



roburite, imported from England, is used for blasting purposes. The existing bridges are to be replaced by iron ones, and the Russian engineer in charge hopes to hand over a carriageable road to Cazveen before the end of the present year.

The importation of marble to the United States has, says the *Philadelphia Record*, almost ceased. It is only now and then that a cargo arrives at this port, while a few years ago a fleet of sailing vessels brought many cargoes annually from the famous Carrara quarries in Italy to Philadelphia. Marble buildings seem to be becoming things of the past, and the tombstone-makers find little demand for marble tombs, slabs, or monuments. Granite has taken the place of marble everywhere, even in the cemeteries where marble shafts and slabs were formerly the only proper things. Granite, unlike marble, does not require very frequent cleaning, and looks well without being touched up for years. It also admits of a high polish, and does not show the marks of rust by contact with metal as marble does.

## MEETINGS FOR THE ENSUING WEEK.

**MONDAY.**—Institute of Sanitary Engineers. Council meeting, at the Offices of the Institute, 63 and 64, Chancery-lane, 5 p.m.—Special General Meeting, in the Arbitration Room, 63 and 64, Chancery-lane. 7 p.m.

## THE ARCHITECTURAL ASSOCIATION.

AUGUST 20th. SUMMER VISIT to a fine Queen Anne and Georgian Mansion, at Arno's-croft, Palmer's Green. Mr. W. White, F.S.A., will conduct the party (limited to 30). Full particulars are contained in "Architectural Association Notes" for August. The Offices of the Association will be closed on Saturday, August 20th, and will be reopened on Monday, September 5th.

E. HOWLEY SIM } Hon. Secs.  
G. B. CARVILL }

## CHIPS.

Mr. W. M. Jameson, surveyor to the South Hornsey District Council, has been appointed surveyor to the Whitechapel District Board of Works.

A mural tablet to the memory of the late Marquis of Exeter has just been placed in the chancel of Barnack Church. It is of white statuary marble framed in grey marble, and is exactly similar to the memorial to his father, the third Marquis, in the same church.

A new organ in the parish church of St. Ewe, Cornwall, built by Messrs. Hele and Co., of Plymouth, was dedicated on Thursday in last week.

The St. Marylebone Vestry have agreed to contribute one-third of the balance necessary to complete the purchase of Golder's Hill, such contributions not to exceed £2,000, and to be made subject to certain stipulations.

Plans of proposed new county police buildings in Crief have been passed by the local Dean of Guild Court. The present police accommodation some years ago was found to be quite inadequate, and the police committee of Perth County Council decided to erect new buildings. They secured a site in King-street, where two tenements, one of which bears the date 1736, will be demolished to make room for the new structure. The buildings are to be in the Scotch Baronial style, and will be two stories in height, with attics.

On Sunday Divine service was performed for the last time in the church of St. Mary-the-Virgin, Charing Cross-road, upon the doors of which the authorities have posted notices ordering the "owner or occupier to pull down forthwith the remaining walls of the church." The old building, which forms the nave of the present church, was erected, in the reign of Charles II., by the Archbishop of Samos, for the use of the "Greek Nation." The next possessors of the chapel were the Huguenots, who sold the remainder of their lease to the Calvinistic Baptists, and the building was only saved from becoming a dancing saloon by its purchase and consecration as a chapel-of-ease to St. Martin's-in-the-Fields by Bishop Blomfield. The clergy house, adjoining Charming Cross-road, was built in 1862, and the chancel was built in 1872. The cost of the new nave is estimated at £3,000.

The Leighton House Committee are raising funds to acquire for the house the painter's "Clytemnestra" (executed 1874). The queen is watching for the beacon fire from the battlements, while the starlight is just fading from the sky. The walls are now filled with a collection of the artist's drawings, given by subscribers. These have attracted much interest during the past month, when the house has been open to visitors. It is hoped that funds may be forthcoming for endowment and to acquire the freehold, if possible.

## Trade News.

### WAGES MOVEMENTS.

**BOLTON.**—The strike of Bolton plasterers ended on Tuesday. The employes received 1d. per hour advance, and agree to accept one apprentice to every four men.

**BRISTOL.**—On Friday, a full meeting of the members of the Bristol Master Builders' Association was held at the Guildhall, Small-street, under the presidency of Mr. A. Krauss. The statement of his Honour Judge Austin, as mediator, was formally submitted, and the reply of the Bricklayers' Society, in which they declined to accept the terms of mediation, was also submitted. It was reported that a letter had been addressed to the general secretary of the Executive Council of the Bricklayers' Society in London, making certain inquiries as to the attitude of the local branch, and a telegram was read intimating that a member of the executive, Mr. Jeffery, would be in Bristol that day for the purpose of investigating the points of difference. That gentleman, in conjunction with the local secretary, had an interview with the officials of the master builders, the outcome of which was that Mr. Jeffery made a suggestion that he would, subject to the approval of the Master Builders' Association, submit a proposal to the Bricklayers' Society, to the effect that the members conform to the recommendations as laid down by Judge Austin. This proposal having been submitted to the general body of master builders, it was resolved as follows:—"That if the bricklayers will, on reconsideration, accept the recommendations of Judge Austin, the Master Builders' Association feel disposed to adopt his suggestion as to when the increased wages shall commence, provided the rules are signed forthwith." This resolution was then handed to the representatives of the Bricklayers' Society, and they promised that the same should be brought under the notice of their society at a meeting convened on Saturday evening. Accordingly, a meeting of the Bricklayers' Society was held, and by a substantial majority it was resolved that the bricklayers would resume work on Monday morning, the 8th inst., on condition that the increased wages come into force on Monday morning next.

**GLASGOW.**—The strike in the Scotch furniture trade, which has lasted for four months, is being continued. Some Glasgow firms have imported about 50 German cabinet-makers, and these were yesterday put into the places of men on strike. Shipbuilders complain that the internal fitting of ships is being seriously delayed in consequence of the dispute.

**NOTTINGHAM.**—The dispute in the building trade has at length been settled. For some weeks past building operations in the city have been almost entirely suspended, and the loss and inconvenience that have been incurred from this cause have been very serious. Work has, however, been resumed this week. There never was so much building going on in Nottingham at one time as there has been during the last two or three years, and there would have been more still if the strikes had not deterred people who were anxious to build from commencing operations. Even now there are the new workhouse and the new Central Railway Station—two undertakings of the first importance—and many others on a smaller scale; while there is other important work in contemplation, which will probably be commenced before so very long.

The late Signor Ludovico Raymond, a Piedmontese artist, who died recently at Turin, has left 1,500 lire yearly to the municipality for the purchase of objects to enrich the civic Museum of Modern Art. The funds may not accumulate for a longer period than two years.

Alterations are being made to the girls' and infants' school, Dartmouth, and special consideration has been given to the ventilation, which will be carried out on the Boyle system.

The Rev. Canon Rawnsley announced at a meeting at the Whitby Abbey House, last week, that the unveiling of the Caedmon memorial cross would take place about the 21st of September. The Poet Laureate, as a distinguished Yorkshireman, has been asked to perform the ceremony.

The Bishop of St. Alban's dedicated the new tower of Chadwell Heath church, off the high road between Ilford and Romford, on Wednesday week. This addition is the gift of Colonel Sale (late Bengal Engineers) in commemoration of the Diamond Jubilee of the Queen. The tower is an embattled red-brick structure. The clock was subscribed for locally, and was supplied by Messrs. Smith, of the Derby Clock Works, at a cost, with the bell, of £115. The plans for the tower were prepared by Mr. Frederic Chancellor, F.R.I.B.A., Finsbury-circus, who designed the church in 1884. The cost of the tower was £700.

## LATEST PRICES.

### IRON, &c.

	Per ton.	Per ton.
Rolled-Iron Joists, Belgian.....	£6 0 0	to £6 10 0
Rolled-Steel Joists, English.....	6 10 0	" 7 0 0
Wrought-Iron Girder Plates.....	5 15 0	" 6 10 0
Bar Iron, good Staffs.....	7 0 0	" 8 0 0
Do., Lowmoor, Flat, Round, or Square.....	17 0 0	" 17 5 0
Do., Welsh.....	5 15 0	" 5 17 6
Boiler Plates, Iron—		
South Staffs.....	7 17 6	" 8 5 0
Best Snedshill.....	10 0 0	" 10 10 0
Angles 10s., Tees 20s. per ton extra.		
Builders' Hoop Iron, for bonding, &c., £6 15s.		
Builders' Hoop Iron, galvanised, £15 10s. 0d. per ton.		
Galvanised Corrugated Sheet Iron—		

No. 18 to 20. No.	Per ton.	Per ton.
6ft. to 8ft. long, inclusive gauge.....	£10 15 0	... £11 0 0
Best ditto.....	11 5 0	" 11 10 0
Cast-Iron Columns.....	£6 0 0	to £8 10 0
Cast-Iron Stanchions.....	6 0 0	" 8 10 0
Rolled-Iron Fencing Wire.....	7 0 0	" 8 0 0
Rolled-Steel Fencing Wire.....	7 0 0	" 7 10 0
Galvanised.....	10 10 0	" 11 10 0
Cast-Iron Sash Weights.....	4 0 0	" 4 2 6
Cut Clasp Nails, 3in. to 6in.....	8 15 0	" 9 15 0
Cut Floor Brads.....	8 10 0	" 9 10 0

Wire Nails (Points de Paris)—	Per ton.	Per ton.
0 to 7 8 9 10 11 12 13 14 15 B.W.G.		
8/6 9/0 9/6 10/3 11/0 12/0 13/0 14/9 16/9 per cwt.		
Cast-Iron Socket Pipes—		
3in. diameter.....	£5 10 0	" £5 15 0
4in. to 6in.....	5 5 0	" 5 10 0
7in. to 24in. (all sizes).....	4 15 0	" 5 0 0
[Coated with composition, 2s. 6d. per ton extra; turned and bored joints, 6s. per ton extra.]		

Pig Iron—	Per ton.	Per ton.
Cold Blast, Lilleshall.....	105s. to 110s.	
Hot Blast, ditto.....	57s. 6d. to 62s. 6d.	
Wrought-Iron Tubes—Discount off Standard Lists f.o.b.		
Gas-Tubes.....	75p.c. Fittings 77p.c.	
Water-Tubes.....	70	" 72s
Steam-Tubes.....	62s	" 65
Galvanised Gas-Tubes.....	60	" 62s
Galvanised Water-Tubes.....	55	" 57s
Galvanised Steam-Tubes.....	45	" 47s

Sheet Zinc, for roofing and work—	Per ton.	Per ton.
ing up.....	£22 10 0	to £23 10 0
Sheet Lead, 3lb. per sq. ft. super.....	15 0 0	" 16 0 0
Pig Lead, in 1cwt. pigs.....	14 0 0	" 15 0 0
Lead Shot, in 25lb. bags.....	17 10 0	" 18 10 0
Copper Sheets, sheathing and rods.....	60 10 0	" 61 10 0
Copper, British Cake and Ingots.....	52 10 0	" 53 0 0
Tin, Straits.....	73 1 3	" 73 11 3
Do., English Ingots.....	76 0 0	" 77 0 0
Spelter, Silesian.....	18 0 0	" 19 0 0

### TIMBER.

Teak, Burmah.....	per load £13	0 0	to £14 10 0
" Bangkok.....	9 5 0	" 14 5 0	
Quebec pine, yellow.....	4 3 0	" 6 3 0	
" Oak.....	3 13 0	" 4 18 0	
" Birch.....	3 7 6	" 5 0 0	
" Elm.....	4 13 0	" 5 13 0	
" Ash.....	3 18 0	" 5 3 0	
Dantaic and Memel Oak.....	1 18 0	" 2 18 0	
Fir.....	2 9 0	" 4 9 0	
Wainscot, Riga p. log.....	4 10 0	" 5 0 0	
Lath, Dantaic, p.i.....	4 10 0	" 6 0 0	
St. Petersburg.....	5 0 0	" 6 10 0	
Greenheart.....	8 0 0	" 8 10 0	
Box.....	4 0 0	" 15 0 0	
Sequoia, U.S.A. ...per cube foot	0 1 8	" 0 1 10	
Mahogany, Cuba, per super foot			
lin. thick.....	0 0 5	" 0 0 6s	
" Honduras.....	0 0 4s	" 0 0 6s	
" Mexican.....	0 0 4	" 0 0 5	
Cedar, Cuba.....	0 0 4	" 0 0 4s	
" Honduras.....	0 0 3s	" 0 0 4s	
Satinwood.....	0 0 5	" 0 1 0	
Walnut, Italian.....	0 0 3	" 0 0 7	

Deals, per St. Petersburg Standard, 120—12ft. by 1 1/2 in.	by 1 1/2 in.	by 1 1/2 in.
Quebec, Pine, 1st.....	£18 0 0	to £24 10 0
" 2nd.....	18 0 0	" 15 15 0
" 3rd.....	6 0 0	" 9 10 0
Canada Spruce, 1st.....	8 10 0	" 10 10 0
" 2nd and 3rd.....	7 10 0	" 8 10 0
New Brunswick.....	7 0 0	" 8 0 0
Riga.....	7 10 0	" 8 10 0
St. Petersburg.....	9 0 0	" 13 10 0
Swedish.....	9 10 0	" 16 0 0
Finland.....	9 0 0	" 9 10 0
White Sea.....	10 10 0	" 17 0 0
Battens, all sorts.....	5 0 0	" 16 0 0
Flooring Boards, per square of lin.—		
1st prepared.....	£0 9 6	" £0 16 0
2nd ditto.....	0 8 0	" 0 13 0
Other qualities.....	0 6 3	" 0 7 0
Staves, per standard M.—		
Quebec pipe.....	—	—
U.S. ditto.....	£35 0 0	" £42 10 0
Memel, cr. pipe.....	220 0 0	" 230 0 0
Memel, brack.....	190 0 0	" 200 0 0

### OILS.

Linseed.....	per ton. £16	12 6	to £17 2 6
Rapeseed, English pale.....	23 0 0	" 23 10 0	
Do., brown.....	21 10 0	" 22 0 0	
Cottonseed, refined.....	15 0 0	" 16 0 0	
Olive, Spanish.....	32 10 0	" 33 0 0	
Seal, pale.....	20 0 0	" 20 5 0	
Cocoonut, Cochin.....	28 10 0	" 28 10 0	
Do., Ceylon.....	23 10 0	" 24 0 0	
Palm, Lagos.....	22 10 0	" 22 10 0	
Oleum.....	18 15 0	" 19 15 0	
Lubricating U.S.....	per gal. 0 6 8	" 0 7 6	
Petroleum, refined.....	0 5 0	" 0 5 1/2	
Tar, Stockholm.....	per barrel 1 0 0	" 1 5 0	
Do., Archangel.....	0 12 6	" 0 15 0	
Turpentine, American... per ton	23 15 0	" 24 0 0	



## LIST OF COMPETITIONS OPEN.

Glasgow—Exhibition Buildings (£80,000 limit)	£210 (merged), £156 10s., £105.	H. A. Hedley, Secretary, 141, Buchanan-street, Glasgow	Aug. 15
Pendlebury—Three Chapels, Offices, Lodge, Entrance Gates, and Boundary Wall, at proposed Cemetery	£50 (and 5 per cent. com.), £30, £20	Samuel Brown, Town Clerk, Town Hall, Salford	16
Pontyvaun—County School (£2,000 limit)	£5 (merged)	Newton Wade, Clerk to Managers, 39, Dock-street, Newport, Mon.	17
Glasgow—City Improvements between King-street, City, and the New-Wynd	£100, £50, £25	J. D. Marwick, Town Clerk, City Chambers, Glasgow	31
Stockholm—City Railway Stations and Junctions	£656, £438, £219	Consulate General, 27, Great Winchester-street, E.C.	31
St. Pancras—New Baths	No 1st premium; five others £50 each	C. H. J. Barrett, Vestry Clerk, Vestry Hall, Pancras-road, N.W.	25
Wivenhoe—Water Supply and Drainage Schemes	£250	C. W. Denton, Clerk, 8, East Stockwell-street, Colchester	25
Plymouth—Shops and Dwelling-Houses, Tavistock-road	50gns., 20gns.	J. H. Ellis, Town Clerk, Plymouth	Sept. 24
Liverpool—New Buildings for Royal Institution		Harold Waterhouse, Hon. Sec., 3, Cook-street, Liverpool	Oct. 5

## LIST OF TENDERS OPEN.

## BUILDINGS.

Wilmington—School	School Board	H. J. Woodhams, Clerk, Alfriston, Berwick Station, Sussex	Aug. 13
Hull—Warehouse and Offices in Wellington-street	Corporation	Percy T. Runtun, Architect, Scale-lane, Hull	13
Dewsbury—Excavating Work at Gasworks		Henry Dearden, A.M.I.C.E., Town Hall, Dewsbury	13
Ewanrigg—Additions to Farm Buildings	A. S. Coates	J. Holliday, Ewanrigg Hall, near Maryport	13
Consett—Shop and Dwelling House in Middle-street		A. S. Coates, Printer, Havelock-street, Consett	13
Halifax—Additions to Pioneer Tool Works		Medley Hall, Architect, 29, Northgate, Halifax	13
Plymouth—Restoration of Front of Congregational Chapel, Courtenay-street	Committee	Henry J. Snell, Architect, 13, Courtenay-street, Plymouth	13
Belsford—Farmhouse		Bourne and Son, Land Agents, Tolnes	13
Clayton—Branch Store at Pasture-lane	Clayton Co-operative Industrial Soc.	Sam Spencer, Architect, 34, Great Horton-road, Bradford	13
Bridlington—Classrooms at National Schools		Edward Jas. Smith, York Bank, Bridlington	13
Scone—Alteration of Public School	School Board	G. P. K. Young, Architect, 42, Tay-street, Perth	13
Crawford—Repairs to Primitive Methodist Chapel		Rev. James Wright, 186, Denon's Green, St. Helens	13
Burnley—Imbecile Wards at Workhouse	Guardians	S. Keighley, Architect, Nicholas-street, Burnley	13
Kinellar—Alterations to House		William Davidson, Architect, Ellon	13
Ugborough—Two Culverts at Workhouse Brook	Totnes Rural District Council	Thos. W. Windcott, Clerk, Totnes	13
Dublin—Works at Training College, Marlborough-street	South Kincardine Club	J. F. Fuller, Archt., Brunswick Chambers, Brunswick-st., Dublin	13
Launceston—Club Premises	Stones and Co., Ltd.	D. Wishart Galloway, Architect, Brechin	13
Eldwick—House and Shop		John Judson and Moore, Architects, Keighley	13
Newsome—Stable, &c., at Victoria Hotel		J. Berry, Architect, 9, Queen-street, Huddersfield	13
Shoreditch—Battery-Room, Boiler-House, and Offices at Electricity Supply Station, Coronet-street	Vestry	Kinsaid, Waller, & Manville, Engrs., 29, St. George-st., Westminster	15
Sheffield—Extension of Car Sheds, &c.	Tramway Committee	Charles F. Wike, C.E., City Surveyor, Town Hall, Sheffield	15
Wrexham—Four Houses in Empress-road		J. Pender, 42, Rusbon-road, Wrexham	15
Ecclesfield—Seven Cottages at The Cross	Loyal St. Mary's Lodge, M.U.	G. A. Wilson, Architect, Harthead Chambers, Sheffield	15
Thornaby-on-Tees—Offices and Foreman's House	John I. Hopper and Co.	J. Mitchell Bottomley, Architect, 26, Albert-street, Middlesbrough	15
Hindley—Wesleyan Church	Urban District Council	Waddington and Sons, Architects, 17, St. Ann's-square, Manchester	15
Penistone—Masonry Piers and Wing Walls of Bridge, &c.	Highway Committee	Wm. Spinks, A.M.I.C.E., 20, Park-row, Leeds	15
Blackburn—Shop, Lord-street	David Haigh	Wm. Stubbs, Borough Engineer, Blackburn	15
Clifton—Parish Room, Emmanuel Church	West Pelton Co-operative Society	Henry Williams, Architect, 24, Clare-street, Bristol	15
Wincobank—Fifteen Cottages, Johnson-street and Wood-grove		G. A. Wilson, Architect, Harthead Chambers, Sheffield	15
Rameton—Creamery	Standing Joint Committee	Andrew S. Hunter, Rameton	15
Beamish—Eighteen Houses	Tramway Committee	T. Ernest Crossling, Architect, Cross-street, Stanley, R.S.O.	15
Great Broughton—Business Premises	Guardians	J. S. Moffat, Architect, Church-street, Whitehaven	15
Tinsley—Extension of Car Sheds, &c.		Charles F. Wike, C.E., City Surveyor, Town Hall, Sheffield	15
Sheffield—Alterations at 12 and 14, Upperthorpe	Corporation	A. E. Booker Union Offices, Westbar	15
Elgin—Dwelling House, Shops, and Printing Office in South-st.	Loyal St. Mary's Lodge M.U.	G. Sutherland, A.R.I.B.A., Elgin	15
Over—Infectious Diseases Hospital		Geo. Sheffield Blackaway, Town Clerk, Guildhall, Gloucester	15
Ecclesfield—Seven Cottages at The Cross		Fredk. Ridge, Secretary, The Cross, Ecclesfield	15
Ball's Bridge—Buildings and Foundations at Electric Lighting Works	Pembroke Township Commissioners	J. C. Manly, Secretary, Town Hall, Ball's Bridge, Co. Dublin	16
Swinton—Alterations to Police Office	Standing Joint Committee	Henry Littler, Architect, County Offices, Preston	16
Cwmbran—Alterations at Upper Cwmbran School	Llanvachva Upper School Board	Lansdowne and Griggs, Architects, Newport, Mon.	16
Cockermouth—Additions and Reseating of P.M. Chapel, Wyndham-row	Trustees	Rev. C. Humble, Mayo-street, Cockermouth	17
Cheltenham—Alterations at Workhouse	Guardians	R. Ticehurst, Clerk, Essex-place, Cheltenham	17
Catcliffe—School	School Board	J. Platts, Architect, High-street, Rotherham	17
Ergenagh—Alterations and Repairs at Rectory	Church of Ireland	A. McStewart, Diocesan Architect, Londonderry	18
Darlington—Extending Greenhouse at Park	Parks Committee	Hy. G. Stevenson, Town Clerk, Darlington	18
Skenagun—Labourers' Cottages	Guardians of Balinglass Union	J. Ralph Dagg, Clerk, Balinglass	19
Milnthorpe—Alterations to Harmony Hill	Dr. Carden	Stephen Shaw, F.R.I.B.A., Architect, Kendal	19
Easingwold—Vagrant Cells, &c., at Workhouse	Guardians	F. J. H. Robinson, Clerk, Easingwold	19
Swansea—Manselton School	School Board	C. E. T. Laurence, Architect, 181, Queen Victoria-street, E.C.	19
Llantwit Major—Additions and Alterations to Llantwit Major Board School	School Board	E. Jenkin Williams, M.S.A., 14, High-street, Cardiff	20
Aberberg—School at Six Bells Village (230 children)	Llanhilleth School Board	Swash & Bain, Architects, Midland Bank Chambers, Newport, Mon.	20
Mansfield—Schools in Rosemary-lane	School Board	Vallance and Westwick, Architects, Mansfield	20
Stowmarket—Alterations and Additions to a Warehouse	George Thulow and Sons	H. G. Bishop, M.S.A., Architect, Cheap-side, Stowmarket	20
Leominster—Cottage Home and Nurses' Home, South-street	Trustees of Cottage Hospital	J. B. Dowding, 5, Corn-square, Leominster	20
Winchester—Peter Symonds School	Governors	F. Bowker, jun., Clerk to Governors, Southgate-street, Winchester	20
St. Anne's-on-Sea—New Church	Oxford Corporation	Austin and Paley, Architects, Castle Hill, Lancaster	20
Littlemore & Sandford-on-Thames—Cottages and Farm Bldgs.	Co-operative Building Soc., Ltd.	R. Bacon, Town Clerk, Oxford	22
Grangemouth—Block of Dwelling-Houses, Forth-street		G. Deas Page, Architect, Old Globe Chambers, Falkirk	22
Blackburn—Probation Homes for Pauper Children and Superintendent's House near Workhouse	Guardians	Stones and Gradwell, Architects, Richmond-terrace, Blackburn	23
Walthamstow—Public Baths	Urban District Council	E. J. Goven, Clerk, Town Hall, Walthamstow	23
Blackburn—Two Homes in Cherry-street, and Two Homes in Poplar-street	Guardians	Stones and Gradwell, Architects, Richmond-terrace, Blackburn	23
Sunderland—Technical College at Green-terrace	Corporation	Fras. M. Bowey, Town Clerk, Town Hall, Sunderland	25
Bangor, Ireland—Two Blocks of Houses, Princeton-road	Samuel Crosbie	Young and Mackenzie Architects, Donegal-square East, Belfast	25
Auchindor—Byres and Stables, Farm of Auchmillan		John Craigen, Solicitor, 193, Union-street, Aberdeen	25
Mortlake, S.W.—Postmen's Office	Commissioners of H.M. Works	Hon. Reginald B. Brett, Secretary, Storey's Gate, London, S.W.	26
New Malden—Public Buildings	Malvern and Coombe U.D.C.	C. J. Lewis, Clerk, New Malden, Surrey	26
Swindon—Holy Rood Schools and Hall	School Managers	Silcock and Reay, Architects, Octagon Chambers, Milson-st., Bath	27
Sheffield—Additional Buildings at the Destructor, Lumley-st.	Health Committee	Charles F. Wike, C.E., City Surveyor, Town Hall, Sheffield	27
Lee, S.E.—Sorting Office	Commissioners of H.M. Works	Hon. Reginald B. Brett, Secretary, Storey's Gate, London, S.W.	31
Consett—Institute Buildings, Park-road	Technical Institute	Plummer and Burwell, Architects, 13, Grey-st., Newcastle-on-Tyne	31
Birmingham—Covered Way at Workhouse	Board of Guardians	W. Bowden, Clerk, Edmund-street, Birmingham	31
Guayaquil—Custom House	Government of Ecuador	Chief Ecuadorian Consulate, Liverpool	31
Mount Pleasant, E.C.—Superstructure of Parcels Depot	Commissioners of H.M. Works	Hon. Reginald B. Brett, Secretary, Storey's Gate, London, S.W.	31
Burley in Wharfedale—County Private Retreat	West Riding Asylums Committee	J. Vickers Edwards, County Surveyor, Wakefield	Sept. 1
Stratford, E.—Museum at The Green, Romford-road	West Ham Council	Fred. E. Hilleary, Town Clerk, Town Hall, West Ham, E.	2
Wells—Public Hall and Buildings	City Council	Regd. L. Foster, Town Clerk, Wells, Somerset	3
Swansea—Manselton School	School Board	A. W. Halden, Clerk, Board Offices, Swansea	19
Fulham-road, S.W.—New Laundry at Workhouse	Guardians	Thomas Worlock, Clerk, Vestry Hall, Mount-street, London, W.	Oct. 12
Belem—Cattle Pens, Abattoir, and Two Markets	Municipal Authority	The Brazilian Legation, London	24
Tutshill, Chepstow—Seven Cottages	Oddfellows Society	J. P. Consterdine, 50, High-street, Chepstow	
Llangennech—Villa		Davies and Sons, Architects, Llanelly	
Braintree—House and Two Cottages, Coggeshall-road	Hy. Calver	Jas. W. Clark, Architect, Coggeshall	
Wigan—Enlargement of Coppull Schools		Heaton and Ralph, Architects, King-street, Wigan	
Horwich—Square Brick Chimney (45 yards high)	A. Mason and Son	Ernest W. Dyson, C.E., Architect, 17, Lee-Lane, Horwich	
North Rode—Additions to North Rode School		John T. Brealey, Architect, Piccadilly Buildings, Hanley	
Waun-llwydd—Hotel	J. B. Yendoll	Swalwell & Creighton, Steam Packet Chambers, Dock-st., Newport	
Ings—Repair of Ings Church	School Board	Ings Vicarage, near Kendal	
Leeds—Two Schools		W. Packer, Clerk, School Board Offices, Leeds	
Brighton—Boys' and Girl's Department, St. Mark's Schools	Harvey and Co.	Joseph Norton, Architect, Alliance Chambers, Sheffield	
Cork—Improvements to Premises, 23, Patrick-street	James Hollywood	Arthur Hill, F.R.I.B.A., Architect, 22, George-street, Cork	
Wigan—Plastering (500 yards)	Rev. F. Hogbin	T. Johnson, Engineering Works, Prescott-street, Wigan	
Belfast—Alterations and Additions to Shops, Albertbridge-road		David M. Cooper, Architect, 23, Donegal-place, Belfast	
Southend-on-Sea—Baptist Chapel, Clarence-road		Goodchild and Sons, 81, Finsbury-pavement, E.C.	



# THE BUILDING NEWS

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FRIDAY, AUGUST 19, 1898.

## NEW BUILDING AREAS AND DISPLACEMENT.

IN every part of London, areas of demolished houses are to be seen, many as large wastes of valuable land, earning nothing, but harbouring refuse and decaying matter; while in their immediate vicinity thousands of toilers in markets, costers and others who have to live close to their daily work, are penned up in hovels and tenements which are sometimes a menace to the neighbourhood. An order to terminate the tenancies, to clear out and pull down is given, without considering the serious displacement of the working classes which is thereby caused. Some acres are cleared between Drury-lane and Wellington-street, a dense centre of living for those who have employment in and round Covent Garden. A lesser evil, but equally a satire on modern methods of street reconstruction, is to allow valuable spaces to remain unremunerative, as in the areas lying at the east of Whitehall, and plots of valuable building land in the neighbourhoods of Clerkenwell, Chelsea, Fulham, Albert Embankment, Battersea, and Camberwell. In some of these places workmen's dwellings have been erected that have provided accommodation for those ousted; but the substituted dwellings have not been patronised by the classes for whom they were principally intended. They are lofty, often barrack-like, buildings, without any of the characteristics of abodes most dear to the English working man. In hot weather women and children crowd the landings and vestibules of the common stairways—not very welcome to the hard-working artisan, who looks for quiet and independence when he returns to his home. The courts on the ground story are usually paved, and crowded with children; comparing unfavourably with the small modern garden or yard in the rear of an ordinary tenement. To take a few of the street improvements that have been carried out by the Council since the Metropolitan Board's jurisdiction came to an end, the Gray's Inn-road, or Rosebery-avenue, route may be regarded as one of the chief. Few of the street remodellings that have been carried out can exceed this in importance, the line of route starting from the Holborn Town Hall at the corner of Clerkenwell-road, and passing through a mass of small properties intersected by small streets and alleys, skirting the old Middlesex House of Correction and Sadler's Wells Theatre, thence into St. John Street-road. The new route, in fact, cuts through dense and squalid neighbourhoods, and opens a direct thoroughfare from Clerkenwell-road to "The Angel" at Islington. The road was carried out in three sections, and a width of 60ft. was given along the greater part of the route. Over a part of the line—that over the valley of the Fleet—a viaduct of fourteen arches was built, and opened in 1890 by Lord Rosebery, whose name the new avenue takes. The thoroughfare has been planted with trees, and a subway for gas and water has been constructed throughout the entire 3,500ft. of the roadway. It is doubtful, however, if all the dwellers in the densely-populated area which has been intersected have been provided for. A great many properties have been cut through, while ragged plots of ground remain not yet filled up. But in this long route there were sites upon which public buildings might have been placed. Courts and streets innumerable have been crossed, and that satire on our old street

nomenclature, "Mount Pleasant," near the former prison, came into the new scheme; but how little attention has been given to make these corners attractive! There were opportunities afforded by reconstruction for creating sites and plots, but they appear to have been lost. Then the County Council have carried out other schemes. A considerable removal of courts and alleys has been arranged or effected in Bishopsgate, known as the Sandy's Row Improvement. Great clearances have been made here. A large insanitary area, the Goulston-street, Whitechapel, area, has been dealt with under the Artisans' and Labourers' Dwellings Improvement Acts, and the widening of Sandy's-row has followed. The Tower Bridge approaches are most important. The southern approach is being proceeded with under the Tower Bridge Southern Approach Act, 1895. Properties are being acquired, and the construction of the approach will involve the displacement of a large number of families of the labouring classes. The Council referred the question of rehousing to the Secretary of State, who gave his consent to the acquisition and removal by the Council of the buildings required; but little new provision for rehousing the persons displaced has been made, as suitable dwellings for these people exist. The new approach from Tooley-street to the south-west end of Bermondsey New-road, cuts through a dense mass of properties and small streets, passing to the east of St. Mary Recreation Ground, and curving round through a mass of houses into Bermondsey New-road. The width is to be 60ft., there will be a subway under the road, and the footways will be planted. Surely here is an opportunity to exercise some control over the frontages of the new approach to the Tower Bridge. On the north side also the Parliamentary powers obtained by the Council are being put into force. The length will be small—only 800ft.—compared with the 3,600ft. length of the southern approach. The route is from Tower-hill to Prescott-street, is short, and does not interfere to any great extent with the houses of the working classes; but the approach will open up some important sites and frontages.

The Tottenham Court-road widening scheme involves the removal of a block of buildings of about 100ft. by 20ft. at Bozier's-court, a block which has long impeded the entrance into Tottenham Court-road at the Oxford-street end. A very busy centre of traffic is here opened up, and there are splendid frontages and corners which focus at this junction of Charing Cross-road, Oxford-street, High-street, and Tottenham Court-road, which might be made architectural if proper conditions of letting were laid down. On the south side of the Thames we must record the Long-lane and Tabard-street improvement now being carried out. This scheme for widening Long-lane and improving the approaches to Tabard-street from the Borough High-street, at the sides of St. George the Martyr, will improve the setting of the old Classic church, and a new frontage on one side of Long-lane will be formed. The open space created in this poor district will, at least, be a boon to the inhabitants. A scheme for rehousing the persons displaced will have to be considered.

We have only noticed a few of the more important improvements. Each of them will create new sites of greater or less value, by opening up new approaches, by widening existing streets, and forming corner plots at intersections. Main arteries like Tottenham Court-road and Charing Cross-road, or Borough High-street, wherever they are intersected, give splendid sites for architectural display; but when once a scheme is adopted, and the frontages laid out to suit the existing interests, all hope is gone. We may only name Charing Cross-road and Shaftesbury-avenue as examples, and in the outlying suburbs the

Coldharbour-lane widening at Denmark-hill, Church-street, Fulham, as examples of lost opportunities, or old neighbourhoods irretrievably ruined by the change.

The London County Council's action in these matters is no doubt a very difficult and often thankless one. The line of a new route must be decided on after considerable difficulties; it must be acceptable to the public, or to that portion of it immediately concerned. Future requirements have to be regarded: possibilities of a change of traffic; the associations of the locality cannot be overlooked, any old house or public building must be respected, and the architectural effect of the improvement must be kept in view. Mr. Percy J. Edwards' "History of London Street Improvements" gives a good epitome of these matters. He speaks of the difficulty of coaxing the traffic into a new route, especially if it happens to be slightly longer, and illustrates it by the case of the Victoria Embankment and Strand. He says, "If it had been possible to induce the heavy general traffic to utilise to the full the route by way of the Embankment, the widening of portions, if not the whole, of the Strand, which the Council has already felt compelled to partly undertake, would, perhaps, not have been an absolute necessity." Light and air, too, have to be considered in selecting a new line of street. Shortness of route is not the only thing to be considered in our plans for street improvements. Architectural effect must be taken into account as well as utility and cost. The main architectural buildings and features in the new elevations of widened streets should be studied, and a committee of the Council, aided by leading architects, ought to be formed to assist in deciding upon the most desirable line of street. It is also most important that before letting plots and frontages, conditions should be laid down requiring the designs to be passed by a committee of experts. These conditions should include arrangement of frontages, style, height of elevation, sky-line, and roof features to harmonise with existing buildings. No new site or frontage should be let on any other conditions, or to irresponsible builders who are only endeavouring to make profitable investments regardless of the dignity and appearance of the locality. We are sure that these terms of letting would repay at least four-fold the cost, and often the delay, of reconstruction.

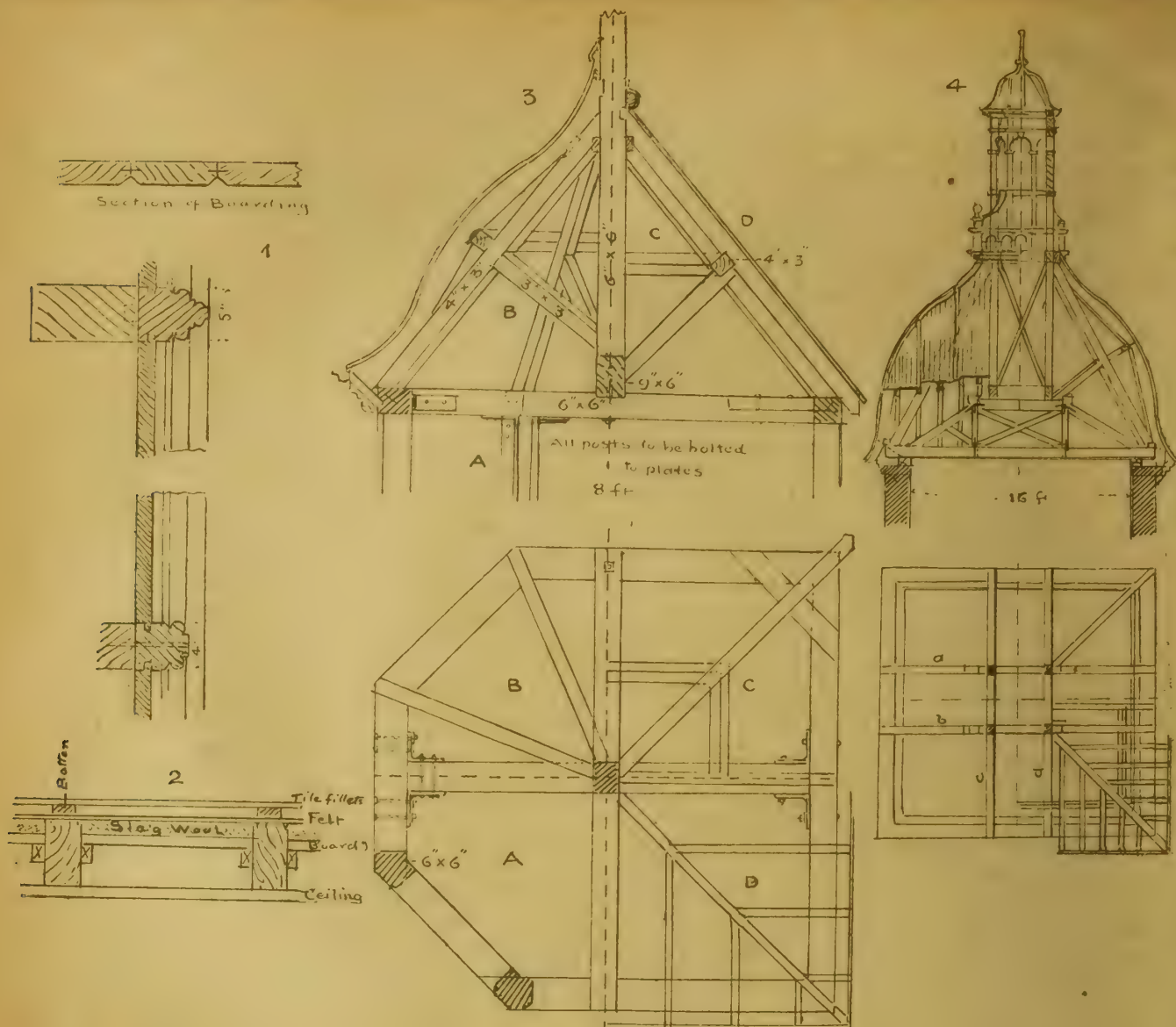
## MODEL SPECIFICATIONS.—XXVI.

THE JOINER.

THE work of the carpenter and joiner are so intermixed in many cases—as in roofs, floors, dormers, and the like—that it is undesirable to describe them separately. In the construction of boarded roofs, skylights, also lanterns, a few details of which we now give, joinery forms an important part of the work. We now specify clauses of more or less general application. The sketches illustrate (1) the boarding of ribbed roofs; Fig. 2, of roofs in which slag-wool and felt are used. The section of turret cupola 3, one half showing an octagonal arrangement, and the other square, exhibits the kind of framing necessary. All parts should be well bolted or secured by iron straps and cleats. Section 4 shows a type of roof often constructed, and the mode of carrying the upper lantern. Section 5 illustrates a mode of fixing a barge board. The wall-plates are sometimes supported on stone corbels or framed brackets, wrought and cut, and the tiling or slating is generally a little tilted at the feet of barge, which requires the lower portion to be made a little wider, or the introduction of a bevelled piece of stuff under the slates at the springing.

No. 7, 8, 9, 10 are details of skylights showing how the lights are raised above the





plane of roof, and how the curb should be dressed with lead and upper gutters formed. The framing we have already specified. Particular attention should be directed to the mode of forming the ridge-rail, hips, stiles, the throated bottom rail, the grooves necessary to keep out wet, and how the condensation gutter should be formed. The glazing beds down on the bottom rail, and carries the water over into the gutter or roof. But inside the condensed moisture should be carried away by a sinking in the curb or by a separate moulded gutter lined with lead (Fig. 9). The bars in large skylight and conservatories, &c., should be moulded with grooves to catch the condensed water (Fig. 10.)

The remarks of Mr. J. Leaning in his useful work on "Quantity Surveying" on a few points may be of service to the architect. We have already said that it is more usual to describe joinery thicknesses as those of the stuff it is produced from instead of "as finished," and architects should state in the preamble of their specification or bill of quantities if finished sizes are required. A 1½ in. door usually means a door 1½ in. thick; framed work will usually be ¾ in. less than the thickness specified, and so on. The difficulty arises when details—as mouldings—are drawn. These are generally scaled or figured to the finished sizes, as, for example, a rebated and moulded frame 5 in. by 4 in.; this would mean a frame 5½ in. by 4½ in. for the purpose of the quantities. Mr. Leaning says "the sooner this anomaly is got rid of the better"; and he wishes all architects

would describe their work as of finished sizes, as the Scotch architects do. If not, they must put up with the reduction.

Where special joinery of a superior class is necessary, it is desirable to specify that the joinery is to be prepared or supplied by B. E. Nightingale, Albert Embankment, or by Crompton and Fawkes, of Chelmsford. Such flooring as parquetry or horticultural buildings should be specified as to be put down or erected by Mainzer and Co., Oxford-street; Bassant, Fitzroy-square; Ebner and Co., or Gregory and Co., or for the latter class of work by Messenger and Company, Loughborough; Henry Hope, Birmingham, or other well-known firm.

We begin with a few general clauses:—

44. *Materials.*—All joinery (except where otherwise specified) to be framed in first quality St. Petersburg, Archangel, or Onega yellow deals, free from large knots and other defects. Or—

The deals for framings to be best red St. Petersburg or Onega, or selected deal kept clean for staining, plane-finished.

The sills of windows to be of English or Hungarian oak. [For superior floors, English or Dantzic oak is suitable, and should be laid on felt.] The mahogany to be the best Tabasco, of good figure, free from defects, and kept clean for polishing.

45. *General.*—All the joiners' work to be executed and finished according to the true intent and meaning of the detail drawings, and the figured drawings are to be taken in preference to the sizes given in specification. The joinery to be kept in a drying-room until required. All the work to be wrought, and finished with a clean, smooth surface, as left by the plane. All dimensions given, unless stated "finished sizes," are to

be taken as the original ones from which the work is produced. All glued joints to be feather-tongued. All linings to be tongued at angles, and to door and window frames, and all skirtings to be rebated to floors. External joinery to be put together in white-lead. Solid frames to be dowelled to stone steps with ¾ in. square wrought-iron dowels. All saah sills to be connected to stone sills with galvanised-iron tongues, 1½ in. by ¾ in., let into grooves and bedded in white-lead. All joinery to be fixed to wrought and framed grounds, and the edges next plastering to be splayed.

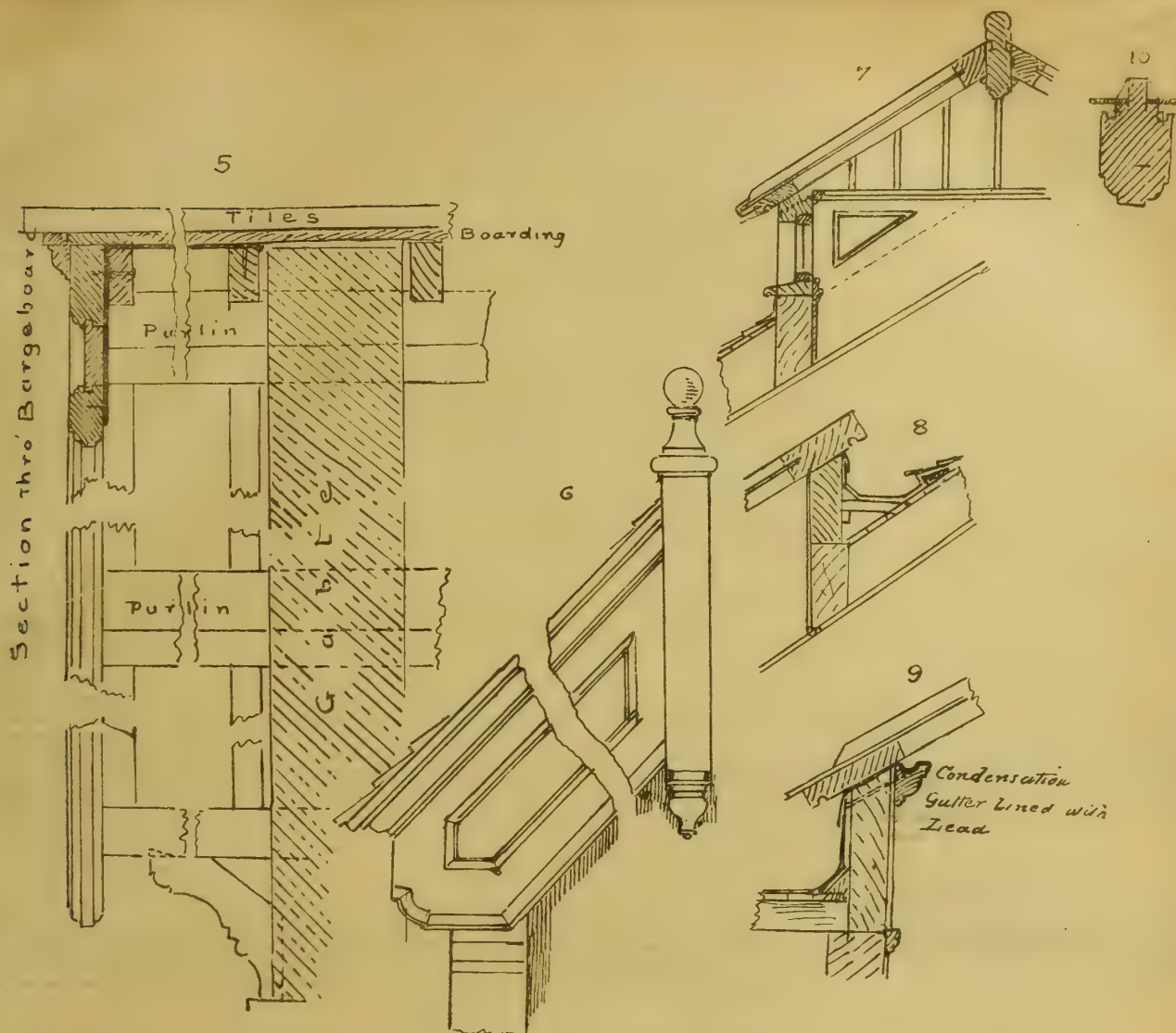
All the ironmongery to be of the best quality, and fixed with screws. The locks and latches to be supplied by the firm of Hobbs, Hart, and Co., Limited, Islington (or Jas. Hill and Co., or Young and Marten, Stratford). Or, all the ironmongery to be supplied from the firm of Young and Marten, Stratford.

The iron butts to be wrought, and to be of the sizes described, or sufficient for the purpose. Provide and fix all necessary iron cramps for fixing the frames of outside doors not more than 2 ft. apart and 1½ in. by ¾ in., of proper length, the ends caulked into wall, and the other screwed and countersunk to frames, &c.

The wrought-iron casements to be provided and delivered (and fixed) by Messrs. Burt and Potts, York-street, Westminster (or H. Hope, Birmingham; or Geo. Wragge, Surrey-street, Strand; or the N.A.P. Window Company).

46. *Barge Boards.*—The barge boards to be executed according to details out of 2½ in. wrought and cross-tongued yellow deal 15 in. or 18 in. wide, moulded on lower edge, and to have a 6 in. by 2 in. moulding planted on and returned at feet. The feet of barge boards to be shaped as shown, and the apex to be framed into a finial 6 in. by 6 in. moulded and cut to detail (or simply mitred and cross-tongued). The barge boards to be screwed to the purlins, ridge (or rafters), or secured by 2 in. by ¾ in. wrought





iron angle-straps every 3ft. apart, and of the full depth of barge, screwed to rafters with 2½in. screws. Or—

The barge boards to be of 2½in. or 3in. wrought framing, with grooved and rebated panels, as shown, 15in. in width, moulded on lower edge, and to have a moulding 6in. by 3in. planted along under tiles. The feet to be shaped as shown, and the apex to be framed into finial 6in. by 6in., moulded and shaped to design, and fixed securely to purlins, ridge, and rafters by 2in. by ½in. wrought-iron angle-straps screwed to timbers with 2½in. screws.

47. *Cupola* (see sketch 3).—The cupola of turret to be framed according to details, with angle posts 4in. by 4in. (or 6in. by 6in.), bolted to the bearers with ½in. bolts; sill and head, 4in. by 4in. (or 6in. by 6in.), framed into posts played on edge, centre post 4in. by 4in. (or 6in. by 6in.); hip rafters, 4in. by 3in. (or to be 2½in. thick), with outer edge cut to curve of cupola; purlins 4in. by 3in. The plate, if octagonal, to be lap-jointed, and secured by wrought-iron cleats bolted through, and all posts to be secured to plates by wrought-iron straps (or ½ bolts).

Cover the cupola with ½in. rough deal boarding in 3½in. widths laid horizontally (or diagonally bent to curve) for lead covering. Put moulded cornice, 8in. by 6in., round cupola, secured to brackets, tongued, and nailed to framing, and feather-tongued at all mitres, and put moulding round finial, grooved and shaped for leadwork.

(In some cases purlins about 1ft. 6in. apart are substituted for rafters, which allows the boarding to be laid vertically for straight surfaces. Boards laid vertically are more durable than horizontal laying).

48. *Ventilation of Roof*.—Provide Boyle's Patent "Air-Pump" Ventilator, and fix the same where shown on roof, supported on the purlins or principals, or trim the rafters for same. Or—

The ventilators to be provided and fixed by Robert Boyle and Son, Ltd. (or Kershaw and Co.) in accordance with the design and direction of the architect.

49. *Ribbed and Boarded Roof*.—The framed rafters over nave (or chancel) to be boarded underneath

with wrought one side V-jointed grooved and tongued (or rebated) 1½in. boarding, tongued to ribs, the ribs to be screwed (or tongued) to the rafters (see section 1). Or—

50. *Boarding and Felling*.—The roof of upper story to be covered with ½in. rough deal boarding, edges shot in batten widths, laid on fillets nailed to side of joists, the upper side of boards to be 2in. or 1½in. below top of rafters for a layer of slag-wool of Frederick Jones and Co., Kentish Town. The rafters to be covered with McNeill and Co.'s inodorous roofing felt of ½in. thickness (or Engert and Rolfe's "asphalted felt"), lapped 3in., and tacked with ½in. clout nails (or copper nails). Fir battens 2½in. by ½in. to be fixed along the top of each rafter for tile-laths for tiling.

51. *Hip and Ridge Rolls, &c.*—Fix hip and ridge rolls 2in. (or 3in.) birdsmouthed to ridge. Put to all rafters sprockets 18in. long, and tilting fillets to all valleys, skylights, gutters where necessary.

52. *Skylights*.—Provide and fix over hall (or billiard-room) a 2½in. deal-framed skylight with all necessary throatings, drips, rebated and moulded bars, the lights to be grooved and hung on brass butts. If hipped, the joints to be grooved and tongued, and the ridge and hips to have 1½in. and ridge rolls, birdsmouthed on all hips. Or—

The skylight to be framed as shown in drawings. Framed lantern with 4in. by 4in. angle-posts, 2½in. by 4in. muntins, 4in. by 4in. heads; 3in. oak, sunk sill weathered and throated, and fitted with 2in. framing, with 4½in. (or 7in.) moulded ridge rails and hip stiles grooved for glass rebated into ridge and hip, and a 6in. throated bottom rail, ½in. clear of glass, 2in. moulded bars; 6in. by 2½in. twice grooved, moulded to ridge and hips. Glaze the skylight with ribbed plate glass in putty, the struts to lap at joints ½in. and cut to curve, clipped with copper clips ½in. wide screwed to head. Or—

The glazing to be executed with Rendle's "Invincible" roofing, with copper (or zinc) astragal, cappings, or gutters.

53. *Conservatory*.—The conservatory shown in elevation and plans to be constructed according to the architect's instructions, and the details fur-

nished with the exposed woodwork of carefully-selected Riga fir, wrought, chamfered (or moulded), with posts 5in. by 5in., intermediate uprights 5in. by 3in., heads 5in. by 4in., sills 7in. by 4in., 4½in. by 2in., rafters, 5in. by 3in., hips with 2½in. rebated, grooved, and moulded sash-bars for glass. Or—

The conservatory is to be executed by Messrs. Messenger and Company, Ltd., Loughborough, and Victoria-street, Westminster (or Henry Hope, Birmingham), with all fittings and ventilating appliances complete.

54. *Gutters*.—Lay to all gutters 1½in. deal gutter-boards and bearers to a fall of 1½in. in 10ft., with rebated drips every 10ft., and 2in. rounded rolls where required. No part of any gutter to be less than 9in. wide.

55. *Floors*.—Lay the floors of (specify rooms) with 1½in. yellow battens, straight joint, splayed headings, mitre borders to hearths cleaned off at completion. Or—

Lay the floors with 1in. wrought yellow deal flooring with splayed headings, bradded with 2in. floor brads punched in; the surface to be cleaned off and nail-holes puttied. Or to be 1½in. yellow deal, grooved and tongued with hoop-iron, with mitre borders to hearths, &c. (For inferior work, "Swedish" white deal may be specified.) Or—

Lay the floors and passages to office with 1in. (or 1½in.) straight-jointed wrought yellow Gaffe deal in batten widths laid folding, with splayed (or tongued) headings breaking joint; or the same, 1½in. thick, straight joint, grooved and tongued.

56. *Ground Floors*.—The best rooms to be laid with 1½in. wrought yellow Gaffe (or Archangel) deal in batten widths, laid with straight joints, with splayed (or tongued) headings breaking joint. The tongues to be galvanised hoop-iron, 1½in. (or 1in. by ½in. cross oak tongues).

57. *Reception-Room Flooring*.—Lay the drawing-room (or reception-room) floors with 1½in. wrought yellow Archangel deal in 3½in. widths (or in 4½in.), laid with straight joints with splayed (or tongued) headings, doweled with oak dowels, 1½in. by ½in., 12in. apart, and side nailed to



joists. Or the flooring may be the same deal and thicker, rebated, grooved, and tongued in half-batten widths, nailed with French nails.

If a double floor, with two thicknesses of boarding, the clause may run:—

58. *Double Flooring*.—Lay the reception-room floors with lin. (or 1½ in.) rough edges shot yellow deal flooring, in batten widths, laid folding, with straight joints and splayed beadings; and the upper flooring to be rebated, skew grooved, and tongued of lin. (or 1½ in.) Trieste (or Hungarian), Memel or wainscot oak in 3½ in. or 5 in. widths, straight-jointed splayed beadings, side nailed with French nails. The floor to be wax-polished at completion.

59. *Wood-Block Floors*.—Lay the basement floor and passages with solid wrought and grooved wood blocks in squares, or herring-bone with borders on a ½ in. cement mortar-floated face on a 6 in. bed of concrete. The blocks to be dipped in hot liquid tarand pitch before laying, and to be smooth and clean at completion. Or—

The basement (or hall or school) floors to be laid with Lowe's improved system of wood-block flooring, "herring-bone" (or "interlacing") pattern, each block securely fastened on a concrete bed 6 in. thick by Lowe's patent composition; or specify the wood block flooring to be laid by Mr. Roger L. Lowe, of Wood Pavement Works, Farnworth, Bolton (or by the "Acme" Wood Flooring Co., Victoria Park; W. Duffy, Victoria Park; or Thos. Gregory and Co., Clapham Junction). Or—

The flooring of school to be put down according to Charteris and Longley's system of wood block flooring, Earl-street, Westminster.

60. *Parquet Flooring*.—Plane over the floor of drawing or other reception rooms, and lay solid parquetry lin. thick to design, with border of the p.c. value of 3s. (or 5s.) per foot super, or cover the floor with veneered oak parquetry to pattern, approved ½ in. thick, with 12 in. border, canvassed at the back, of the p.c. value of 2s. per foot; the parquet to be laid in prepared glue, and French nailed and polished complete to satisfaction of architect. Or—

The flooring for parquetry to be counter flooring, ½ in. thick, laid diagonally, and laid quite level and planed over, and to be well seasoned. The parquetry design to be approved by the architect, and to be executed by Mailer and Co., Oxford-street (or H. W. and C. Bassant, Fitzroy-square, or Ebner and Co.)

#### SOCIETY OF ARCHITECTS' VISIT TO ELY.

A VERY pleasant meeting of the Society of Architects was, Mr. Ellis Marsland writes in an advance copy of the Society's *Journal* just to hand, recently arranged to the cathedral town of Ely. The party, numbering about twenty, started from Liverpool-street Station at 11 a.m., where the Great Eastern Railway Company had thoughtfully placed a saloon carriage at our disposal. The time spent in travelling was usefully employed for luncheon and tea, so that the all too short time to be spent in the cathedral should not be encroached upon unduly, but fully occupied in architectural pursuits. Arriving at the cathedral about one o'clock, eyes and cameras were soon busy taking in the details of this wondrous structure. At two o'clock Mr. Hills, the courteous head verger, who has an intimate knowledge of the cathedral and its history, met the party in the Galilee Porch at the west end of the nave, and conducted us round the building and, finally, into the Lady-chapel, and, at the conclusion of his description, provided seats in the choir-stalls for such of the members as desired to stay to evensong. Mr. Hills, in the course of his address, stated that the foundation of the monastery was due to Etheldreda, one of the four daughters of Anna, King of the East Anglians, in 673, of which she was the first abbess. It was one of the earliest of the great monasteries of the Fens, and upon the site of the church was afterwards erected the present Cathedral of Ely. The monastery was entirely destroyed at the Danish invasion in 870. It was refounded by Ethelwold, Bishop of Winchester, about a century later, and from this second foundation to the Conquest gradually increased in importance. No portion of Ethelwold's building remains, and the existing building is due to Simeon, the first Norman abbot, who laid the foundation of the choir and transepts between 1082 and 1094, and the work was continued by his successor Abbot Richard, who died in 1107, who so far completed the work as to remove the

body of St. Etheldreda from the old Saxon church into the new Norman choir, when the church was dedicated to that saint and to St. Peter. The work of continuing the nave to its western extremity proceeded for some 70 years, and Bishop Ridell is mentioned as having completed this, together with the bold western tower and the north-west and south-west transepts, towards the close of the 12th century. This part contains some beautiful Transitional detail. But, alas! for the work of these old Norman builders. The south-west transept has fallen and gone, and no one knows how or when, and to save the western tower, which probably soon began to show signs of collapse, Bishop Eustace at the beginning of the 13th century erected the glorious Galilee Porch, in all probability as an abutment and support to the tower, if one may judge by the thickness of the walls; but even this proved insufficient, and more had to be done in the 15th century, as evidenced by the Perpendicular piers and arches built around the 12th-century ones at this point. The condition of the extreme western arches of the nave on each side showed, undoubtedly, the wisdom of this course. The Norman church existed intact up to 1233, the only addition made being the Galilee Porch just mentioned; then Bishop Hugh, of Northwold, increased the length of the choir by taking down the Norman apse and adding to its length six bays of the most perfect and intact Early English work to be found in England. Mindful of the failure of his predecessors, the piers and clustered shafts around are all of solid Purbeck marble, and the work is as perfect as the day when completed; the remains of the end Norman piers from which the work was started eastward still exist, crowned by Early English caps. The shafts surrounding the piers are connected to them by annulets, the capitals are richly carved, and the vaulting shafts spring from foliated corbels of Purbeck marble; these are marvels of patient and loving workmanship. The triforium and clerestory are excellent in proportion, and from floor to vaulting reflect the piety and zeal of the good bishop who lies buried beneath this portion of the church which he contributed to the glory of God. Small wonder is it that the work occupied so many years to build, seeing the distance from which the materials had to be brought, the hardness of their nature, and the elaborate workmanship which had to be wrought upon them. But the church is not now in the condition in which it was left by good Bishop Northwold. A sad catastrophe happened to Abbot Richards' central tower. It had long shown signs of insecurity; so much so, that the monks had not ventured to use this portion of the church for their offices, and on February 12, 1321, it fell "with such a shock and so great a tumult that it was thought an earthquake had taken place," carrying with it the three bays of the choir up to Northwold's work. Fortunately the shrines of the three sainted patronesses escaped. The ruin caused must have been sad to contemplate, and the work of removing the debris occupied a considerable time. Alan of Walsingham was superior at that period, and to his artistic conception and under his direction was begun and completed the glorious octagon, which justly claims to be and which is undoubtedly the most perfect piece of 14th century work in existence. Cutting himself away from all former tradition, a difficult thing in those times, he conceived and carried into execution one of the boldest innovations it was possible to undertake—viz., an octagonal crossing. "Alan of Walsingham alone," says Mr. Fergusson, "of all the architects of Northern Europe, seems to have conceived the idea of getting rid of what was, in fact, the bathos of the style—the narrow, tall opening of the central tower, which, though possessing exaggerated height, gave neither space nor dignity to the principal feature. Accordingly he took for his base the whole breadth of the church, north and south, including the aisles, by that of the transepts, with their aisles in the opposite direction. Then cutting off the angles of this square he obtained an octagon more than three times as large as the square upon which the central tower would have stood by the usual English arrangement." In all probability it was Alan's intention to have placed a stone vault over his octagon, but whether from lack of means or of skill, possibly the latter, the vaulting is in wood, and forms only a decorative screen, behind which the timber struts are concealed carrying the wooden curb upon which the lantern is erected. Small wonder is it if this Medieval architect had not the

courage to put a vault over so large an area, as such a work would tax the ingenuity of latter-day architects, even with all the resources of construction and materials now at their disposal. An opportunity was given to some of the party to study the timber construction of this lantern, and a very profitable time was spent in the space above the wooden ribs and on its lead-covered sides and roof. The worthy architect Prior lies buried beneath a marble slab under the dome, and needs no other memorial than his octagon to hand his name to posterity. The three west bays of the choir are also his work. Passing through the north transept, another specimen of this architect's work is revealed in the superb Lady-chapel, situated, as at Peterborough, on the north side of the choir with its elaborate and intricate sculptured arcading; before its mutilation in Reformation times, it "must have been a perfect storehouse of statuary and elaborate tabernacle work," but even in its present condition will repay a careful study. The chapel is now used as the parish church of Holy Trinity, hence it is frequently called Trinity Church. It has a vaulted roof 46 ft. wide and 100 ft. long, and is perhaps the widest church spanned by a vault in the kingdom. The spacious windows at the east and west are of somewhat later date, and flood the building with light; but as they are not fitted with stained glass the effect at times is overpowering. Returning to the choir, two small chapels complete the cathedral as we see it to-day. That of Bishop Alcock at the end of the north aisle dates from 1486-1500; it is Late Perpendicular in style, around the sides are crowded a multitude of corbels, niches, and crocketed canopies all elaborately carved, and with a fan-vaulted ceiling and pendant in the centre. The niches were filled with statues until Puritan fanaticism decreed their demolition, and they are now empty. The whole effect of the work, beautiful and complete as it is in detail, has the effect of being overdone. The other chapel is to Bishop West, and is the latest specimen of Gothic work in the church, erected between 1515 and 1534; it has some Renaissance detail in the ribs of the vault which more resembles panelling than vaulting. The sides are a mass of niches and canopies of endless detail and elaboration, but much has gone by the hand of the spoiler; all figures have disappeared and much of the delicate carving defaced in consequence of the order in Council made 1547-8 against "the Romish superstition, and for removing images out of churches." What architecture and art lost by this order, ruthlessly executed as it was all over the country, it is impossible to estimate; but it is matter for gratification that even so much remains to testify to the skill and devotion of these old monk architects in a time which some people even to-day describe as the "Dark Ages." The remains of the conventual buildings of Ely are both interesting and numerous. The chapter-house and cloisters are gone. Prior Cranden's chapel, built under the direction of Alan of Walsingham, is most interesting for the rich remains of work of the Decorated period it contains both inside and out. The gate-house, formerly the entrance to the monastery, is an interesting building, and, known as the Ely Porta, is Early 15th century work. The remains of the infirmary were equally interesting; but the time for departure came all too soon for a careful examination of all save the cathedral itself, and as time and trains wait for no man, we had to regretfully take our leave as the setting sun was illuminating the grand old western tower with its golden rays.

#### NEW IDEAS IN LIBRARY BUILDINGS.\*

NOTICEABLE is the increasing tendency on the part of library boards to recognise that the librarian himself is—or ought to be—the expert authority to be consulted within the field of technical library details. An ideal way of bringing the librarian into closest contact with every successive step in the planning and construction of the building is by making him either the secretary or a member of the committee, board, or other sub-organisation of the governing body which has the immediate charge of erecting the building. Should this be done at the very outset—before even the building lot has been secured—the resulting benefit will be seen in the fact that each separate division of the general subject, as it comes up, will be considered,

\* From a Paper by WILLIAM E. FOSTER, Librarian, Public Library, Providence, R.I.





NEW LIBRARY OF CONGRESS, WASHINGTON, D.C.



REPRESENTATIVES' READING ROOM.



DOORWAY, REPRESENTATIVES' READING ROOM.





SOUTH HALL, CONGRESSIONAL LIBRARY.

discussed, and finally agreed upon, in the light of the suggestions which the librarian is able to bring forward. This has been done in the case of the New York, Newark, and Providence public-library buildings. Mention should be made of several architectural competitions which are of exceptional interest. The first of these is that of the New York Public Library. The preliminary arrangements were conducted by a committee of the board (with a special advisory committee of three, consisting of the executive officer of the library, Dr. Billings, Professor William R. Ware, of Columbia University, and Mr. Bernard R. Green, of the Library of Congress). It is not pleasant to be obliged to add that, owing to a peculiarly unenlightened course of action which the New York City Controller has felt obliged to adopt, this admirable building remains unbuilt, and not even begun. A letter from Dr. Billings, dated May 19, 1898, says: "The matter is now before the Department of Public Parks and the Board of Estimate and Apportionment, and it is impossible to say when action will be taken. I think it probable that ultimately the necessary funds will be granted, and the work go on to complete the contract made by the city; but this may not be done before next fall, or possibly not for a year." One of the most elaborate schemes of architectural competition is that embodied in the pamphlet of thirty-nine pages, entitled "Programme for International Competition for the Phebe Hearst Architectural Plan of the University of California" (including a library building for 750,000 volumes), which is dated "Berkeley, Cal., December 3, 1897," and which was distributed to architects and others in both continents early in 1898. The estimated cost of the building is not stated; but the fact that the sum of 50,000dols. has been set apart simply for the purposes of this competition, including the payment of the awards, makes this a noteworthy architectural incident. Among instances of

buildings not yet begun, but now in the earliest stages of preparation, there may be named the New York State Library at Albany (now moving for a location distinct from the State Capitol); the Cleveland Public Library (now making comparison of plans); and the St. Louis Public Library (which on March 24 last purchased a lot 324ft. by 282ft. for its new building). To these should be added the New York Public Library and the Jersey City Public Library, neither of which has yet advanced beyond the stage of securing plans. Seven libraries, costing in each instance more than 100,000dols., are now in process of construction—namely, the Lynn (Mass.) Public Library, the Fall River (Mass.) Public Library, the Providence (R.I.) Public Library, the Free Public Library, Newark, N.J.; the Wisconsin State Historical Society Library, Madison, Wis.; the Milwaukee Public Library and Museum; and the Omaha (Neb.) Public Library. The record of noteworthy library buildings which have been opened to the public since January 1, 1895, is a striking one. It includes the Boston Public Library, January 31, 1895; the Carnegie Library, Pittsburgh, November 5, 1895; the Pratt Institute Library, Brooklyn, May 26, 1896; the Peoria (Ill.) Public Library, February 11, 1897; the Hart Memorial Library, Troy, N.Y., May 12, 1897; the Kansas City Public Library, September 1, 1897; the Chicago Public Library, October 9, 1897; the Columbia University Library, October 12, 1897; the Library of Congress, November 1, 1897; and the Princeton University Library, November 7, 1897. Several of the public libraries above named show a striking resemblance in general type of architecture. It is obviously only a superficial observation which would classify them as "reproducing" the architecture of the Boston Public Library Building. It would be more correct to say that both the Boston Public Library and the others named below show strongly the influence

of the Sainte Geneviève Library in Paris, as that, in turn, shows the influence of some of the Italian palaces of the Renaissance, such as the Pitti Palace at Florence or the Pompeii Palace at Verona. This is a phenomenon which should possess not only interest, but instructiveness, for both the librarians and the architect who are studying the future of library architecture. Some of the subordinate bearings may be stated as follows:— (1) The architectural strong point of this type seems to consist in the symmetry and simplicity of its outlines; in the main, two parallel lines extend horizontally only so far as symmetry demands. It does not include such a feature as a tower as one of its outgrowths, and it seems to embody the counsel of an eminent English architect, quoted in a recent paper: "If you have height, do all you can to emphasise it and make it tell," and similarly, if you have length, emphasise that. In this case it is length that is emphasised and made effective. (2) Provided the other dimensions are so pronounced as to preserve the symmetry above indicated this is an architectural type that even lends itself well to buildings of so great a height as the Chicago Public Library. This is a building whose fenestration—practically only two horizontal lines of window-spaces—gives the spectator at first no real conception of its true size, its height being 90ft. Much the same may be said of the New York Public Library, though this is classified under another heading below. (3) It is also a treatment which lends itself equally well, so far as architectural considerations are concerned, to very different treatments of the ground spaces, including the quadrangle, as in the Boston Public Library; the interior courts in buildings treated like the Library of Congress; the stack in the interior of the building, as in the Chicago Public Library; the stack built parallel to the main building, or even absorbed in it architecturally, as in the Fall River instance; and the stack built at right angles to the main





NORTH-WEST GALLERY, CONGRESSIONAL LIBRARY.

building, as in the Kansas City, Newark, and Providence instances. In the last-named instance—Providence—where the stack building is compelled, by the nature of the library lot, to be a prominent architectural feature, the treatment of this “refreshing” problem—to quote Mr. Russell Sturgis—has been conspicuously successful, from an architectural as well as a practical point of view. (4) It is a type of architecture which lends itself well to the demands of purely practical considerations, such as lighting, ventilation, and arrangement. While it is true, as stated above, that this is a type which possesses many obvious advantages for library purposes, it does not by any means follow that it should be regarded as the exclusively “library” architectural type. When such a feature as a dome is rendered necessary, it combines well with the other features of this type, but, when prominently in sight, with the inevitable result of something distinctly different in effect. This may be seen in the Library of Congress, the Wisconsin Historical Society Building, the Milwaukee Public Library and Museum, and other instances. The Columbia University Library Building, one of the most exquisitely beautiful buildings recently erected in America for any purpose, while it is of the Renaissance style of architecture, has nothing in common with the type above referred to, the dome in this instance being one which very distinctly emphasises height. Finally, in touching on the details

of library arrangement, it should be said that the library building of the future will of necessity cover more space than has been planned for in the past, quite independently of the question of the constantly increasing number of volumes. Rooms such as the children’s reading-room, the art-room, and the lecture-room are here to stay, and must be reckoned with in plans for any library of the larger size. But, more than that, provision must be made for a large use of the books on the premises, in such rooms as study-rooms, reference-rooms, classrooms, &c. It is evident from a study of these recent buildings that the stack is not yet eliminated as a feature in library arrangements and construction. Yet it is noteworthy that the movement in the direction of open shelves is very well entrenched, even in those libraries which have a stack. Thus, to take what is perhaps an average case, the Providence Public Library will have at least two-fifths of its volumes elsewhere than in the stack, these volumes being accessible on open shelves, in such rooms as the reference-room, the art-room, the patent-room, the medical library, the educational library, &c. (and an even more striking result has been reached in the Newark building). One other feature of library arrangement should here be mentioned—namely, the delivery room. It seems like a truism to say that it should be in close contact with the stack, yet the experience of one

of the largest libraries in the country shows that statement is not wholly unnecessary. Acting on the principle that a straight line is the shortest distance between two points, we might naturally wish not only to place the delivery desk at the intersection of all the lines in a horizontal plan; as in the library of Congress, but also at the centre, so far as the vertical lines are concerned. The library of Cornell University makes an interesting approach to this ideal. The delivery-desk is not only at the point of junction of two stacks running at right angles to each other, but it is midway of the distance from top to bottom of the seven-story stack, owing to the sharp descent of the hill on which it is built. The Providence Public Library cannot reproduce these conditions, owing to the much less decided slope of the hill, but it makes as close an approximation to it as it can. The delivery-room projects into the stack itself, as a tenon extends into a mortise, so that there are stack floors above and below the delivery-desk as well as just beyond it.

The Congress of the Royal Institute of Public Health was opened in Dublin yesterday (Thursday), under the presidency of Sir Charles Cameron. The honorary secretary of the Congress, which will be continued to-day, to-morrow, and on Monday and Tuesday, is Mr. Henry Campbell, town clerk.



LANARKSHIRE MIDDLE WARD  
HOSPITAL, NEAR MOTHERWELL.

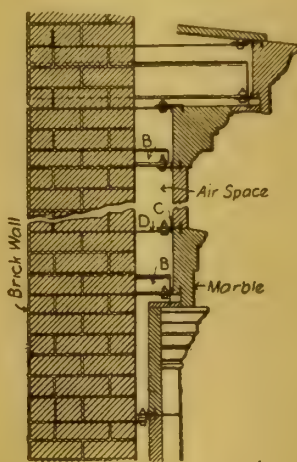
[WITH LITHOGRAPHIC ILLUSTRATIONS.]

THIS hospital, for the treatment of infectious diseases, is the fifth which has been provided by the District Committee to meet the needs of the Middle Ward of the county. The site, extending to about six acres of elevated ground, and commanding a fine view of the Clyde Valley, is admirably adapted for a hospital. The hospital is planned to accommodate 100 patients. The resident staff provided for consists of a physician, matron, 16 nurses, six maids and other servants, and a married male attendant accommodated in the lodge. In arranging the positions of the buildings care has been taken to keep the blocks as distinct as possible, yet in due relation to one another. In the porter's lodge at the entrance gate, besides accommodation for the male attendant, there is a waiting-room, lavatory, &c., for the use of patients' friends. The administrative buildings are placed in a detached position at the front of the hospital. This block comprises, on ground floor, resident physician's office, dispensary, sitting-room and bedroom, matron's office, sitting-room, nurses' dining-room and sitting-room. The bedrooms for matron and nurses are on the upper floor, apart from the servants. The kitchen is centrally placed for the distribution of food to the wards. For cooking there is a large range and an installation of steam apparatus, consisting of jacketed copper boiling-pans, steamers for fish and potatoes, &c. To rear of the kitchen are scullery, pantry, larders, and a laundry for the staff. There are four main ward pavilions, arranged on the ground *en echelon*, with the axis north and south, thus securing exposure to the sun's rays the whole day. Each pavilion is divided into two ten-bed wards, and has two separation one-bed wards attached. The main wards are 60ft. long by 26ft. wide, and 13ft. high, giving to each bed 12ft. linear wall-space, 156sq.ft. of floor-space, and 2,028ft. of cubic space. The floors are of pitch pine, wax polished, and the walls and ceilings are finished in Keene's cement. All internal angles in wood and plaster-work are rounded or hollowed. A window, 2ft. 6in. from the floor and extending to the ceiling, is placed between each bed and is constructed of double-hung sashes to three-fourths of the height, with a hinged hopper fanlight at the top, to open inwards, and all double-glazed with sheet glass. There is a verandah at the south end of each pavilion. The duty-room, or ward scullery, is placed between the wards, and through its glazed openings the nurses in charge can overlook the main and separation wards. This room is fitted with a small cooking range. The ward conveniences for patients are placed at the distal angles of each pavilion, and are cut off from the wards by ventilated and heated lobbies, and consist of ablution and bath-rooms on the one side, and water-closets and sink-rooms on the other. Each bath-room has a white enamelled bath and two lavatory basins, standing clear from the wall, with all the fittings easily accessible. In the closet-room, the basins and flushing cisterns are of the most approved pattern. The sink-room is fitted with a bed-pan sink and a scalding sink, and with a ventilated cupboard for the chamber utensils kept for examination. The floors are of cement, tinted red. All these rooms are warmed by hot-water radiators. Attached to each pavilion is a suite of undressing, bathing, and dressing-rooms, through which the patients pass on arrival at, or on being discharged from, the hospital. There is a special dressing-room for nurses, in which they can change their ward dresses before leaving the pavilion. The wards are heated by means of (a) open fireplaces, (b) low-pressure hot water. The open fireplaces are in glazed faience. Fresh air is admitted to the radiators by regulating valves, and after being heated is admitted into the wards, thus combining heating and ventilation. There are two means of exhaust ventilation in each ward—viz., vertical shafts in the end walls and ventilators in ceilings. Each shaft is fitted with a steam coil to insure, at all times, an upward current. The isolation and observation pavilions are the same in plan; each pavilion is divided into four wards for one and two beds. The laundry block is airy and amply lighted, and is divided into four sections—viz., (a) stabling, (b) boiler and engine-rooms, (c) disinfecter, destructor, and mortuary, (d) laundry. In order to economise fuel, the condensed steam from the heaters throughout the hospital build-

ings flows back to a tank near the boiler-house, from which it is pumped into the main feed-tank. The destructor has been designed to destroy not only the domestic refuse from the kitchen wards, &c., but any bedding or other infected material which may require to be burned. The mortuary is placed in a position for the convenient removal of the dead, and has a small room adjoining, from which relatives can view the dead through a glazed opening. All the walls are faced with stone and lined on the inside with brick, having a hollow space between for ventilation. The passages, lavatories, bath-rooms, and water-closets have the dado lined with white tiles. The lathing is of steel, instead of wood, while the buildings have been erected in a substantial and durable manner; every detail has been kept as plain and simple as possible. There is a complete system of subways connecting the various buildings. In these the steam and water mains, and the main leads for electric light, telephone, &c., are placed, and access can also be had through them to the several buildings, rendering it unnecessary to enter any infected ward for ordinary examination or repair. The hospital is lighted throughout by electricity. The buildings are connected by a system of telephones. The cost of the hospital, including all fittings, apparatus, machinery, furniture, and fees, will be about £37,000, or £370 per bed. Professor Jamieson, of the Technical College, Glasgow, arranged the electric light, and Mr. Archibald Leitch, consulting engineer, Glasgow, the laundry plant, which was supplied by Messrs. D. and J. Tullis, of Glasgow. The measurers were Messrs. Douglas, Hunter, and Whitson. Mr. James Corner acted as clerk of works. The architect is Mr. Alex. Cullen, of Hamilton and Motherwell.

## MARBLE VENEERING.

MARBLE veneering has been supported at a certain distance in front of the face of the main brick wall of a building in several cases, as reported by Mr. J. C. Pelton. In a paper on



"Released Ashlar," before the Technical Society of the Pacific Coast, he gives the accompanying section of the front wall of the Stockton Library Building, San Francisco, Cal. This has a brick front wall 210ft. long, faced with thin marble slabs, spaced out so as to leave an air-space about 2in. thick between them and the wall. At intervals of a foot apart, vertically, small I beams, B, are built into the wall, and project a few inches horizontally to carry a few courses of marble up to the next set of I beams; but each of the courses is held by cast-iron lugs, C, about 7in. wide, with two slotted holes, bolted to anchors D, about 10in. wide, which are built into the wall.

## PROFESSIONAL ETHICS.

THE Société Centrale des Architectes Français, issues a document entitled the "Professional Duties of the Architect Towards Himself, His Professional Brethren, His Clients, and His Contractors." The signatories are M. Gaudet and M. Charles Garnier, President of the Society. Prefacing the code is the definition of "architect" given in the "Dictionnaire de l'Académie Française" as follows: "The artist who composes buildings, determines their proportions, plan, and

decoration, has them carried into execution under his orders, and regulates the payment for them." The official code says the custom of architect is incompatible with that of contractor, manufacturer, or dealer in materials and goods employed in construction; it declares that the architect must be paid only by fees, to the exclusion of every other kind of profit, and must not engage in any operation which would bring to him discounts or commissions. He must abstain from personal advertising, from distributing prospectuses or circulars, all offers of service through newspapers, posters or other means, and is precluded from all commissions, percentages on fees, must not engage as business agent, representative of owners, manager, or in any way transact business concealed from his client. These rules are strict, and if scrupulously adhered to would make it impossible for any professional man to have any commercial transactions whatever with tradesmen or manufacturers. The Institute of Architects would do well to peruse the rules and lay down a similar code of ethics, which would render it impossible for any member of the profession to accept any commission or any appointment or profit injurious to his position as an architect. We have known architects interested in building materials and patented processes and in company promoting, all of which things would be quite contrary to the spirit and intention of these rules which our French brethren of the craft have committed themselves to.

## SCIENCE AND ART MUSEUMS.

THE second report from the Select Committee on Museums of the Science and Art Department, issued on Friday, enters into a lengthy review and criticism of the condition and management of the various museums. In the matter of purchases, it is observed, "mistakes have doubtless been made; but they have been unimportant compared with the magnitude of the collections. After withdrawing from circulation objects of no value, there remains such an increase in the value of other objects purchased, that the loss arising from those errors becomes of small account." The committee record their opinion "that the termination of the engagement of Mr. Weale, late keeper of the Art Library, immediately after the rising of the House in 1897, and subsequent to the giving of evidence by Mr. Weale, in which errors and abuses of administration in the museum were freely exposed, very much resembles a breach of privilege, and an infringement of the immunity usually enjoyed by witnesses before committees of the House of Commons." The committee have observed with regret indications of acute controversy between persons in official positions at or in connection with the museum at South Kensington. This has been an injury to the public service, and has brought discredit on the administration. They sincerely hope that all members of the staff will henceforth cordially co-operate, and thus, working together, endeavour to promote in the most effective manner the usefulness of the museum. A great deal of evidence was laid before the committee about the catalogue of "National Engraved Portraits," compiled by a cousin of the secretary of the Department. The compiler was appointed, in spite of protests from the keeper, who said that it would be a sheer waste of public money. The prediction has been verified. The catalogue has no index whatever. It is grossly inaccurate, and full of absurdities, so far as the biographical notes adapted (sometimes almost verbatim) from previous catalogues issued by South Kensington are concerned. Pugin, for instance, is said to have "cruised about the Channel, collecting archaeological and natural curiosities." Hobson is said to have died "at the time of the plague" in 1630. Ballantyne became a friend of Sir Walter Scott in 1873, and in the same year Sir David Baird took the Cape of Good Hope from the Dutch! Jackson, a publican pugilist, has eleven lines of biography, while Lord Beaconsfield, "Conservative Politician," has three. It is difficult to believe that the compiler was paid two guineas a day for correcting his proofs. In some cases the "national" prints represent personages of whom no particulars can be given, simply because they were not of national moment—Mr. West, for instance, wax chandler and oilman of Soho. Such prints are useless to an art library, and there is no need to spend large sums of money in describing them. The report concludes with the following, among other, recommendations:—



"With a view to the efficient and economical management of the museums in London, to say nothing of other educational advantages not within the order of reference, your committee deem it of paramount importance that there be an Education Minister of Cabinet rank having a seat in the Legislature, aided by a Parliamentary Secretary.

"They recommend that the Secretary for the Science and Art Department, like the Secretary of the Education Department, have his office at Whitehall.

"That there be advisers or visitors who would assist the Department by suggestions or information in matters affecting the museums, but would not lessen the responsibility to Parliament of the Parliamentary chiefs.

"That a wide discretion as to the duties of the staff continue to be vested in the Parliamentary heads and those immediately responsible to them, it being impossible to foresee what modifications of any given system may be called for by new circumstances. Your committee desire, however, to state their opinion that (1) larger discretion as to purchases ought to rest with the director of the Art Museum as well as with the director of the Science Museum, and (2) that officers be as far as practicable assigned to different divisions in the Art Museum in order that they may become accomplished experts.

"That the director of the Science Museum should possess scientific attainments, and that the director of the Art Museum have like qualifications as regards art.

"That the higher staff at the South Kensington Museum being in point of numbers inadequate to the due discharge of the duties imposed upon it, ought to be increased.

"That, having regard to the annually increasing demand made by local museums and schools of art on the South Kensington collection for circulation, it is desirable that the Parliamentary grant for purchases be increased.

"That admission to all the museums be always free.

"That provision be made for the residence of some of the principal officials in the immediate neighbourhood of the museum within which they are employed."

#### ELEVATORS IN PRIVATE HOUSES.

THANKS mainly to the high charges at which the monopolists of electric power supply it in London, we are years behind America in our adoption of lifts in private houses. In the Eastern States, American architects in their designs for residences, which are to be four stories or more in height, now make provision for an elevator, unless they have received express directions not to do so. Even in cases where the elevator is not to be put in immediately, provision is made for it either by space left for a shaft or by the actual construction of the shaft.

Nearly all elevators in private houses are operated by electricity by means of a current derived from the electric mains of the subways in the street. The owner of the house is thus relieved of all trouble concerning the motive power; it is turned on and off like the gas or electric light. Nothing is required except that the working parts of the elevator should be kept clean and lubricated, and this is usually attended to by the inspector of the installing company, so that nothing could be less troublesome.

One thing rendering it so popular is that no elevator operator is required; it is not necessary to add another to the army of servants already employed. Anyone can operate the elevator with perfect safety, for all that she or he has to do is "press the button and the company does the rest." If one wishes to ascend or descend to any floor, all he has to do is to press a certain button, and the elevator immediately starts for that floor and stops of its own accord when it gets there. In some cases the doors open and close automatically; but this involves a complicated apparatus which is found usually unsuited to a private residence. The possibility of an elevator door being left open is guarded against by a device which prevents the elevator from moving until the door has been closed, and when closed it automatically locks until it is unlocked by the arrival of the elevator.

Most of the elevators are, of course, quite small, accommodating about three persons. Some are large enough for six, or even eight. They are often very handsomely and expensively decorated. The entire designing and construction of the

elevator is done under the supervision of the elevator company; but the ornamentation is confided to the decorators and furniture makers.

#### PRISMATIC LIGHTS AND FIREPROOF CONSTRUCTION.

THE prismatic light was an English invention, having been due to Messrs. Hayward Bros. and Eckstein; but our American friends use it still more largely than we do. The new building ordinance recently adopted by the Chicago City Council provides among other things that the owner may substitute for iron shutters those made of wire glass or *prisms in fireproof setting*. That is an official recognition of the great value of these prisms, not alone for casting daylight where under former conditions it could not be brought, but for making an improved glass front or fireproof glass window. What makes the action of the city council most significant is the fact that this clause in the ordinance was due to the assertion of the secretary of the Underwriters' Association, who stated that the insurance companies regarded these glass shutters as better than iron, and that tests had shown that they resisted fire and water fully as well as iron did.

#### CHIPS.

Princess Louise has made considerable progress with the model of the statue of the Queen which she has undertaken to execute for the west porch of Manchester Cathedral. The work represents her Majesty in robes of State at the age which she had attained when she opened the Art Treasures Exhibition at Manchester in 1857.

The foundation-stones of a new Wesleyan church were laid last week at Scunthorpe, at the junction of High-street and Wells-street. The estimated cost of the land and building is £6,293. Seats will be provided for 1,100 worshippers.

Mr. J. E. Stannard, builder and contractor, of Aldeburgh, Suffolk, died last week, aged 49 years. The deceased was by trade a plumber, and going to Aldeburgh from Ipswich about 20 years since, succeeded to the old-established connection of the late Mr. H. Calver. To this business was afterwards added that of a builder and contractor. The late Mr. Stannard had been a member of the Corporation since the date of the new charter, and in 1891 was elected an alderman of the borough, to which office he was again re-elected in 1897. He had occupied the position of Chairman of the Paving and Lighting Committee.

The city council of Newcastle-on-Tyne adopted at their last meeting a scheme for an outlay of £84,000 for alterations at the Quayside, including the erection of a range of sheds from the milk market to the Swirle, together with railways, cranes, lifts, &c., at an expenditure of £39,000, and the rebuilding of the Quay at the Rotterdam and London wharves, and the 80-ton crane berth, involving an expenditure of £45,000.

The hall that has been erected at Shere, West Surrey, to commemorate the Queen's Diamond Jubilee, was formally opened on Friday. The hall, built of red brick, in the Tudor style, is situated on the cricket-ground on the Netley Park estate, facing the main street. The hall itself is 57ft. by 28ft., and seats 200 persons. It has a large platform, which can be screened off so as to form a reading-room. At the rear is a dressing-room and a balcony. The estimated cost of the hall, with the furniture and fittings, is £1,200. It has been built to the designs of Mr. Felix Clay, and Mrs. Etherington, of Albury, was the contractor.

The old hall at Hebburn-on-Tyne has been reconstructed as an infirmary from plans by Mr. Thompson, architect, and was formally opened last week. The outlay has been about £1,200.

Plans for a new brick and stone church to replace the wood structure at the top of Lockwood-street, Driffield, known as St. John's Church, were passed by the urban district council on Monday night. The church is to cost about £4,000, a considerable part of which comes from the Marriott bequest, and its seating capacity will be 421. The style is Norman.

In the course of a few weeks the memorial window, which is to be erected in Cloughton parish church in memory of Sir Frank Lockwood, will be completed and unveiled. The committee selected the design of Messrs. Atkinson, of Newcastle-on-Tyne, and the subject illustrated is the Judgment of Solomon. In the centre light is a figure of the king in the act of giving judgment. It is draped in an under-robe of white diapered with gold. On each side are the two mothers, one with her dead child at her knees, and the other clasping the living child to her breast. A secondary figure is a soldier with a drawn sword ready to carry into effect Solomon's award.

#### OBITUARY.

WE regret to announce that Mr. JAMES SINNOTT, of the firm of Sinnott, Sinnott, and Powell, architects and surveyors, 13, Harrington-street, Liverpool, lost his life by a bathing accident at Eastbourne on Tuesday morning. The deceased, who leaves a widow and two children, came to Eastbourne on Sunday with his brother, Mr. Bernard Sinnott, of 13, Harrington-street, Liverpool. The brothers left their hotel on Tuesday morning and hired a boat from the beach. When they were some distance from the shore deceased undressed and, jumping into the water, commenced to swim. The weather was fine and the sea smooth; but after he had been in the water some little time he cried out in distress, calling his brother by name. Mr. Bernard Sinnott made every effort to get the boat round, but was unable to do so quickly because of the strong tide, and the deceased, who disappeared almost at once, was drowned.

THE death occurred on Monday, at Darlington-place, Bath, of Mr. THOMAS BROWNE, A.R.I.B.A., of the firm of Messrs. Browne and Gill, architects, of 1, Fountain's-buildings, in that city, who came from London in 1864, and afterwards succeeded to the practice of the late Mr. Gill. Mr. Browne, who had carried out many important works in Bath, had been an Associate of the Royal Institute of British Architects since 1874. He was in his sixtieth year.

M. EUGENE BOUDIN, the well-known artist, died from cancer in Paris on the 11th inst., aged 73 years. Eugène Boudin, the son of a Honfleur pilot, learnt by instinct to draw dramatic and picturesque scenes of sea and land. He received much help from Troyon, and the municipality of Havre provided him with the means of going to Paris to study Art. In the French capital he frequented none of the studios, but studied the works of the great artists exhibited in the Louvre and other public galleries. At the same time, Troyon, Millet, and Corot gave him advice. Very numerous works signed by Troyon were drawn and partially painted by his pupil. At thirty years of age no one could equal Boudin in the colouring of skies. In 1860 Isabey taught him how to animate his landscapes, and it was works of that description which gained for him his high reputation. Among his masterpieces are the Inauguration of the Casino at Deauville, the Regatta at Trouville, and the Races at Deauville. By his death French Art loses the last representative of the school of 1830, and the first of the Impressionists.

MR. MURDOCH PATERSON, C.E., Inverness, whose name has been identified with the Highland Railway for many years, died on Tuesday week. He had been in failing health for a long time; but the end of his long career came somewhat unexpectedly, as he had been taking part in engineering supervision within the past fortnight. An Invernessian by birth and training, the late Mr. Paterson designed and constructed 500 miles of railway in the Highlands. When a lad, Mr. Paterson entered the employment of the late Joseph Mitchell, C.E., who then occupied the position of surveyor of the roads and bridges in the Highlands which were being constructed and maintained by the Government. In a few years, the young man was intrusted with the surveyorship of some of the new roads, and he assisted his chief in the designing of harbours on the north coast, and of various buildings, including churches, which were also being provided by a paternal Government. Mr. Paterson's work on the harbours enabled him to design an embankment for the river Ness, executed early in the "fifties." From the inception of the Highland Railway, which took its first shape in the Inverness and Nairn line, a level bit of fifteen miles, Mr. Paterson had been actively engaged in the extensions and development of the system, and he has died, as he wished, in harness. He assisted in the survey of the Inverness and Nairn Railway in its subsequent extension to Keith, and, later on, in the construction of the Forbes and Stanley line, which surmounted the Grampians. About this time Mr. Mitchell assumed Mr. Murdoch Paterson and Mr. William Paterson, his brother, as partners, and the firm of Mitchell and Co. did a great deal of engineering work all over the Highlands. The Highland Railway began to spread itself to the north of Inverness, and the subject of this notice was busily employed in designing the extension to Dingwall, then to Invergordon, and finally to Helmsdale and Wick, the last piece being



separately formed as the Sutherland and Caithness Railway. Attention was then turned to the west, and Mr. Paterson and his brother prepared the designs and superintended the construction of the Skye line. The firm of Mitchell and Co. having been dissolved, Mr. Murdoch Paterson entered upon an independent professional career, and after he finished the railway work in Caithness in 1874, he accepted the post of chief engineer to the Highland Railway Company. Until the end he continued to serve the company, latterly in connection with the construction works only, Mr. William Roberts, C.E., having been appointed engineer for the opened lines in 1891. The designing and construction of the Aviemore deviation, which materially shortens the journey between Inverness and Perth, was Mr. Paterson's last and greatest undertaking, and he was employed in supervising the finishing touches to it when he was called away. Had he lived a few weeks longer, he would have seen a train passing over the new line. He has died in his seventy-second year, and is survived by a widow and two daughters, one of whom is married.

#### CHIPS.

By her will, Mrs. Elizabeth Lynn Linton, of Brougham House, Malvern, author and journalist, who died on July 14 last, aged 76, disposed of personal estate valued at £16,484. The testatrix ordered that the Elgin marbles, which did not belong to her, should be carefully packed by an art packer and sent to her husband's representatives for presentation to the American National Gallery, by his desire.

In the case of Herbert Maybury, of Crewe, builder, the order of discharge from bankruptcy has been suspended for four years, ending July 5, 1902.

The Board of Trade have issued a certificate sanctioning running cars on the new Cliff Tramways at Swansea, declaring the same fit for traffic. The line will be opened forthwith.

Extensive improvements are to be made on the Mid-Kent (South-Eastern Railway) line, including new stations at New Beckenham and Lower Sydenham, the total cost to be about £10,000. The work has just been commenced.

A dinner was held at Colwyn Bay on Tuesday night in celebration of the completion of the electric light installation on the new promenade. The light was afterwards switched on by Mrs. Herbert Roberts, wife of the member of Parliament for West Denbighshire. The arc-light installation has been carried out by Messrs. Biggs and Thomas, the contractors, the engineers being Mr. Chozeburg.

At Monday's meeting of the Dundee Harbour Board, considerable discussion took place on a proposal to increase the salary of Mr. G. C. Buchanan, harbour engineer, from £400 to £500. An amendment was proposed limiting the increase to £50, and, after some altercation, the amendment was carried by 10 votes to 9.

The sanction of the Local Government Board has been received for the borrowing by the Lincoln Corporation of £1,994 for the extension of wood-paving in the city.

Mr. B. Parkes, of the Public Works Department of India, whose services were lent gratis to the Lahore Municipal Committee, to draw up a proper scheme for the improvement and extension of the Lahore Water Works, has completed his task. Mr. Parkes' scheme has been accepted by the Chief Engineer and Secretary to Government, Punjab Public Works Department.

Mr. C. Waymouth has been appointed surveyor to the Urban District Council of St. Marychurch, near Torquay, at a salary of £140 per annum, in the place of Mr. W. D. Bowden, resigned.

The town council of Morpeth have adopted plans prepared by their sanitary inspector, Mr. W. F. Curry, for converting the Grand Stand on the common into an infectious diseases hospital, at a cost of £750. The Medical Officer of Health (Dr. Skrimshire) stated that the proposals were on the lines of model plans prepared by the Local Government Board. It was ordered that the designs be submitted for approval to the Rural District Council, in whose district the property is.

At the last meeting of Launceston Town Council, plans and specifications were produced and approved of the proposed Passmore Edwards Public Library and Science and Art Schools to be erected at Northgate. A letter was also read from Mr. Silvanus Trevel (the architect), stating that the cost of the building would be £1,800. The balance between that and the sum promised would be required in payment of architect's commission, heating, and incidentals. The contract was for Mr. Edwards personally, and had been let to Mr. Burt.

## Building Intelligence.

**BURSLER.**—A new building for the Birmingham, District, and Counties Banking Company (Limited) has been opened for business. The bank is situated in Moorland-road, at the corner of Price-street. The two fronts are faced with Ruabon bricks, and have dressings of red and buff terracotta. The bank entrance is at the corner of the two streets; the doorway is richer than the other parts of the exterior, and is executed in red terracotta. There is a side entrance from Price-street, and another doorway in Moorland-road, the latter giving access to a set of offices on the upper floor. The banking room is 30ft. in width, by 34ft. in length, and 17ft. 6in. in height. It has a dado all round of encaustic tiles, which, with the pavement of the public space, is the work of Messrs. T. and R. Boote (Limited). The counter, clerks' desks, and other fittings, together with the furniture of the manager's private room, have been made by Messrs. H. Goodall and Sons, of Newcastle, working from the architects' designs. The builders are Messrs. C. and J. Grant, of Cobridge. The architects are Messrs. C. Whitwell and Son, of Birmingham.

**CANTERBURY.**—Lieut.-Col. Albert C. Smith, R.E., Local Government Board Inspector, on Friday, opened an inquiry at the Guildhall, Canterbury, into the proposal of the city council to borrow £70,000 for the purchase of the Stone House Estate and the erection of a lunatic asylum. Mr. W. J. Jennings, architect and surveyor, Canterbury, was called, and said he recently carried out extensions at Chartham Asylum, costing £40,000, for the Kent County Council. He conducted the negotiations for the purchase of the Stone House Estate for the purposes of any asylum for Canterbury, and he had prepared the plans (produced) for the proposed asylum. The property covered an area of 51 acres, and was situated on the outskirts of the city. There were at the present time a residence, large pleasure garden, kitchen garden, glass-houses, stabling, cottages, and a small range of farm buildings. The property was well timbered and watered. The proposal was to erect on the Canterbury site of the present house new buildings to accommodate 200 pauper patients (100 of each sex), with administrative buildings, laundry, kitchens, stores, &c., capable of serving 350 patients; to convert the present residence into a building to accommodate 30 private patients, and to build a new block to accommodate 20 private patients. The medical superintendent's house would be erected, and also a storekeeper's house and the other usual offices. The asylum would be only two stories high, and the plans had been generally approved by the Lunacy Commissioners. The drainage would be carried into the Canterbury system of sewerage, and for the lighting it was proposed to supply by electricity from the corporation station. As to cost, he estimated the site at £10,000; blocks of buildings for 200 pauper patients, £20,000; administrative buildings, &c., £15,000; alterations and additions to Stone House for 30 private patients, £2,000; block for twenty private patients, £3,500; and medical superintendent's house, £2,500. Other buildings, drainage, furnishing, architect, clerk of works, &c., brought the total up to £70,000. Considerable opposition was raised on behalf of ratepayers and neighbouring landowners, who urged that the better course would be for the Canterbury Corporation to unite with the Kent County Council, and build an additional wing to the existing asylum at Chartham.

**CARISBROOKE CASTLE.**—Princess Henry of Battenberg opened, on Friday, a museum which has been formed out of a portion of the ruins over the Gate House at Carisbrooke Castle, and constitutes the memorial of the Isle of Wight to the memory of her late husband, who was the Governor of the island. The rooms have been erected, or rather restored, in the ancient gateway, and include the guard-room, the portcullis-room, and smaller rooms in the turrets. In the first-named room hangs a painting of the late Prince, inclosed in an oak frame, by Angeli. On the walls is arranged a quantity of ancient armour, sent from the Tower of London, and, in addition, a Ventnor resident has lent a complete suit of armour in an excellent state of preservation. An object of local interest is the old parish gun from Carisbrooke, dated 1555, which has also been forwarded from the Tower of London. The bronze

work is handsome, and the enamelling in silver is said to be the most elaborate ever done in England. The works of restoration have been carried out from plans by and under the supervision of Mr. Percy G. Stone, F.S.A., F.R.I.B.A., of Great Marlborough-street, W., the author of several well-known illustrated architectural works on the Isle of Wight.

**CHESTERFIELD.**—The Stephenson Memorial Hall, which was erected in 1877-9, at a cost of £13,362 15s. 1d., as a memorial to George Stephenson, was opened on Monday, after enlargement and alteration at a cost approaching £4,000. The old building, which covers an area of 1,200 square yards, comprised on the ground floor a public hall with three retiring-rooms and council-room, lecture-hall, museum, library, and reading-room. On the first floor elementary and advanced art-rooms, science-class room, and laboratory. In the basement was placed the caretaker's house, storage, cellar, serving-kitchen, and lavatories. The corporation eventually secured the property for £4,000. But by them the building was found to be inadequate, and not up to present-day requirements. It was badly heated and ventilated, the entrances were far from satisfactory, and the caretaker's basement house was unhealthy. The corporation then purchased vacant land at the east end of the public hall, and determined to enlarge the hall by adding a stage, providing retiring-rooms, and improving the entrances. Premiums were offered in open competition to architects, and the plans and designs by Mr. W. H. Wagstaff, architect, Chesterfield, were selected. That scheme has now been carried out under Mr. Wagstaff's supervision. The new stage is 48ft. wide and 45ft. 8in. from front to back, and well fitted up with stage-traps, &c. The flies are 8ft. wide, the height from stage floor to beams at the front being 20ft. 6in., and 19ft. at the back, the grid is about 30ft. wide, the beams being 43ft. above the stage floor. There is a bridge from fly to fly, and so arranged as to be used for scene painting. The proscenium opening between the old hall and the new stage is 26ft. wide and 24ft. 6in. high in clear, and enables the stage to be used for concerts. To the opening is fixed a fireproof curtain, which, when down, completely divides the stage from the auditorium. Six dressing-rooms have been built alongside the stage and fronting Corporation-street, with artistes' entrance. The entrances have been entirely rearranged. In Station Back-lane are special exit doors both to the hall and gallery. The new staircases have been constructed in stone with landings in each flight. The public hall has now a floor space of 68ft. by 46ft. 6in. The heating, ventilation, and lighting arrangements have been revised. In Station Back-lane, which is now being made wider, a new house has been built for the caretaker. The decoration of the hall has been carried out by Messrs. Eyre and Sons, Limited, Chesterfield. The sole contractor for the alterations is Mr. John Wright, Beetwell-street, Chesterfield. The mosaic flooring is by Messrs. J. and H. Patterson, Manchester; the proscenium fibrous plaster work and decoration to same by Messrs. F. de Long and Co., London; the fireproof curtain by Messrs. Merryweather and Sons, London. The hydrants and fire-extinguishing appliance have been supplied by Messrs. Shand, Mason, and Co., London. The sunburners and brass work are by Messrs. Guest and Chimes, Rotherham, and the ventilators by Messrs. Robert Boyle and Son, London.

**INVERURIE.**—The new locomotive and carriage-building works which are being erected at Inverurie by the Great North of Scotland Railway Company are being rapidly proceeded with, and the completed works will be occupied twelve months hence. The carriage and wagon shop measures 362ft. by 182ft. The east wall has been completed, while the west wall is well advanced. The building will be roofed on the multiple system, the north side of each roof being of glass, and the south side slated. Ten columns in two rows in the interior of the building aid the walls in supporting the lattice girders that form the framework of the roof. The side walls, which rise to a height of 23ft. above rail level, are each pierced with twenty-one large windows, and the floor above is lighted by means of the roof lights and by windows in each of the numerous small gables. The building is wide enough to permit of nine lines of rails being laid abreast, but only seven tracks are provided for meantime. Benches for the staff of work-



men will run along the sides, and part of the ground floor is to be inclosed as a store and office—118ft. by 21ft. There are large sliding doors at the ends for the passage of carriages and waggons, and entrance is also gained by three doors in each side wall. The second floor will be used as a pattern-making shop. None of the other buildings are yet commenced. The paint-shop will occupy a site to the west of the carriage works, and will be 242ft. by 122ft. In it accommodation will be provided for painters, upholsterers, machinists, French polishers, &c., and it will contain hair, cloth, and cushion stores. The locomotive workshops will be erected at the east end of the ground. The dimensions of the first building are 270ft. by 102ft., and it will contain foundry, copper-smiths' and tinsmiths' workshops, tire furnace, and smithy. Adjoining the foundry is another building, 270ft. by 263ft., containing fitting shop, erecting shop, and boiler shop. In the smithy there will be 36 furnaces, and the furnishings include three steam-hammers. A large gang of men are now at work levelling the ground and laying the line of rails. Besides the new works the company are providing a new station. The plans have been prepared, and tenders are to be invited almost immediately. In all about 80 acres of ground have been purchased by the company in and about the burgh.

**MULLION COVE.**—An hotel has just been built on the rocks at Mullion Cove, overlooking the whole sweep of Mount's Bay. The design of the building is plain and substantial. The principal features on the south are two prominent bays—one, circular, forming the central feature of the complete plan when circumstances may require the enlargement of the premises. A covered verandah occupies the space between the bays. The entrance is placed on the south, a projecting wing, with bay, affording shelter from the east wind. The south wing and flat roof of this bay is finished with battlements, behind which rises a flagstaff. On the ground floor are coffee-room, 32ft. by 17ft., with smaller dining-room adjoining, 20ft. by 13ft.; sitting-room, 13ft. by 12ft.; drawing-room, 20ft. by 16ft.; reading-room, 24ft. by 16ft.; billiard-room, 25ft. by 20ft.; office and luggage lift, and lavatory block, which projects from main building. There are two kitchens adjacent to coffee-room, with larders, pantry, and scullery, and servants' dining-room. From the kitchen department separate service stairs communicate to a cellar in basement, and to each upper floor. The first floor contains 13 bedrooms and three sitting-rooms, one in each bay, bath-rooms, linen-room, and offices, supplied with hot and cold water. The second floor has 18 bedrooms, with offices as on first floor. The whole of the doors and joinery to the principal rooms on ground and first floor, with hall and corridors and the main staircase, are of selected pitch-pine. All the rooms are provided with fireplaces, and are of the following heights:—Ground floor, 11ft. 6in.; first floor, 10ft.; second floor, 9ft. The lighting is by electricity, the motive power being from a 4½ H.P. oil-engine, fixed in a detached building. At the back of the main building are coal and wood stores, laundry, and other offices, with three bedrooms over a picnic-room 42ft. by 16ft. There is also a detached stable block and coach-house, with provision for cycles. The private grounds include tennis courts, spacious terrace, and gardens. The main drain from the hotel boundary to the sea is laid by Lord Robartes, who has also laid out the carriage drive from the new Mullion Cove-road to the hotel site. This road also opens up most building sites facing south and west. The water supply has been taken at Lord Robartes' expense from a spring in the opposite hill and piped to the valley, whence it is raised by a hydraulic ram to a covered reservoir, and passed then on to the highest part of the hotel. Mr. Sampson Hill, of Redruth, was architect; the contractors were Messrs. Winn and Son, of Helston, and Messrs. James and Son, of Helston, were the furnishers.

**RAVENSTONDALE.**—Mr. Carver, having bought a considerable portion of the village, has already built himself a house and stable, and is now building model cottages. A new hotel has to follow immediately, which will be made in a very substantial manner on the lines of the old "manor houses" in the neighbourhood. A stone staircase leading from the roadway to a public room for sales, &c., will be made a feature, having an oak gallery over, as seen in many country inns. Homesteads and farm building

for the estate will also be built. This work is in the hands of his architect, Mr. Robert Walker, F.R.I.B.A., Windermere, who has been engaged for upwards of two years upon the work.

**SPARKBROOK.**—As we announced last week, Mr. W. H. Bidlake, M.A., of Birmingham, has been selected as the architect of the new church of St. Agatha, to be built at Sparkbrook, under the Birmingham Churches Act. Mr. Bidlake's designs provide for a building with a modern rendering of Early Perpendicular. The west front of the building, which is to face Stratford-road, will consist of a lofty tower on the central axis of the church, with deeply recessed porches each side. Under the tower will be the baptistery, and the porches, with cloak-rooms adjoining, will lead to a nave of six bays, crossed transversely by a series of arches carrying the roof. The chancel of three bays will be terminated by a large traceried window. The choir transept, with organ-loft over, is to be on the north side of the chancel, and the choir and clergy vestries on the south side, communicating with the chancel by an ambulatory. There is also to be a third porch at the east end of the south aisle. The building will be faced with red brick externally, with roof of green slates, and light buff brick internally, and the tracery is to be of buff terracotta. The nave arcade is to be of Hollington stone, and the floor of wood blocks. Accommodation is to be provided for 1,000 worshippers, and the cost of the church will be about £10,000.

**WREXHAM.**—A special service has been held at St. Mark's Church in connection with the dedication of the new choir stalls which have just been erected by Messrs. Harry Hems and Sons, of Exeter. The stalls, which are of oak, have been constructed from drawings by Mr. J. H. Swainston, architect, Wrexham. The choirsters' desks are divided into five bays on the north and six on the south side by moulded and columned cut standards rising from a moulded plinth, intervening spaces being spanned by cusped elliptical arches, with carved spandrels springing from moulded and carved corbels, and surmounted by pierced geometrical traceried panels, with moulded string and cornice. All the bench and desk ends are moulded on edge, and have sunk traceried panels and carved scroll terminations and poppy-heads, the clergy desks, which are somewhat more ornate than the choir desks, having carved representations of St. Mark on the north side as evangelist, and on the south in his subsequent capacity as Bishop of Alexandria. The clergy seats have modelled and carved winged lions in a seated position, forming the outer end of the arm of the seat. The remainder of the end facing the nave and the backs are treated with sunk traceried panelling. The choir desks are broad and comparatively high to prevent as far as possible the liability of sheet music to damage, supplemented by broad bookshelves below. Recently, the space within the altar rails was laid with marble, the steps were faced with the same material, and the windows are now being replaced by cathedral glass in lead quarries.

The Duchess of Newcastle has consented to open a fine art and industrial exhibition at Newark on November 30.

At Blackburn, on Friday, Mr. W. O. E. Meade held a Local Government Board inquiry at the town-hall into the corporation's application to borrow sums of £10,500 for the erection of a new main outlet, opposite the end of Rigby-road, into the sea; £1,000 for improvements at the sanatorium; and £5,948 for private street improvements. In support of the applications, the town clerk said it was intended to make the town, as a health resort, as nearly perfect as possible. There was no opposition.

In connection with the widening of the Great Northern Railway at Finsbury Park, the old cast-iron bridge, carried on brick piers over the Stroud Green-road, has been removed, and a new steel bridge, without piers, weighing over 200 tons, has been put in its place, and, despite the awkwardness of the situation, the line was ready for use within four hours of the time it was first disturbed. In March last Messrs. Handyside, the contractors, commenced operations. By the northern side of the old bridge they built a new one, with the railroad already on it, resting on six small carriages. All being ready, cranes were set to work to lift the 10-ton girders of the old bridge out, and in a few minutes they were all cleared away. Steam crabs were used for hauling the new bridge, and 20 minutes sufficed to pull it along the lines in the place of the old one.

## Engineering Notes.

**ELECTRIC TRAMWAYS FROM KEW BRIDGE TO HOUNSLOW AND FROM HANWELL TO BRENTFORD.**—A measure which received the Royal assent in the closing days of the Session just ended is the London United Tramways Act, promoted by the London United Tramways (Limited), the proprietors of the tramways from Acton to Uxbridge-road Station and from Hammersmith to Kew Bridge and Richmond. This provides for the extension of the present system from Kew Bridge, through Brentford and Isleworth, to Hounslow, and involves the widening of High-street, Brentford. Another section of the line for which powers have been obtained will connect Hanwell with Brentford, *via* Boston-road. In the measure as originally drafted it was proposed to connect Hanwell with Acton by a tramway running along the main Uxbridge-road through Ealing; but the opposition of the Ealing frontagers succeeded in inducing the House of Commons Committee to declare that portion of the preamble of the company's Bill not proved. In its original form the Act also contemplated the carrying of the line over the new Kew Bridge when constructed, and the relaying of the section along the Kew-road to Richmond as a double line, but these portions of the Bill were dropped. The Act, as now passed, contemplates not only the extension of the system, but the substitution on that part of it which is wholly in the county of Middlesex, and electric motive power for horse haulage, the opposition of the London County Council to the overhead trolley system, which it is intended to adopt, having prevented the company obtaining powers to apply the system to that portion of the line which is within the county of London. In order to secure the consent of the Chiswick District Council, through whose area the line runs, to the postponement of their powers of purchase, which were exercisable as to part of the system in 1903, and as to the remainder in 1910, till 1919, when the other local authorities affected will have power to purchase the sections within their areas, the company, as the result of negotiation with the council, agree to pay £12,000.

**THE RIBBLE WORKS AND THE INTERESTS OF LYTHAM AND ST. ANNE'S.**—Mr. G. N. Abernethy, C.E., has, at the request of the urban district councils of Lytham and St. Anne's, made an examination of the training walls now being constructed by the Corporation of Preston under their Act of 1896, and he has presented his report. It is evident, he says, that the training walls sanctioned by Parliament have been partially constructed. A great accumulation of sand has taken place at Lytham Pier, and more particularly at St. Anne's, where the channel is rapidly filling up. The Preston Corporation, he finds, have constructed works Nos. 4 and 5 on the Parliamentary plan; but the work to which he attaches the most importance in directing and diverting a portion of the ebb tide on to the Lytham foreshore and down the north channel—namely, training wall No. 1—has not been commenced. As a consequence of this, training wall No. 4 practically arrested and diverted the whole of the ebb tide down the main channel, which is a very serious condition of things for Lytham, and particularly for St. Anne's, and unless steps are immediately taken to construct training wall No. 1 and remove the accretion of sand which has taken place below Lytham Pier, and at the entrance to the north channel, in Mr. Abernethy's opinion the waterway of St. Anne's will soon cease to exist. By the extension of training wall No. 6 the subsidiary channels which admitted the tidal water of the north channel have been completely closed, and the only water which at present reached the north channel on the early period of the flood is that which passed over the sandbanks with great velocity, and which is heavily charged with sand. He strongly recommended the committee of the two councils to call the attention of the Board of Trade to the condition of the estuary, and considers it important that immediate steps be taken to mitigate the further damage which must inevitably ensue.

Probate of the will of Mr. William Brettell, Chawn Hill, Oldswinford, Worcester, maltster and builder, who died on the 15th January last, aged sixty-three years, leaving personal estate of the net value of £1,989 5s. 4d., and the gross value of whose estate has been entered at £4,819 8s. 11d., has been granted to his widow and his two sons.



## PROFESSIONAL AND TRADE SOCIETIES.

**CAMBRIAN ARCHEOLOGICAL ASSOCIATION.**—The fifty-second annual meeting of this association was held at Ludlow on Monday in last week and four following days, the headquarters being at the fine old half-timbered hostelry known as The Feathers. The formal proceedings commenced on Tuesday, the 9th inst., in the town-hall, when Sir Owen Swinfield, Bart., the retiring president, vacated the chair in favour of his successor in office, Lord Windsor. Lord Windsor then took the chair, and offered the visitors a hearty welcome to the neighbourhood, which possessed undoubtedly many old buildings worthy of careful attention and study, and scenery of its kind hardly to be surpassed in Great Britain. There was no doubt about the importance of the country, or about the stirring events which must have taken place during the struggle of the Romans and Britons for the border country of Wales, and whether the great battle which ended in the defeat of Caractacus really took place near Coxwell Knoll, between the Clun and Teme, or whether, as seemed more probable, the site was thirty miles further north, on the banks of the Severn, the position of the Roman roads and numerous Roman as well as British encampments abundantly testified to many such bloodthirsty encounters between invaders and invaded. Mr. R. Jasper More, M.P., read a paper on "Caractacus," after which the Rev. C. H. Drinkwater read another on "Bromfield Priory." The members also visited the famous castle, the great Church of St. Lawrence, the Bull Inn, the Museum, Barneby House, the Broad Gate, and Ludford Bridge. On the Wednesday morning the members assembled at the Feathers Hotel, and were conveyed to Stanton Lacy, Culmington, Diddlebury, Corham Castle, Holgate, The Heath, and Abdon, where Abdon Burf was inspected. Tea was taken at Burwarton. On the Thursday excursions were made to Bucknell, Coxwell Knoll, and Stokesay Castle. At the annual general meeting held in the evening, it was decided that next year an excursion should be made to Scotland.

**EAST RIDING ANTIQUARIAN SOCIETY.**—The third summer excursion of this society took place on Friday, when Driffield was visited. There was a strong muster of members, including the president, the Rev. M. C. F. Morris. The party drove to Langtoft, and Mr. J. Bilson, F.S.A., explained that the name was derived from the Long toft or field, which in Edward the Confessor's time produced a fair rental, but in Domesday was returned as waste, the gross value being only 10s. It soon came into the hands of the Church, for in 1298 we find that Reginald FitzPeter did homage to the Archbishop for lands in this village. In the Inventory of Edward VI. the church is described as possessing a chalice of silver, three vestments, and two candlesticks, and Sir Tatton Sykes was quite right, from an antiquarian point of view, in resisting more than two candlesticks being placed in Sledmere Church. From there the party went on to Kilham, which formerly was a very important place, as evidenced by the size of the church. In Domesday the land was stated to be the property of the Archbishop of Rouen, so early did the Conqueror begin to reward his Norman followers. Kilham is another striking instance of the havoc wrought by the Conqueror in Yorkshire, for the land went down in value 87 per cent. from what it had been under the Confessor. The party concluded the day at Harpham, where the tombs of the St. Quintins were inspected.

Extensive improvements in connection with the Midland and Great Northern Joint Railways are contemplated. The work of doubling the line between Sutton Bridge and Lynn is steadily proceeding, about forty men now being employed in laying the additional metals from Terrington to Walpole Station. A new station is about to be built for the same joint committee at Wisbech.

The Local Government Board has sanctioned the borrowing of the £2,250 for which the urban district council of Castleton, near Rochdale, asked, in order to purchase land to add to the sewage works.

On Thursday, in last week, the members of the town council and waterworks shareholders accepted the invitation of the directors of the Chester Waterworks Company to visit the works in Broughton, on the occasion of the opening of a new filtering reservoir. The new bed covers an area of 2,000 square yards, with a capacity of storing three-quarters of a million gallons of water. It will filter 18,000 gallons per hour.

## COMPETITIONS.

**GLASGOW.**—The time for receiving competitive plans for the Glasgow International Exhibition of 1901 expired on Monday. It is understood that 16 sets of plans have been lodged with Mr. Hedley, the manager. A meeting will be held on an early date to examine the plans and make a selection.

**MAIDSTONE.**—The town council have decided, on the recommendation of the electric lighting committee, "that competitive designs for a combined electric station and dust destructor, on the lines of the Shoreditch system, be advertised for, such designs to be submitted to Messrs. Kincaid and Co., as assessors."

**PLAYING-CARD DESIGNS.**—The Worshipful Company of Makers of Playing-Cards offers the "H. D. Phillips prize" of £5 5s. for the best special design for the backs of playing-cards, intended for presentation by the Company to its guests at the banquet of the Master and Wardens in November next. Two other prizes of £3 3s. and £2 2s. respectively are offered by the Company for the two next best of such designs. The designs must be of the size of an ordinary playing-card, and are to be in colour, and such as can be reproduced effectively in not more than six printings. The arms of the Company are to form a portion of the design. Designs must be sent to W. Hayes, the clerk of the Company, Guildhall, London, E.C., not later than Sept. 27 next. The monogram or device of the artist is to be marked on the back of each design and on the outside of a sealed envelope to accompany it, within which envelope must be given the full name and address of the artist. The three designs selected are to be the absolute property of the Company; the unselected ones will be returned to the senders. Novelty of design will be regarded as an important element in the competition.

**REIGATE.**—According to the particulars of competition for the new Municipal Buildings, issued by Mr. W. H. Prescott, of Redhill, the borough surveyor of Reigate, the corporation of the twin towns seem to have lost their heads, for in a paroxysm of reckless extravagance they offer premiums of £50, £30, and £20 for designs for the proposed buildings, the limit of cost being £15,000, exclusive of fittings and furniture. There is a certain method in their prodigality, for the assessors to the corporation, whose names unfortunately are withheld, "do not bind themselves, in the event of only a small number competing, to give the three premiums before mentioned, but only such as they may consider merited," while all "three designs to which the assessors may award these premiums are to become the property of the corporation, and their authors shall have no further claim upon them." The town council amply protect themselves, for they "do not guarantee to carry out any of the designs, and also reserve the right to modify, combine, alter or amend any of the prize designs which they may think fit, and in the event of any designs being carried out, no further payment will be made to the authors," who will thus have the honour of planning, designing, and superintending the erection of municipal offices, fire-brigade station, police offices, and borough court and chief constable's residence, for a commission of one-third per cent., fittings and furniture to be thrown in. Such a privilege will be almost priceless, and had we not the printed conditions before us as a guarantee of good faith, we should have imagined that some mistake had been made, or that it emanated from Dawson City or some other El Dorado where gold is accounted as silver. The postmark, however, is the familiar one associated with the Mid-Surrey town. The drawings required, five in number, all to an  $\frac{1}{4}$  in. scale, comprise a general elevation, general section through main portion of building, basement plan (police department), ground-floor plan (throughout), and first-floor plan (throughout). It will be interesting to see the number of responses to this generous open invitation sent in by October 6th.

**WIMBLEDON.**—Plans were received on Monday by the clerk to the urban district council from the half-dozen architects invited to compete for the public library, proposed to be built in Latimer-road, at a cost of from £7,000 to £10,000.

Four almshouses are about to be built at York as a memorial to the late Sir Joseph Terry. The architect is Mr. W. G. Penty, of York.

## STATUES, MEMORIALS, &c.

**NETLEY.**—An addition has been made to the memorials in the chapel at Netley Hospital, in the form of a marble tablet, intended to perpetuate the name and services of the late Sir William Mackinnon. It is erected on the west wall of the chapel, and consists of a panel surrounded by fluted and moulded pilaster, supporting a frieze and pediment. The tympanum of the latter is enriched by conventional carving, which supports a shield quartered with the arms of Sir W. Mackinnon. On the lower portion of the tablet beneath the inscription panel the badge of the medical staff is carved, whilst in each of the spandrels above the Geneva Cross is introduced, formed by red marble inlaid in white marble circles. The latter material is used for the whole of the memorial except the shaped background, which is of the red marble. The chief portion of the white marble is cut from the same block as that used for the upper part of the tomb to Prince Henry of Battenberg in Whippingham Church. The work has been designed and carried out by Messrs. Garrett and Haysom, monumental masons, of East-street, Southampton.

## CHIPS.

A new Wesleyan chapel is about to be built at Hindle, near Wigan, from plans by Messrs. William Waddington and Son, of St. Ann's-square, Manchester.

The strike of carpenters at Amsterdam has ended, the Religious Workmen's Unions having retired, as they do not wish to disturb the coronation festivities.

The ancient walls surrounding the historic borough of Conway were reopened on Friday, after restoration, the ceremony being performed by Lord Mostyn.

Rapid progress is being made in the construction of the promenade from Seacombe and Egremont to New Brighton, a promenade which, skirting the Cheshire bank of the Mersey for several miles, will hardly have a rival in the country.

A special meeting of the members of the Archaeological and Architectural Society of Durham and Northumberland, in conjunction with the Newcastle Society of Antiquaries and the Cumberland and Westmoreland Antiquarian and Archaeological Society, will be held at Housesteads (Borricovicus) on the Roman Wall on Thursday in next week, the 25th inst. The Newcastle Society of Antiquaries are now excavating the site of this interesting Roman camp.

On Saturday, the Duke and Duchess of Westminster visited Halkin Castle, their Flintshire seat, for the purpose of being present at the opening of the village hall and library, which has been built by the Halkin Parish Council. Halkin is the centre of the Flintshire lead-mining industry. The village hall, which combines a reading-room, library, billiard-room, &c., is of local stone. It was built by Mr. A. B. Lloyd, Flint, from plans prepared by Messrs. Douglas and Minshull, Chester, the architects of the Eaton estate. The total cost has been £950.

The annual outing of the Exeter and District Master Builders' Association was held on Friday. The party, numbering about forty, took train for Otterham, North Cornwall, leaving Queen-street Station at 7.7 a.m. Arriving at Otterham Station, breaks were in waiting to convey the party to the Wellington Hotel, Boscawen, where breakfast was served. Boscawen having been explored, the breaks were ready again at 12.30 for a drive to Tintagel. King Arthur's Castle and other places of interest having been visited, the party again returned to the Wellington Inn, Boscawen, where dinner was served at 5 p.m. Mr. H. Passmore took the chair, and was supported by Messrs. Sampson and Bayley. The members afterwards drove to Camelford, and thence proceeded home to Exeter by train.

At the London Consistory Court, Dr. Tristram has granted an application by the vicar of Edmonton parish church, for a faculty to authorise him and his churchwardens to re-seat the church, and to make other alterations in accordance with certain plans, including the lowering of the floor, the re-arranging of the hot-water pipes, changing the position of the organ, and putting into use a different system of gas-lighting.

The members of the Derbyshire Archaeological Association, on Wednesday week, visited Bolsover Castle and Hardwick Hall. The party left Derby by train, and on arriving at Chesterfield had dinner at the Angel Hotel. After dinner they drove to Bolsover, and went through the Castle, where a paper, dealing with its history, was read by the Rev. C. Kerry. Hardwick was then visited, and Mr. Kerry read another paper, dealing chiefly with the life of Arabella Stuart at Hardwick. The party left the Chesterfield Station shortly after seven. The excursion was organised by the secretary, Mr. Arthur Cox, Mill Hill, Derby.



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ILLUSTRATIONS.

SECOND PREMIATED DESIGN FOR MUNICIPAL BUILDINGS, HENLEY-ON-THAMES.—BOOD SCREEN IN ST. GEORGE'S CHURCH, DUNSTER.—LANARKSHIRE MIDDLE WARD HOSPITAL.—"CHARLWOOD," EPSOM.—ADMINISTRATIVE BLOCK, LINEN AND WOOLLEN DRAPERS' INSTITUTION, MILL HILL.—BANK AT ST. QUENTIN.—COTTAGES NEAR ST. ALBAN'S.

Our Illustrations.

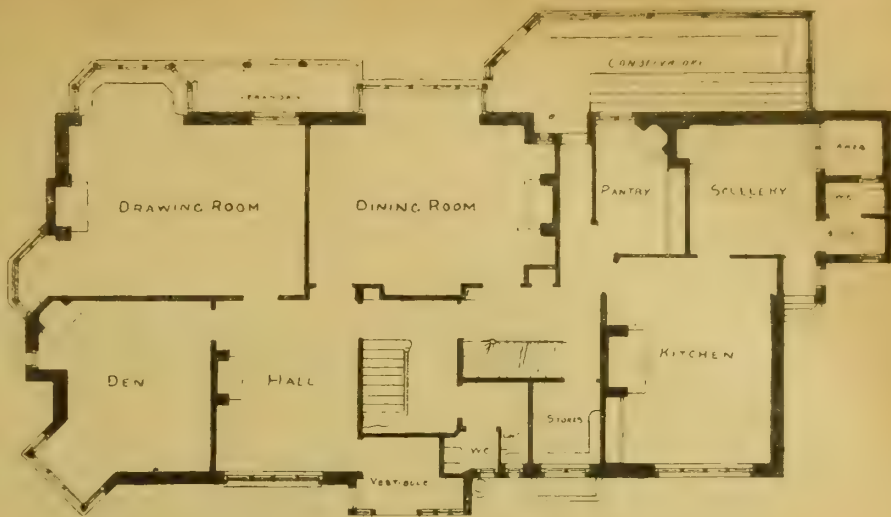
HENLEY-ON-THAMES MUNICIPAL BUILDINGS COMPETITION: SECOND PREMIATED DESIGN.

Our illustrations show the plans and perspective view of the second premiated design for the Henley-on-Thames Municipal Buildings, submitted in competition by Messrs. Millar and Nasmyth, of Reading and Oxford. The competition was limited to six architects, and the design sent in by Mr. H. T. Hare, of London, was awarded first place by the assessor, Mr. E. W. Mountford, F.R.I.B.A. The site presented a difficulty from the existence of several ancient lights to the adjoining property, but was otherwise an ideal one. The plans show the required accommodation upon the two principal floors, and will explain themselves. The following particulars from the architects' notes and description were supplied with their drawings.

**Ground Floor.**—The small hall has been designed with a view to its use for different purposes. It has north and south light and ventilation, and has symmetrically arranged waiting and retiring rooms, with good access to both entrances.

**Second Floor.**—This floor shows seating accommodation for 420 persons in area, or, including platform, 490, which may possibly be considered enough without gallery; with the latter, however, the total would be about 620. The seating is calculated at 2ft. 6in. by 1ft. 6in. for each person, so that by placing chairs slightly closer together over 500 could be seated in hall alone. Exits being arranged at each end diagonally, the safety of public in case of panic is well provided for. In addition fire hydrants are suggested in positions indicated. The front entrance gives access by a 5ft. 6in. stone staircase without winders to platform, retiring-room, and best seats, while a second retiring-room has been provided at level of hall, for use either of occupants of platform or ladies from body of hall. Sufficient platform accommodation has been provided for small choral concerts, and the fact that occasional theatrical entertainments will probably be given has not been lost sight of. A slight rearrangement of design at platform end would allow space over retiring-room to be utilised for a small organ.

**Materials.**—It is proposed to build the whole of external walls with Bath stone facings and brick backing. Internal walls brick, except those from east entrance to door of council-chamber, which would be stone with dressed face. Interior of drill-hall to have dado of glazed brick, with local red facing bricks above. All other internal walls to be plastered. The roof is covered with local red tiles, which are excellent in quality. The roof is timber framed, stiffened with T-steel principal up to tie-beam with shaped



"CHARLWOOD," EPSOM.

web angles, all above ceiling level; ceiling would be plastered, with plain panelling. All other ceilings would be plain plaster, with moulded cornices where shown. **Heating.**—The heating-chamber is placed at a lower level than basement floor, to secure proper circulation. It is proposed to use hot water, with a separate flow and return to each floor, and coils where necessary to give requisite heating surface. In this way flow and returns can be arranged round external walls without interfering with doorways. **Ventilation.**—Outlets would be provided from each room in basement at ceiling level, carried up in walls to parapet level, with grating at back and front, as shown, while air would be admitted by inlets 7ft. above floor level. On ground floor the window ventilation is so good additional inlets are not considered necessary; but outlets would be arranged as for basement. In hall a large extract ventilator is provided, connected to three points in hall and one in gallery by separate pipes into body of ventilator.

SCREEN IN ST. GEORGE'S, DUNSTER, SOMERSET.

There is a great affinity in the screens of the South-West of England, and the above may be taken as a typical example. It is constructed around the second pier of north aisle, but, owing to different spacing on the south, passes centrally through the second bay of that aisle to rood-turret. Its unusual position in nave is due to a dispute having taken place in the latter portion of the 15th century between the vicar of the parish and the prior of the cell (Dunster was a cell of Bath Abbey), which led to the making of a new nave for the parishioners from the western tower arch upwards. It has fourteen bays, the details of which will be found in the drawing, which was actually made on the spot, and carefully measured and finished in the building. We add this remark to the above notes which Mr. W. Haywood has been good enough to send us because the fact mentioned adds much to the value of the illustration, and it also accounts for the somewhat unfinished character of some of the minor and unimportant parts—such as the repeats of the bases, &c. Views of Dunster Church will be found in the Building News for Aug. 12, 1892, with an account of the building.

LANARKSHIRE MIDDLE WARD HOSPITAL, NEAR MOTHERWELL.

(For description see page 242.)

"CHARLWOOD," EPSOM.

This house occupies a corner site overlooking The Durdans. The walls are faced with local red bricks, the upper portion being weather-tiled. All internal joinery is of Oregon pine, and was designed by Mr. J. Hatchard Smith, F.R.I.B.A., for his own occupation. Messrs. J. and J. Ward, of Warrington, were the contractors.

ADMINISTRATIVE BLOCK, LINEN AND WOOLLEN DRAPERS' INSTITUTION, MILL HILL.

IN THE BUILDING NEWS for May 6 last, we illustrated from the Royal Academy Mr. Hornblower's bird's-eye view of this interesting group of buildings, now in course of erection at Mill Hill. An account of the work appeared with the

drawing alluded to. We now print a view of the main building occupied by the administrative departments of this useful institution.

CHIPS.

A large addition to the gasworks of the Newcastle and Gateshead Gas Co. is now about to be proceeded with. The first contract—that for the gasholder tank—has been let to Mr. Walter Scott, of Newcastle.

At the Llandudno Police-court, on Monday, Wm. Thomas, The Avenue, Llandudno, was fined £2 and costs for not submitting amended plans of certain houses at Conway-shore, and also a continuing penalty of 5s. a day from June 21. The whole fine amounted to over £16.

There is some probability that the house of the late Lord Leighton, in Holland Park-road, will pass into the control of the Kensington Vestry, and be preserved as a permanent art centre. The special committee appointed by the local authority consider that it might easily form the centre of a school of art in the widest sense.

Alterations are being made to the Avenue-road Church, Regent's Park, and special consideration has been given to the ventilation, which will be carried out on the Boyle system.

Mr. Cresswell, Privy Council Commissioner, commenced an inquiry at Leigh on Monday touching the petition for a charter of incorporation for the town. No opposition was offered.

On Monday afternoon, the building committee of the proposed new Diamond Jubilee Free Library to be erected at the corner of the Cleveland-road and Garrick-street, Wolverhampton, met at the town-hall to examine the twenty tenders which had been sent in. As the estimates were larger than had been anticipated, it was decided to defer their consideration. The architect is Mr. H. T. Hare, whose design was selected in competition.

At Monday's meeting of the school board of Glasgow, the chairman, Sir J. N. Cuthbertson, made reference to the death of Mr. M'Math, who entered the employment of the board in 1873 as an attendance officer, but who from 1876 till his death had acted as clerk of works and inspector of property. It was agreed to record in the minutes an expression of the board's sense of the loss sustained in Mr. M'Math's death.

Mr. R. O. Wynne-Roberts, A.M.I.C.E., borough surveyor and water engineer to the corporation of Oswestry, has been selected, out of about 100 candidates, as the city engineer of Cape Town, with a commencing salary of £800, and will start to commence his new duties in about three months' time.

The engineers are engaged in the preliminary work connected with the scheme for electric underground line from Baker-street to Waterloo. The line will take about four years to complete, and it will be three miles long. The southern terminal station will be close to the terminus of the Waterloo and City Railway. From that point it will run under the river towards Charing Cross, and there will be a station at the point where it crosses under the District Railway on the Embankment. Thence it is to run to a station at Piccadilly-circus, and up Regent-street to another at Oxford-circus. The line will thence pass down Portland-place, across the Marylebone-road, and so to the south-western corner of Regent's Park, where the Baker-street terminus will be.



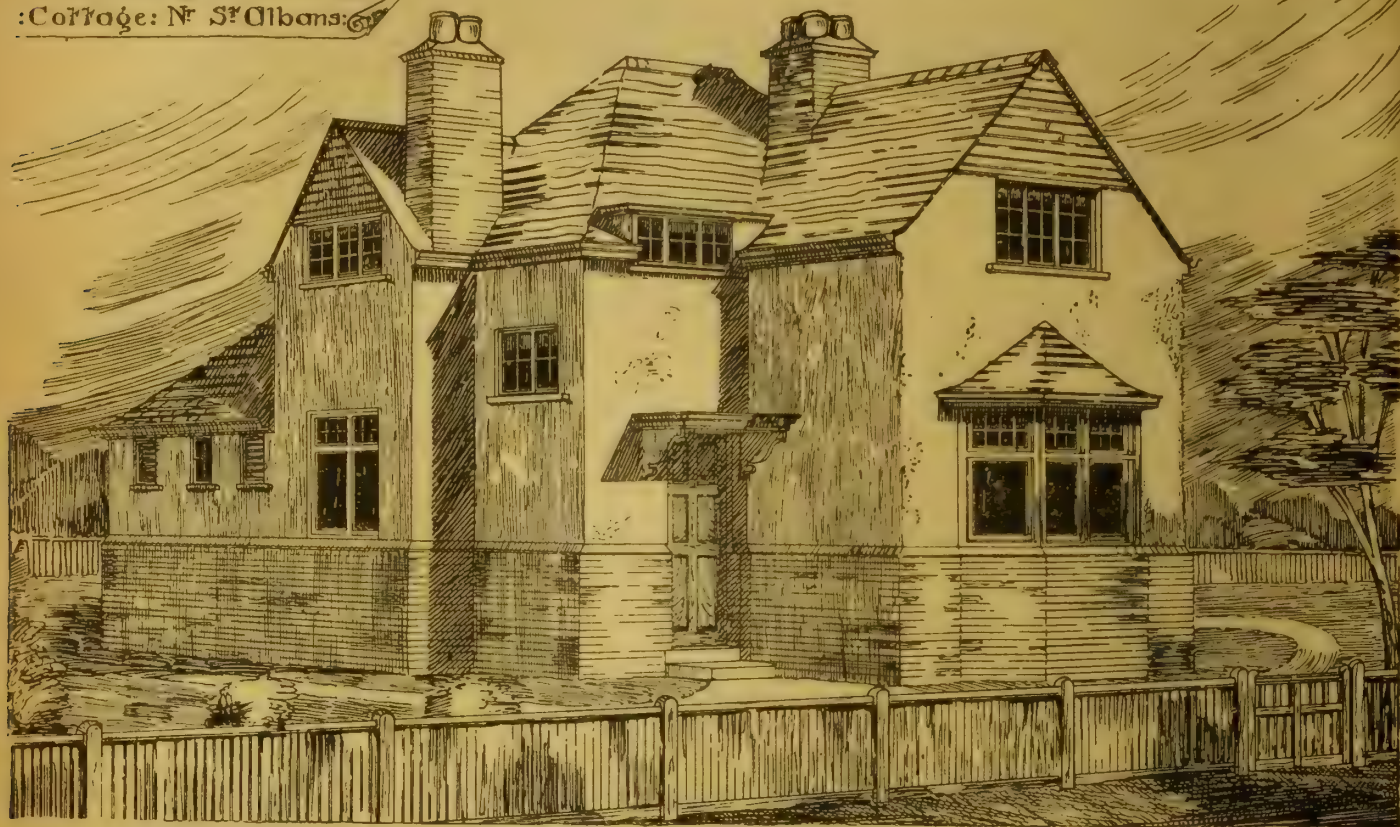
Robt. T. Miller, 214 Great Dover-st., London, S.E.



Cottage: N<sup>o</sup> St Albans.

## A COTTAGE AT ST ALBANS

ROBERT T MILLER ARCHITECT



### COTTAGE NEAR ST. ALBAN'S.

**T**HIS cottage is being erected near St. Alban's at a cost of £400. There are two living-rooms and large scullery and stores on ground floor, and three bedrooms over. To sill level the walls are red brick, and above they are covered with Broseley tiles. Mr. Robt. T. Miller, of Great Dover-street, S.E., is the architect.

### INSPECTION OF BRIDGES, ETC.

**T**HE periodical inspection and supervision of bridges, piers, quays, temporary stands, and other structures of a like character to insure their repair, strengthening, and safety, is a duty which ought to be made a permanent one. It is true our municipal and county councils undertake the inspection and superintendence of these structures in our large towns; but how far these duties are carried out, or with what regularity, we cannot say. The publication of rules to be used for officials engaged on duties of this kind would be desirable, so that a proper system or method of inspection should be followed. For example, a perfunctory and casual inspection of a timber or iron railway bridge can be of little use; but if the officer was equipped with all necessary appliances and knowledge as to those points where weakness first manifested itself, as, for example, defective piles, ties, joints, chords, web systems, decay of timbers of struts and sills, the task of examination would be much simplified, and any source of weakness be soon detected. The Association of Civil Engineers of Cornell University have published a paper by one of its members, Mr. Justin Burns, which gives some useful notes on Inspection of Timber Structures. Weak places in trestle bridges and viaducts of timber can be quickly discovered by observing the alignment of the rails and the surface of the track over the bridge. If alignment and rails are in good condition little further inspection is

necessary; but if the rails are found out of line or crooked at any point, it may indicate that a trestle has shifted or become defective. A depression of the surface of the track indicates at once failure of foundation, or the timber has crushed. Another important point to notice are the ties and stringers. The ties should be in a condition to hold the spikes firmly, and prevent the rails from spreading. The stringer should be observed for "checks" or cracks on the lower edge, and for crushing upon the caps. In white pine stringers these "season checks" are found to precede failure from overloading, and should be distinguished from "strain checks." Each bent should be inspected, the cap for soundness, noticing the amount of crushing on the piles or posts. A cap is often rotten in the centre, and will split over a small pile; it should be examined as to its bearing on every pile. Where the piles enter the ground or water, they should be carefully examined, as the alternate wetting and drying at this point cause speedy decay. If sound at this point, no further inspection is necessary. This test is best applied by using a small auger or gimlet, where decay will soon become manifest by the hold or otherwise of the tool. The posts and sills of frame bents are examined for the same weakness caused by water getting into the joints; the sills are especially liable to rot as they rest upon piles, and they are apt to crush if decayed. Longitudinal timbers should be examined for crushing and longitudinal motion. The author says: "The condition of alignment and the surface of track on Howe bridge trusses will indicate any serious defect in them." By sighting along the chords, the camber can be observed, and any deflection noted; and the passage of trains over may be made useful on this point, as the camber may be greater in one truss than the other. If the Howe truss is a deck bridge, the track will possibly be carried on ties resting on the top chords. They are usually 14 in. or 16 in. in depth, and are notched down over the chords; and these notches should be observed for

cracks or the splitting of the lower portion of tie. The square notch, the author says, has a weakening effect, as the timber below the notch is apt to split off. The lower chord is another particular point which requires attention, as it is often on account of its failure the bridge is condemned. "It is built of several pieces of timber bolted and keyed together and spliced at joints, and the first indication of overloading is a slight revolving of the packing blocks, shearing at the splices, &c. All splices ought to be carefully examined for cracks or pulling apart. The verticals in the web system should be examined for any unequal distribution of stress, and each rod should carry its own portion of the loads. Nuts and screws should be carefully examined, and the diagonals inspected for any crushing at the ends. These are some of the chief points Mr. Burns alludes to. For iron structures similar rules as to corrosion, bolts, and riveted connections, especially in the web and lower chords, might be usefully framed. If these examinations were conducted on some system like this, the time and labour involved would be considerably reduced.

The scheme for providing a new cattle market for Chesterfield, in Wheelodon-lane, is taking definite shape. Application is to be made by the town council to the Local Government Board for leave to borrow £4,000 for the works, and when that is obtained the market will be at once laid out in accordance with the plans prepared by the borough surveyor and already approved.

The formal opening of the new tramroad between Blackpool and Fleetwood took place last week. The cars are open at each side, and each has accommodation for 45 passengers. They cover the nine and a-half miles of road in half an hour. Lytham, St. Anne's, Blackpool, and Fleetwood are now united by a capital system of tramways. From Lytham to South Shore the motive force is gas. Then from South Shore to the North Shore the cars are drawn by the electric conduit system. The new company have adopted the overhead trolley system.



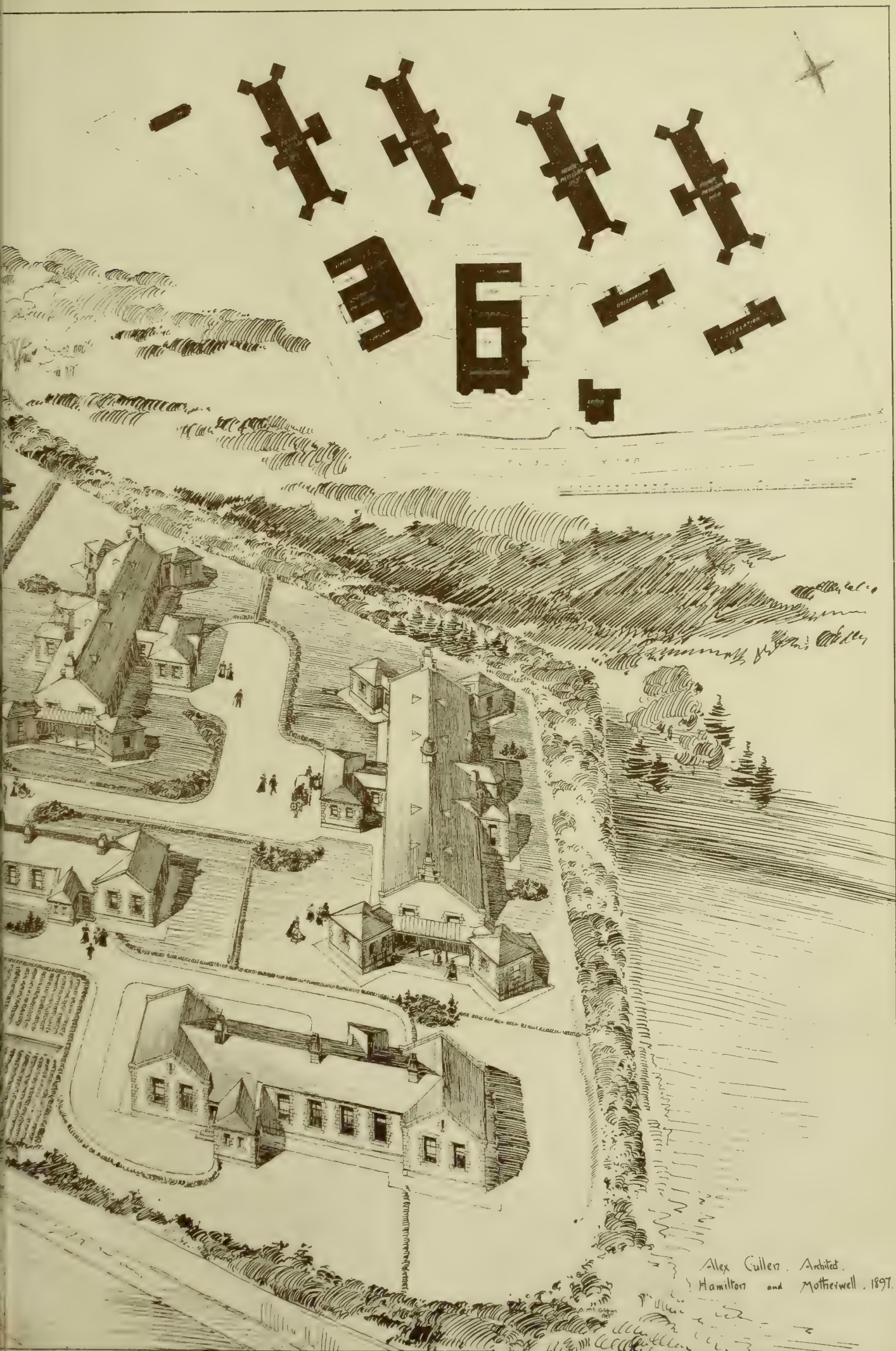








Aug. 19. 1898.







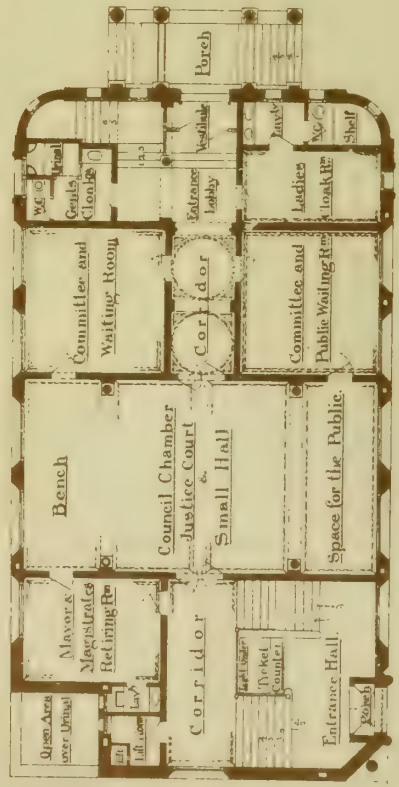




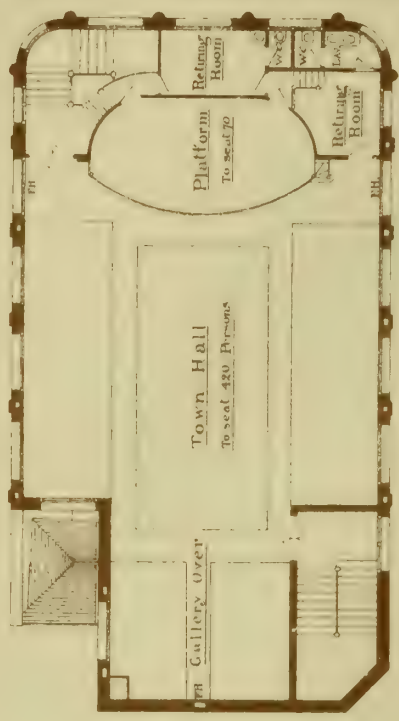


# HENLEY ON THAMES MUNICIPAL BUILDINGS.

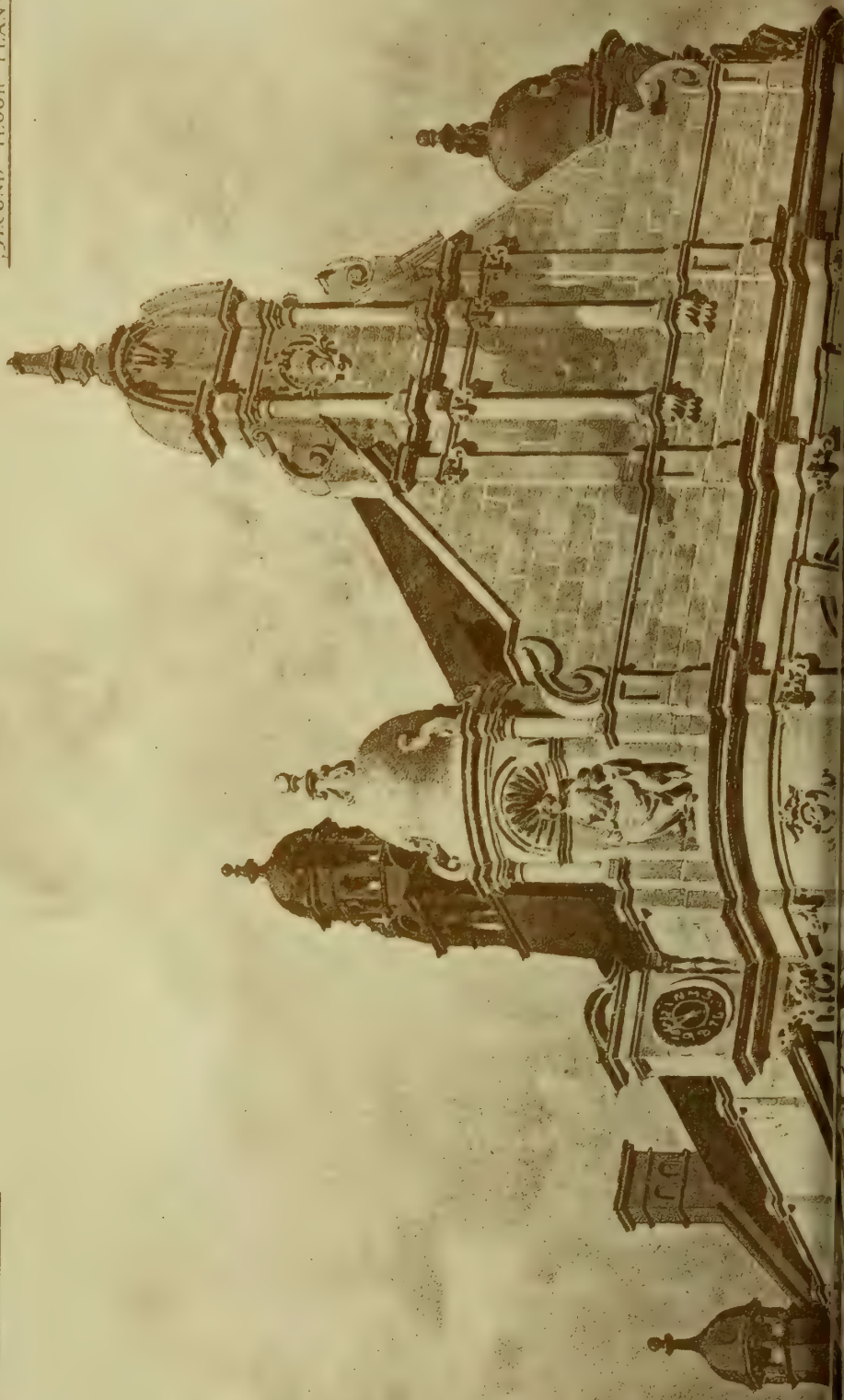
MILLAR AND NASMYTH  
ARCHITECTS



GROUND FLOOR PLAN



SECOND FLOOR PLAN









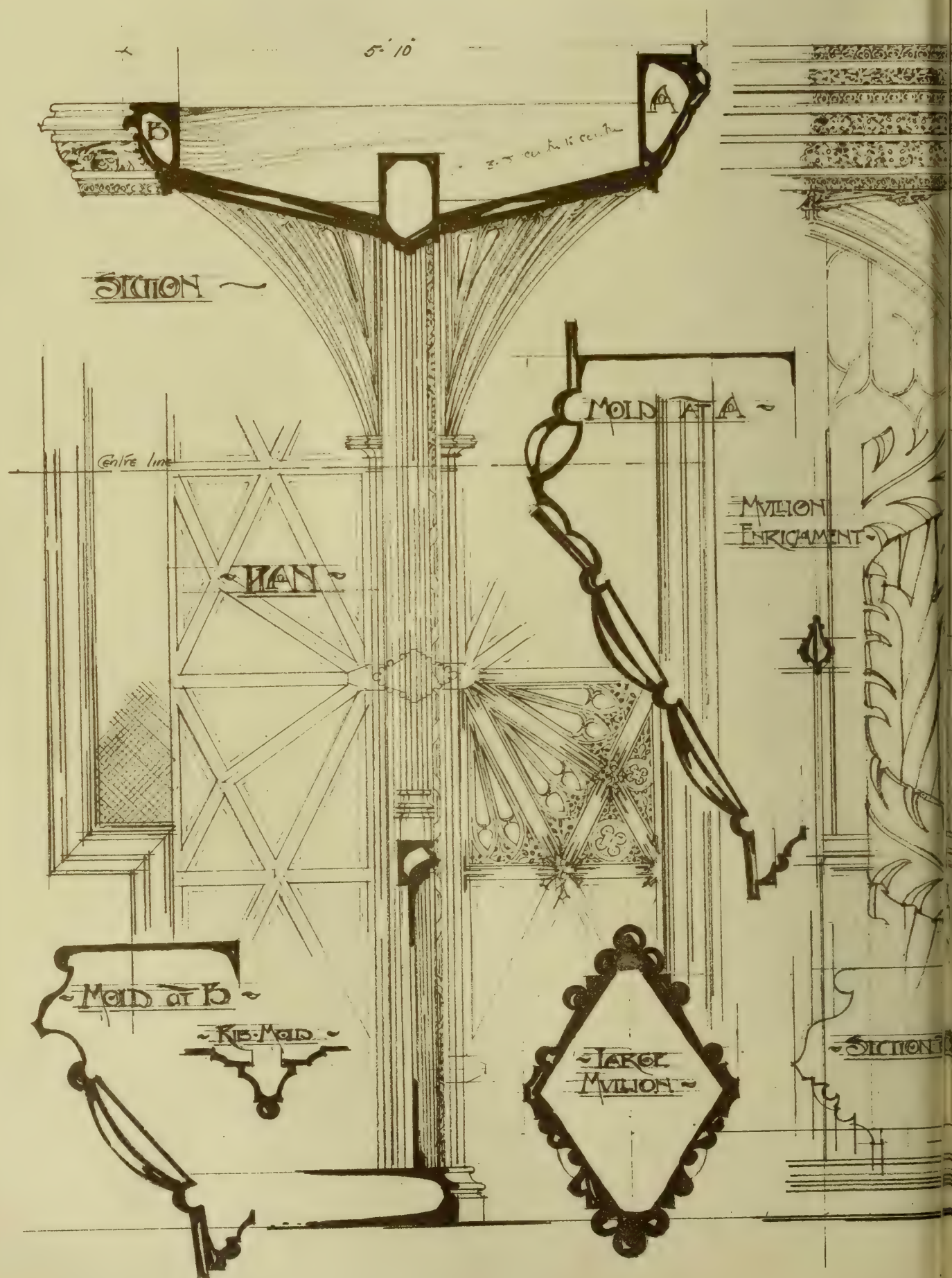






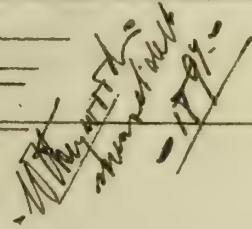


# WOOD SCREEN IN ST GEORGES - DUNSTON

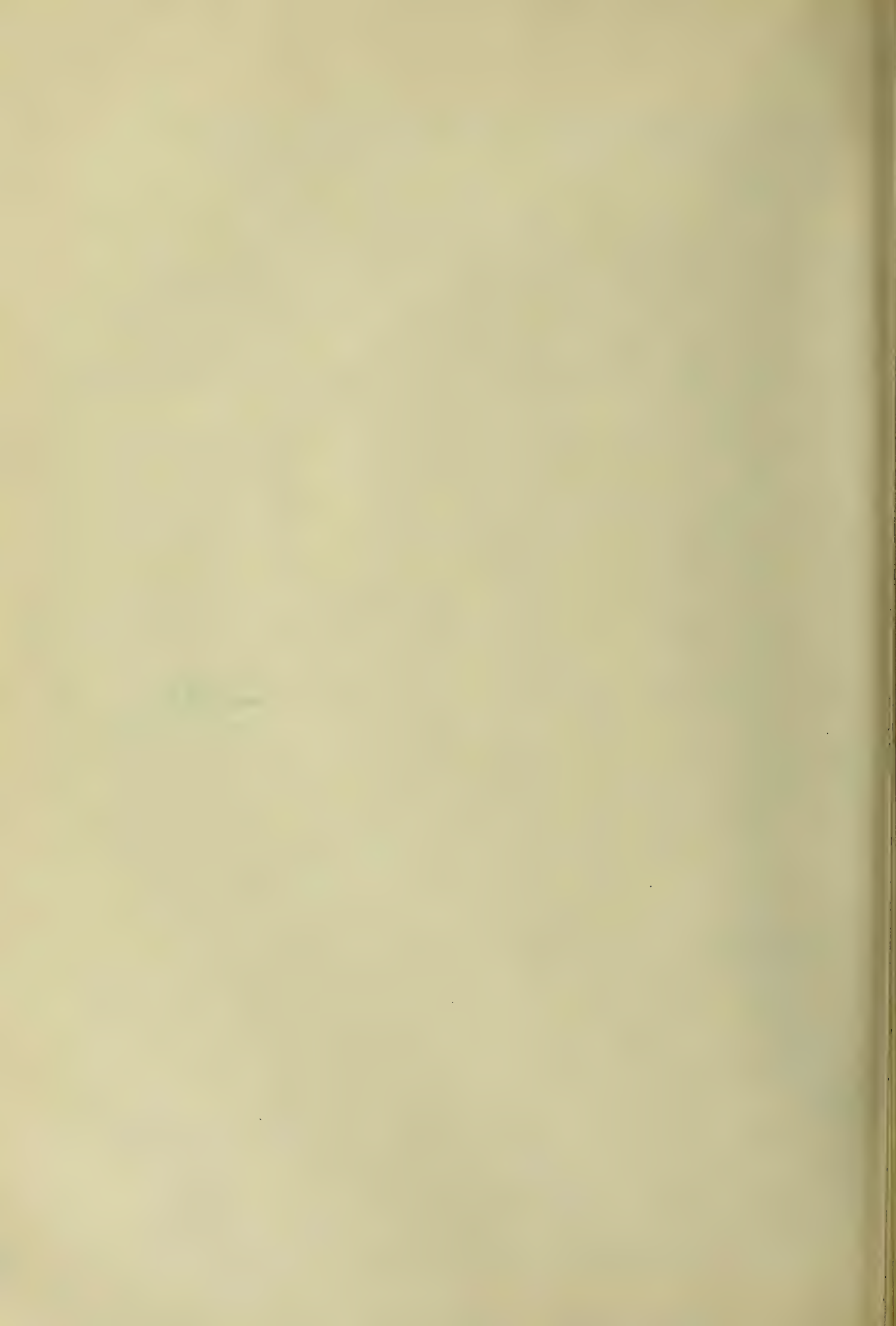




GENERAL - DRAWING -  
MOLDINGS -  
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THE BUILDING PEWS, AUG. 19, 1898.

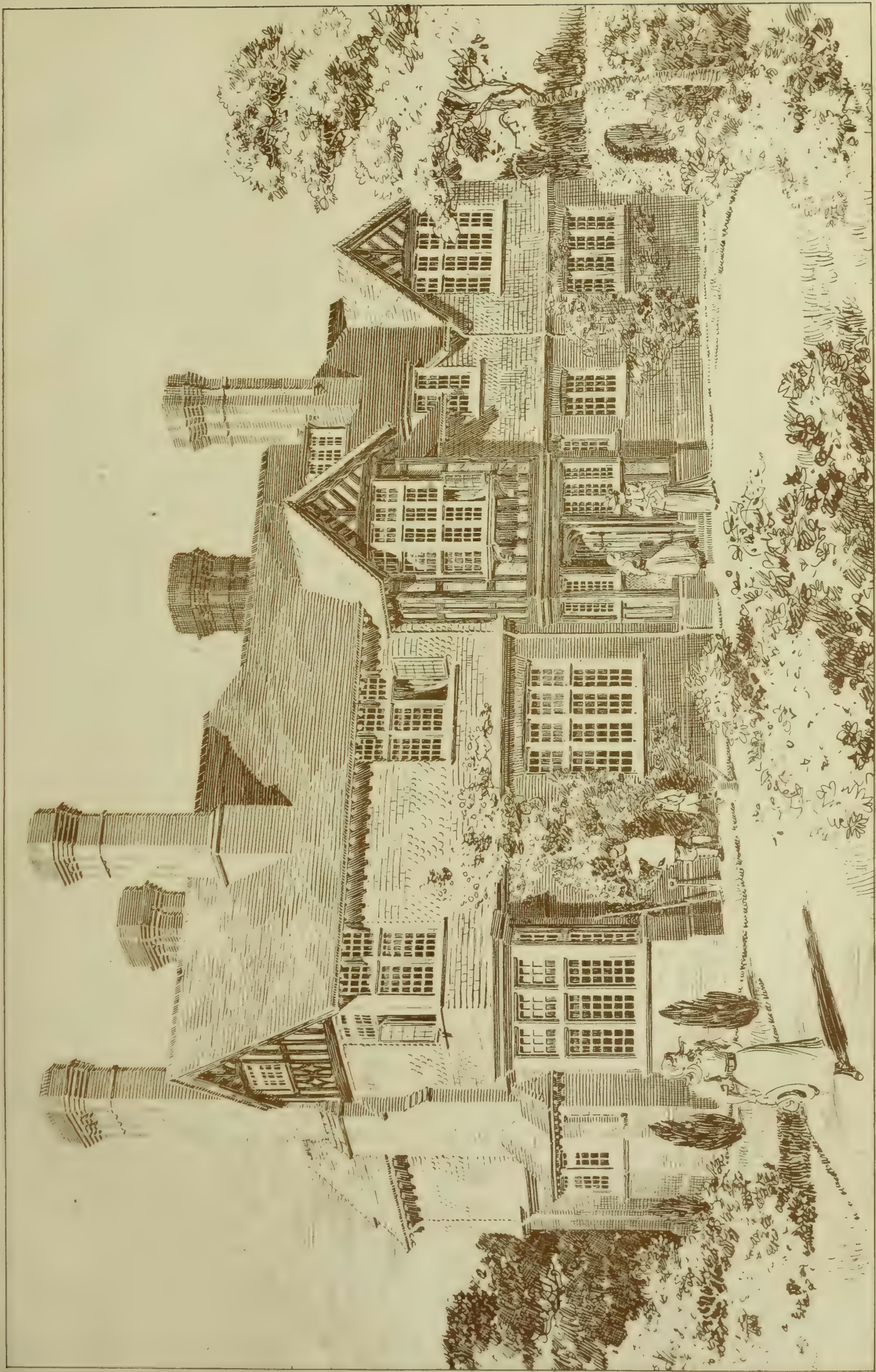
ADMINISTRATIVE BLOCK, LINEN & WOOLLEN DRAPERS INSTITUTION, MILL HILL.



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GEORGE HORNBLLOWER  
ARCHITECT





CHARLWOOD, EPSOM. J. HATCHARD SMITH, F.R.I.B.A. ARCHITECT

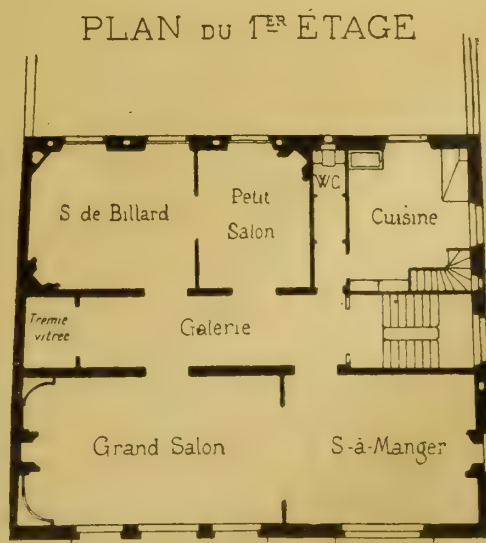
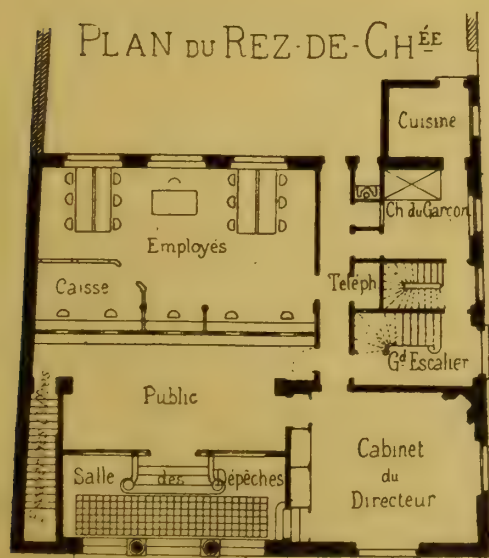








Échelle de 0<sup>m</sup>005 par mètre.



Échelle de 0<sup>m</sup>004 par mètre.

BANK AT ST. QUENTIN.—M. MALGRAS, Architect.

BANK AT ST. QUENTIN.

THIS bank, the illustration of which we take from *La Construction Moderne*, has been erected at St. Quentin, under the direction and from the designs of M. Malgras, architect, of that town. The cost of the building was 94,500 francs.

The city council of Canterbury have, by the Mayor's casting vote, adopted plans prepared by the city surveyor for the erection of public baths at the rear of the Beane Institute, at an estimated cost of £5,500 exclusive of site. The buildings will comprise twelve slipper-baths for gentlemen, and six for ladies, two spray baths, laundry and heating apparatus.

The Nelson Hall and public library for the district of Stockbridge, Edinburgh, is about to be built from designs by Messrs. Lessels and Taylor, of George-street, Edinburgh. The style is Late Tudor, all the windows being mullioned and square, and the parapets finished with battlements, and the gables crow-stepped. The hall proper is 34ft. by 50ft., and will have an open-timbered roof.



## TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the BUILDING NEWS, 832, Strand, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

Cheques and Post-office Orders to be made payable to THE STRAND NEWSPAPER COMPANY, LIMITED.

## TERMS OF SUBSCRIPTION.

One Pound per annum (post free) to any part of the United Kingdom; for Canada, Nova Scotia, and the United States, £1 6s. 0d. (or 6dols. 30c. gold). To France or Belgium, £1 6s. 0d. (or 33fr. 30c.). To India, £1 6s. 0d. To any of the Australian Colonies or New Zealand, to the Cape, the West Indies, or Natal, £1 6s. 0d.

## ADVERTISEMENT CHARGES.

The charge for Competition and Contract Advertisements, Public Companies, and all official advertisements is 1s. per line of Eight words, the first line counting as two, the minimum charge being 5s. for four lines.

The charge for Auctions, Land Sales, and Miscellaneous and Trade Advertisements (except Situation advertisements) is 6d. per line of Eight words (the first line counting as two), the minimum charge being 4s. 6d. for 40 words. Special terms for series of more than six insertions can be ascertained on application to the Publisher.

Front-page Advertisements 2s. per line, and Paragraph Advertisements 1s. per line. No Front-page or Paragraph Advertisement inserted for less than 5s.

Advertisements for the current week must reach the office not later than 3 p.m. on Thursday. Front-page Advertisements and alterations in serial advertisements must reach the office by Tuesday morning to secure insertion.

## SITUATIONS.

The charge for advertisements for "Situations Vacant" or "Situations Wanted" is ONE SHILLING FOR TWENTY-FOUR WORDS, and Sixpence for every eight words after. All Situation Advertisements must be prepaid.

## NOTICE.

Bound copies of Vol. LXXIII. are now ready, and should be ordered early (price Twelve Shillings each), as only a limited number are done up. A few bound volumes of Vols. XXXIX., XL., XLI., XLVI., XLIX., LI., LII., LVIII., LIX., LXI., LXII., LXIII., LXIV., LXV., LXVI., LXVII., LXVIII., LXIX., LXX., LXXI., LXXII. may still be had, price Twelve Shillings; all the other bound volumes are out of print. Most of the back numbers of former volumes are, however, to be had singly. Subscribers requiring any back numbers to complete volume just ended should order at once, as many of them soon run out of print.

ALEX. TAYLOR. (Your letter asking for name and address of Secretary last received attention.)

RECEIVED.—O. J. O.—T. G.—W. S. M. (Greenock).—R. K. N.—F. L. S. Co.—B. T. B.—H. G.

## Intercommunication.

## QUESTIONS.

[12004].—**Glazing.**—Will some practical reader give his experience about the kind and qualities of glass best adapted for skylights and conservatories, and the best means for conveying the water caused by condensation? Are there not some systems of glass roofing which are recommended, and which are they?—A BUILDER.

[12005].—**Concrete Floors.**—Has it not been proved that steel wires or bars inserted in the lower part of a concrete floor or slab increase the bearing power? I should like to hear of any results from experiments that have been made, and the section of bars or metal used.—TENSION.

[12006].—**Exhaust Ventilators.**—How should these be fixed on a roof of a school where there are principals with collars and braces? If not very heavy, cannot they be carried on the ordinary rafters?—T. S.

[12007].—**Casements.**—Can these be made watertight? I know several houses fitted with French casements with a south-western aspect that let in water whenever there is a heavy rain. Is there not some means of preventing this, by fixing metal fillets on outside of casements? Where can these be purchased?—LANDLORD.

[12008].—**Ventilation of Top Rooms.**—The upper story of my house is very close and warm during the hot weather we have been experiencing. I should like to know if I could not do something to ventilate the roof. Is there any cheap ventilator made that can be put in from the ceiling of room to air outside of roof? Would a zinc pipe, say, of 4in. diameter, with a wire-net outlet, be of any service, bent so as to break any direct down current? The ordinary window opening does very little to prevent the closeness.—A. G.

[12009].—**Workhouses.**—Can any readers inform me where I can see some modern up-to-date complete workhouse buildings?—London or South of England preferred. If possible, describe planning and accommodation, also mention date of erection.—ANGLO-SAXON.

[12010].—**Marble Pilasters.**—I shall be glad of any ornament about the fixing of polished marble slabs

round iron pillars and stanchions, as to the mode of jointing, cement used, cramps, and other detail. I am not able to find any advice about it in treatises on building.—YOUTHFUL.

[12011].—**Photographic Apparatus for Tourist.**—Are there any portable cameras suitable for architectural purposes, and the cost? Any advice as to focussing and other matters will be appreciated by—INTERESTING TOURIST.

[12012].—**Silicate Cotton Layer to Roof.**—How thick should a layer of silicate cotton be on a roof? Is it better to lay it between the rafters or boarding resting on fillets, or be nailed in sheets below the rafters just above boarding of ceiling? Is felt necessary if silicate cotton is used? Answers to these questions will oblige.—PRACTICAL MAN.

[12013].—**Bungalows.**—I should be greatly obliged if any reader could tell me of any book, with plans, prices, &c., on bungalows.—J. T.

[12014].—**Estates Clerk of Works' Society.**—Can any correspondent give us the name and address of the Secretary?—X.

## REPLIES.

[12001].—**Framing of Fleche.**—The construction of fleches is treated only incidentally in books of carpentry. See the remarks on fleche construction that have appeared in "Model Specifications," or examine any of the constructions of this sort to be found in London. St. Cuthbert's Church, Earl's Court, has a very elegant fleche, designed after French models. There is also a handsome one over the centre hall of the Courts of Justice. A very beautiful example is that over La Sainte Chapelle, Paris, now part of the Law Courts, a unique building in the Early French or Decorated style. I believe sections of this fleche are published, and may be obtained of any French publisher of architectural books.—A. T. S.

[12002].—**Window Fastenings.**—Look over the advertising columns of the BUILDING NEWS, where you will be sure to find something that will suit you. Apply for a list of fastenings sold by Young and Marten, Caledonian Works, Stratford, who have in stock every kind of ironmongery used by the builder. There are many improved forms of window latches and skylight openers.—G. H. G.

[12003].—**Hard-Woods.**—Red beech (not birch) can be obtained of suitable quality and grain at many timber and hard-wood merchants, such as C. B. N. Snewin, Hatton-garden, who keeps a large stock of seasoned hardwoods in all thicknesses.—ARCHITECT.

[12003].—**Hard-Woods.**—Canadian maple makes a durable floor if not exposed to dampness. It should be weather seasoned, not kiln dried. Red beech is also a handsome wood for flooring, and can be obtained at any of the hard-wood dealers. Canadian white oak is better, and makes a very durable and handsome floor. If the floor is waxed its beauty is much enhanced.—A. J. B.

## CHIPS.

Mr. George de Nyst Clark, of Brooklands Villa, Dartmouth Park-avenue, N.W., partner in the firm of Patman and Fotheringham, builders, of Theobald's-road, W.C., and Park-street, Islington, N., was drowned while bathing at Mundesley on Wednesday week. Mr. Clark, who was only thirty-three years of age, leaves a widow and three children. The business of Messrs. Patman and Fotheringham will be carried on entirely as heretofore by Mr. James Fotheringham Parker and Mr. A. E. Parker, the surviving partners.

The Mayor of Cardiff, Alderman Ramsdale, J.P., laid, on Friday, the memorial-stone of a new station which is being erected in Roath, Cardiff, by the Great Western Company. The contract, which amounts to £15,000, for the erection of the new station has been entrusted to the firm of Messrs. Mackay and Davies, of Cardiff, Newport, and Pontypridd. The site selected is in Pearl-street, near Splott Bridge.

Sir Richard Thorne-Thorne, the chief medical officer of the Local Government Board, is to be presented with the hon. fellowship of the Royal College of Physicians of Dublin in recognition of his work in connection with sanitation.

M. Desperthes, one of the architects of the present Hôtel de Ville, Paris, died at Rheims last week. He was born in the Ardennes in 1833. He designed and erected the Hôtel de Ville with the late Théodore Ballu.

The cutting of the first sod for the new road between the village of Markington and Wormald Green Station took place on Wednesday week. The estimated cost of the work is £800, the contractor being Mr. F. U. Simpson, of Burton Leonard.

A lengthy Local Government Board inquiry was held in Cheltenham, on Friday, by Col. J. T. Marsh, R.E., relative to the application of the town council for sanction to borrow £13,410 for certain works of sewerage and sewage disposal, which the council proposed to construct outside the limits of borough.

The waterworks committee of the Lincoln City Council, on Friday, resolved by a large majority to recommend the council to appoint Mr. J. H. Teague, son of the late engineer, to the vacant post of waterworks engineer, at a salary of £250 per annum. The appointment has been confirmed by a meeting of the council in committee.

A stained-glass four-light Perpendicular window in the south wall of the chancel of St. Laurence Church, Winchester, has just been filled with stained glass as a memorial to the late rector, the Rev. H. M. Richards. The subjects are full-length figures of St. Swithun, William of Wykeham, William of Waynesflete, and Lancelot Andrewes. Messrs. Powell and Co., of Whitefriars, E.C., were the architects.

Herr Kaulbach, who is staying at Wilhelmshöhe, is painting a portrait of the Emperor William for the town-hall at Cologne.

The Redcar pierhead and bandstand were totally destroyed early on Saturday morning by a fire which broke out after the place was closed on the previous night at the termination of an entertainment.

Replying to the offer of £65,000 made by the corporation of Edinburgh for the purchase of the Port Hopetoun basin of the canal as a possible site for the Usher City Hall, the general manager of the North British Railway Company states that the directors have "definitely and conclusively" resolved that they cannot dispose of any part of their canal property.

The Caedmon Cross at Whitby, erected in honour of England's first Christian poet, will be unveiled by the Poet Laureate on September 21. The cross, which will stand 20ft. from the ground, has been modelled after the general shape and proportion of the four great Anglian crosses that were erected in Caedmon's time, and which are wholly or in part extant to-day. The whole cross shaft, which weighs close on three tons, is richly carved with emblem and symbol on all four sides, and the famous nine lines of Caedmon's "Song of Creation"—preserved in the Moore Bible at Cambridge—are given upon the cross in English, in Rome, and in Saxon minuscule.

The Light Railways Commissioners have granted an order for the patented line from Cosham to Horndean, Hampshire. This light railway will commence on the south side of the level crossing at Cosham Station, and after passing to the west of the houses in the High-street, Cosham, will enter the main road and follow it as far as Horndean.

The length of the railway lines in Russia, including those of Siberia and the Grand Duchy of Finland, opened for traffic extended on January 1st, 1898, over 27,616 miles (of which 5,199 miles were provided with a double track). The principal Government railways remaining under construction at the end of the year were those of Central Siberia (about 533 miles), in the Trans-Baikal region (about 700 miles), the Perm-Kotlas line (about 533 miles), and in the Trans-Caspian region (about 433 miles). The total extent of new lines projected and the building of which received sanction extended to about 1,667 miles. Most of these new lines will be main trunk railways.

At Boxmoor, Herts, a new Roman Catholic church was opened last week. Mr. G. Harvey was the architect, Mr. Payne the builder, and Mr. Hales carried out the decorations.

The new carved oak reredos which has been placed in Alton parish church as a memorial of the Queen's Diamond Jubilee was dedicated by the Bishop of Winchester on Wednesday week. The reredos has been designed by Sir Arthur W. Blomfield, A.R.A.

St. Polycarp's School, Everton, was reopened last week after extensive alterations and enlargements. The boys school has been subdivided by means of Wilks's Climax sliding partitions, new apparatus for heating and ventilating has been supplied, and a fresh roof constructed. The accommodation has been raised to 1,000 places. Mr. T. Taliesin Rees, A.R.I.B.A., 32, Hamilton-street, Birkenhead, was the architect, and Messrs. Dargue, Griffiths, and Co., Limited, of Lord-street, Liverpool, were the contractors.

In our notice last week of the dedication of the tower just added to St. Chad's Church, Chadwell Heath, near Ilford, we should have stated that the addition has been made by Mr. Joseph Grimes, of North Gate, Colchester, by whom the original edifice was erected in 1884. The architects of the church and tower have been Messrs. Chancellor and Son, of Chelmsford and London.

Mr. Herbert Gladstone, on behalf of the family, has purchased the bust of the late Mr. Gladstone, which was executed by Mr. Albert Toft, and for which the deceased statesman gave the sculptor sittings in 1889.

The Centralblatt der Bauverwaltung states that the German Emperor himself sketched the plans for the bell-tower of the Church of the Saviour at Jerusalem. The tower is about 150ft. high. The Emperor is also said to have assisted in the internal architecture of the edifice. Unfortunately, our Berlin contemporary neglects to publish the name of the ghost who devilled the work for his Majesty. This would have added a spice of interest to the revelations.



## LEGAL INTELLIGENCE.

**IGNORING THE ARCHITECT.**—**WIDDOWSON V. BARNETT.**—At the Birmingham Assizes on the 11th inst., Henry Widdowson, of Witton-road, Aston, asked for an order for £78 2s. 6d. from David Barnett, of 51, Aston-road North, for work done. Plaintiff contracted with defendant to repair certain houses in Oak-lane, West Bromwich. The work was to be done to the satisfaction of Mr. Devall, architect, of City-road, Birmingham, and he duly gave his certificate that the work had been carried out properly. Defendant, however, contended that it was incomplete, and not according to contract, and refused to pay on the architect's certificate.—His lordship, however, awarded plaintiff the verdict for £70 18s. 6d., the amount due on the contract, without extras.

**THE FENCING OF SAW MILLS.**—At Lyndhurst Petty Sessions on the 10th inst., Alfred John Andrews and John Andrews (trading as Messrs. Rose and Andrews), timber merchants, Totton, were summoned under the Workshops and Factory Act, 1895, for not having, on the 24th of May, fenced a certain circular saw, whereby a boy named Frederick George Moses Grant sustained bodily injury. Captain F. J. Bevan, one of H.M. Inspectors of Factories, conducted the prosecution; Mr. Mortimer, of Romsey, appeared for the defence. Captain Bevan, in opening the case, said that it appeared on the 24th May last Messrs. Rose and Andrews had in their employ a boy named Grant, who, two days after entering the works, got into one of the circular saws, nearly losing his life; as it was he had to have his left arm amputated, and sustained a severe cut on the chin. Witness saw him lying in the infirmary, and he did not think he would live. The firm had duly reported the accident to him, which did away with the contention that they were not within the meaning of the section under which they were summoned. The Act of 1891 made it imperative that all dangerous parts of machinery should be fenced. When a circular saw was in motion it was dangerous. His colleague, Mr. Harston, visited the premises of the defendants from time to time, found that their circular saws were not fenced, and gave them notice to fence before the accident, but it was not done. They had thus rendered themselves liable to a penalty of £100, and the Bench had the power to recommend the Home Secretary to give the penalty, or any part of it, to the injured person. Mr. Mortimer, for the defence, objected that the saw was a tool and not a machine, but the Bench overruled the objection. Plaintiff, a lad of 14, and Mr. John Edwin Harston, inspector of factories at Southampton, confirmed the opening statement, the latter stating that he sent in written notices to the defendants to fence their saws, accompanied by sketches of various guards. Cross-examined: Witness did not consider any guard perfect, but either Tayler's or Parkinson's guard would have prevented this particular accident. Mr. Mortimer, for the defence, said he was instructed to defend not only by Messrs. Andrews, but also by the Timber Trades Federation of the United Kingdom, and he had to say on their behalf that it was practically impossible to effectually fence these circular saws. In the English timber trade there was a difficulty in using the guards, and men said they were not safe, and that it was more safe to work with a saw without them—that they were simply "traps," and not guards in any way. He hoped, under the circumstances, the Bench would not convict; but if they did there would be an appeal to a higher court, because those who instructed him considered there should be a decision which should be binding in all courts throughout England. Captain Bevan: We have got a decision already. Mr. Mortimer proceeded to deal with the question of the notice to fence, and he submitted that as no such notice had been given these proceedings were abortive. His clients would swear they had received no such notice. Mr. Mortimer, at the request of Captain Bevan, read the case of "Redgrave v. Glover and Co.," heard at the Greenwich Police-court, when defendants were fined £10 for not fencing. The timber merchants were all willing to fence, especially in the face of the Employers' Liability Act, but they wanted to know how it was to be done. Mr. Alfred John Andrews said he had had a life experience in the timber trade. He had received no notice from Mr. Harston at all to fence the circular saws. Mr. Harston had suggested that straps and other things had better be fenced, which was done. When Mr. Harston told him the Home Secretary had decided that all machinery was to be fenced, he asked him what guard he would suggest. He replied it was not for him to suggest, but the saws would have to be fenced. After the accident witness put up some guards, which witness himself designed, and which he had since patented. Mr. John Andrews said he had never received notice from H.M. Inspector to fence the circular saws. Mr. Edwin Charles Wright, J.P., of Basingstoke, said he had been in the timber trade all his life. The reason the English timber merchants considered it was impossible to guard a circular saw was that English timber was so unequal. It was not the same with deals and other

foreign converted timber. His own men felt safer without the guards than with them. At the present there were many applications for patents for circular-saw guards, and in the face of that they did not know what to do. Mr. William Henry Mulford, timber merchant, of Southampton and Exeter, said he could not see how it was possible to work with English timber with the saw guards, which his men called a "perfect trap." It was more safe to work with a naked saw than a guarded one with English timber. The Bench, having consulted, convicted defendants under section 2, and ordered them to pay a fine of £10 and £1 11s. costs. Notice of appeal was given.

**LIVERPOOL CORPORATION AND INSANITARY PROPERITY.**—In connection with the 14th presentation of insanitary property in Liverpool, about 17 cases had to be settled on Monday before the arbitrator (Mr. George R. Askwith) with respect to the compensation to be paid to the owners of the property to be demolished owing to the authorities having declared it to be in an insanitary condition. The houses in question are situated in Llanrwst-street, Rachel-street, Dryden-street, Collingwood-street, Pepper-street, and other thoroughfares. The sitting of the arbitrator at St. George's Hall on Monday was, however, rendered unnecessary, as Mr. E. R. Pickmore (deputy town clerk) had, on behalf of the corporation, come to terms with the owners of the 14 lots of property—terms considered to be satisfactory to all parties.

**GRAND JUNCTION WATERWORKS V. HAMPTON DISTRICT COUNCIL.**—In the Queen's Bench Division, on the 10th inst., before Mr. Justice Mathew and Mr. Justice Kennedy, judgment was given in this special case stated by justices for Middlesex on a summons against the appellants, the Grand Junction Waterworks Company, for committing an offence under the Public Health (Buildings in Streets) Act, 1888, by unlawfully, without the written consent of the respondents, erecting part of a building in Upper Sunbury-road beyond the front main wall of the building on either side thereof. The question raised was whether the appellants were justified by their local Act in filling up the whole of a certain plot of ground with buildings, or whether the later general Act of 1888 had been made applicable by Clause 93 of the local Act, and therefore prevailed over the other provisions of their local Act. The appellants are a waterworks company constituted by an Act of 51 Geo. III., cap. clxiv. By the Grand Junction Waterworks Act, 1852, the appellants were empowered to make and maintain works in the lines and situation delineated in the plans and sections deposited with the clerk of the peace for Middlesex. By section xxv. it was provided that the works should be completed within five years, with a proviso that nothing in the Act contained should restrain the company from extending their works whenever it should be necessary for the purpose of supplying water within the limits of their district. In 1853 the company compulsorily acquired some land in the parish of Hampton, situate at the junction of the road leading from Sunbury to Hampton with the road leading from Staines to Hampton. The land was within the limits of the deviation marked on the plans. Upon it the appellants constructed works for supplying water. Since 1853 the west wing, consisting of engine-house and boiler-house, had been erected as an extension. In October, 1897, the appellants, finding it necessary to extend their works, proposed, in carrying out such extension, to construct an additional engine-house in connection with their then existing boiler-house. The plans were submitted to the respondents, who decided not to allow the new engine-house to be brought forward beyond the front main wall of the building on either side, and accordingly disapproved the said plans. In October, 1897, the appellants commenced to excavate upon the lands, upon the only site which was available without taking down an existing building, and to construct an engine-house. On March 7, 1898, the engine-house being then above the ground, the respondents gave notice to the appellants under the statute of 1888 to discontinue the offence against the provisions of the said Act. By section xciii. of the Act of 1847 it was enacted as follows:—"That nothing herein or in the special Act contained shall be deemed to exempt the undertaker from any general Act relating to waterworks or any Act for improving the sanitary condition of towns and populous districts which may be passed in the same Session of Parliament in which the special Act is passed or any future Session of Parliament." It was contended, on behalf of the appellants, that they were authorised by their special Acts to construct upon the land such works as were necessary for the purposes of their undertakings, and that they were therefore not prohibited by the general provision contained in the Public Health (Building in Streets) Act, 1888, from erecting the said engine-house, which was necessary. The magistrates, however, were of opinion that the appellants should be convicted, and also that the engine-house was, "without reference to its position, necessary for the purposes of their undertaking." Mr. Asquith said that the

question was this: Had the appellants a statutory license to override the law of the land? The particular building was not authorised to be built. The Act only gave the appellants a general power to extend their buildings when necessary. It was under that power that the building had been erected. He contended that it was subject to the provision of section 93 of the local Act. At the date of the Act, in 1847, there was no Public Health Act in existence. The legislation which was ripening into the Public Health Act of 1848 was in contemplation. By section 4 of the Public Health Act, 1875, a definition of sanitary Act was given, by a reference to the schedule, which included Local Government Acts as being sanitary Acts. It was proved that, in order to enable the appellants to carry out their statutory duties, engine-houses were necessary adjuncts to their works. Mr. Justice Mathew, in delivering judgment, said that it was not disputed that under section 25 of the local Act the appellants would be entitled to erect any works on the land acquired by them and to make any extensions of buildings so erected, and, further, that they were entitled to acquire by agreement any other lands and erect buildings thereon provided they were necessary for their undertaking. But the legislature went no further. They did not say that the buildings might be erected without regard to obligations imposed by other Acts. More than that, the powers of the appellants were expressly limited by section 93. It was said by the respondents that that section imposed on the appellants the obligation to comply with the provisions of any Act for the improvement of the sanitary condition of towns and populous districts, and it was pointed out that the local Act of 1847 preceded the earliest of the Public Health Acts. It was said, further, that the first Public Health Act was a sanitary Act, as, indeed, its name and description implied. That Act was followed by the Public Health Act of 1875 and by the Act of 1888, under which these proceedings were taken. It was contended by the respondents that all these Acts were sanitary Acts within the meaning of section 93, and that the conviction was, therefore, perfectly right, the main wall of the building having been advanced beyond the building line in defiance of the Act of 1888. The appellants called attention to the exact terms of section 93, and argued that it was only intended that the appellants should be fettered by sanitary Acts so far as they concerned waterworks. They contended that, having acquired land compulsorily, they were entitled to build on it as they liked. His Lordship saw no grounds for departing from the plain language of the section of the Public Health Act, 1888, which appeared to have been infringed. Section 93 of the local Act made the appellants amenable to that provision. The conviction was therefore right. Mr. Justice Kennedy concurred.

**SANDY MORTAR AT SMETHWICK.**—John Carter, builder, of Lightwoods-road, Smethwick, was summoned at the instance of the Smethwick Urban District Council on Friday for a breach of the building by-laws by using inferior mortar in the erection of dwelling-houses in course of erection in Milcote-road on April 29 last. It was stated that in consequence of complaints received, the surveyor to the district council (Mr. C. J. Fox Allen) sent a man to the building which the defendant was erecting. He took a sample of the mortar being used, which, upon being analysed, was found to contain 9·60 parts of sand to one part of lime. The maximum quantity of sand allowed for use in making mortar is four or five portions to one of lime. A solicitor explained for the defence that his client was doing the work for another person who was finding the materials, so that what the materials consisted of he had not the slightest knowledge. He used the mortar in the *bona-fide* belief that they were proper materials.—Defendant was fined £6 10s., including costs.

**ARBITRATION AT HEYSHAM, LANCs.**—The Heysham manor and foreshore was the subject of an important arbitration heard at the Westminster Palace Hotel, London, last week-end, before Mr. Ralph Chilton, arbitrator selected by the lords of the manor of Heysham and the Midland Railway Company. The question involved was the sum which the company were to pay to the lords for 255 acres of foreshore, taken by the company under their Acts of 1896, for the purpose of constructing a harbour at Heysham. Mr. Balfour Browne, Q.C., after speaking of the natural advantages of Heysham for dock purposes, said that so long ago as 1865 a Bill had been promoted to make a railway and pier at Heysham. Notices to treat were given, but the Bill dropped. The Midland Railway Company had now taken the matter up, and intended to spend upwards of half a million sterling on the scheme. Heysham Lake was the finest sheltered anchorage between the Clyde and the Mersey, and there was always sufficient water for the largest vessels at any state of the tide to sail up the lake, thereby gaining access to the dock. The doctrine of special adaptability could be applied in this case, and the value would be estimated at £100 an acre, making the amount £25,500, which, with the added 10 per cent.



for the compulsory purchase, would be £38,050. Evidence was then called as to the value of the land, the witnesses including Mr. Fair, surveyor, Lytham; Mr. Fenwick, civil engineer, Leeds; Mr. Hartley, civil engineer, Liverpool, &c. On behalf of the company, Mr. Wainwright (surveyor, Manchester), Mr. Wallis (of Manchester, surveyor to the Board of Trade), and others, were called, and said that in their opinion they valued the foreshore at £10 an acre, making the sum considered reasonable to be £2,550. Mr. Cripps, Q.C., for the railway company, contended that it was an ordinary case of valuation, and the special adaptability doctrine did not apply. The proceedings then closed, and the arbitrator will in due course make his award.

W. R. LEGGOTT, LTD., LONDON AND BRADFORD, V. JAMES GIBBONS, LONDON AND WOLVERHAMPTON.—This case was heard on the 5th inst. in Mr. Justice North's Court, Chancery Division. Mr. Swinfen Eady, Q.C., and Mr. E. Clayton, instructed by Mr. Bartlett, 26, Bush-lane, E.C., were counsel for plaintiffs, and the motion was treated as trial of action. An order was made by the learned judge restraining defendant, in terms of notice of motion, from passing off his openers for skylights or fanlights for the openers of the plaintiffs, and from selling or contracting to sell, or offering, or exposing, or advertising for sale, openers or any goods under the name or description of Leggott's openers or "Silens" openers, or under any name or description of which the words "Leggott's" or "Silens," or either of such words, or any colourable variation of them, form part. Defendant to pay damages and costs.

#### CHIPS.

A receiving order has been granted in the case of James Mackintosh, of King's-row, Brownwood Park, N., builder; and an adjudication in bankruptcy is gazetted in that of Henry Albert Carnick, trading as Carnick and Son, of Leatherhead and Bookham, late of St. John's Hill, Clapham Junction, builder and contractor.

The purchase of the Golder's Hill estate from the trustees of the late Sir Spencer Wells is now completed. A conveyance has been taken to Sir Henry Harben, Mr. T. J. Barratt, and Mr. Samuel Figgis as nominees of the private subscribers to the scheme, by whom the estate will be transferred to the London County Council as an extension of Hampstead Heath, as soon as the necessary arrangements for providing the funds which have been voted by the public authorities can be made.

The Rev. J. M. Guilding, Vicar of St. Lawrence, Reading, since 1874, who died on Friday after a prolonged illness, was treasurer and librarian of the Berkshire Archaeological Society and a Fellow of the Royal Historical Society.

Mr. A. Nottley, of Lowestoft, has sold by private treaty six plots of the Gunton Cliff Estate, with frontages of 300ft. to the sea and Corton-road, and an average depth of about 400ft. The land is purchased for the erection of a large hotel in close proximity to the site for the intended new railway-station.

The Board of Trade have confirmed an Order authorising the construction of a light railway in the county of Wilts between Pewsey and Salisbury, subject, as regards the portion of railway proposed to be laid on property of the War Department, to the consent of the Secretary of State.

In memory of the late Recorder of Reading, Mr. J. O. Griffiths, Q.C., two stained-glass windows have been placed in the High Wycombe Free Library, an institution he founded, and upon which he expended about £3,000, afterwards presenting the building to his native town. The windows represent Poetry and Literature, and they also contain the Arms of the Borough of Wycombe and of the Middle Temple.

The Light Railway Commissioners, at Penzance, have refused to sanction either of two schemes for the construction of light railways in the Land's End district. They came to that decision with reluctance, believing that better railway facilities in the district were much needed, but they thought the schemes submitted were not suitable.

The chief feature in last week's business at the Tokenhouse-yard Auction Mart was the appreciation for building estates. The most important of these was the Knott's Green estate at Leyton, which has frontages to existing roads of over 3,700ft. and an entire area of over 100 acres, and fetched about £600 per acre. The returns for the week amounted to £119,965, or about £13,200 in excess of the corresponding week in last year.

At a meeting of the Dumfries Town Council on Wednesday a letter was read from Mr. Andrew Carnegie offering £10,000 for the erection of a library provided that the Free Libraries Act was adopted by Dumfries and Maxwelltown. Mr. and Miss McKie, of the Mote House, Dumfries, have given a free site for the purpose of the library building.

#### WATER SUPPLY AND SANITARY MATTERS.

BRISTOL.—For some months past the question of dealing with the sewage of Bristol has been occupying the attention of a sub-committee of the Bristol sanitary authority, and the advice has been obtained of Mr. Santo Crimp, of the firm of Messrs. Tayler, Sons, and Santo Crimp, engineers, of Westminster. The sub-committee have received Mr. Santo Crimp's report, which will probably be recommended to the full committee for adoption at an early date. The scheme, says the *Western Press*, is of a very comprehensive character, dealing with the whole question of sewage disposal, and freeing the River Avon from all pollution. The plan provides for an outfall near Dunball Island, and there are to be banks constructed at Avonmouth for storage purposes, so that the discharge may be effected at suitable states of the tide. A new sewer will be constructed following the course of the river on the Gloucestershire side, and a pumping station will have to be provided near the Cliff House Estate, so as to lift the sewage into the outfall sewer, whence it will be conveyed to the Bristol Channel. It is in contemplation to extend the sewer up the valley of the Avon, and it has been suggested that it might be utilised for accommodating outlying districts if satisfactory arrangements can be concluded with the local authorities. Another suggestion is that in the event of an agreement being arrived at with the Bath Corporation, the Bristol sewer might be taken up sufficiently far to receive the Bath sewage, and thus render their disposal works unnecessary. With regard to Bristol itself, the whole of the sewage now discharging into the Avon will be collected at a point near Cliff House, and lifted by means of pumps into the new outfall sewer. The cost of the scheme will be between £300,000 and £400,000, and in its conception allowance has been made for the growth of the population for many years to come. The council will probably be asked to sanction the promotion of a Bill in Parliament to carry out the proposed works, the execution of which will occupy about two years.

MARYPORT.—For years past Maryport has ineffectually striven to prevent the pollution of the river Derwent—from which it draws its water supply—by sewage from Keswick and other places. At the meeting of the urban district council on Monday night the question of obtaining a pure supply was raised afresh. Workington and Cockermouth are considering the question of bringing down an additional supply from Crummock Lake, and it is thought that Maryport ought to consider whether they would not join these two authorities and obtain an unlimited supply of water from an absolutely unpolluted source. The question was referred to a committee of the whole council.

ENTERIC FEVER IN NORTH WALES.—Repeated outbreaks of infectious disease in the Bettws-y-Coed rural district not appearing to be properly dealt with by the local sanitary authority induced the Local Government Board to despatch Dr. Wheaton, one of their medical officers, to institute inquiries on the spot as to the prevalence of infectious illness and as to the general administration of the rural district council. Bettws-y-Coed, Trefriw, and Capel Curig stand in the midst of some of the prettiest scenery of North Wales, and have long been important centres of tourist traffic during the summer months. The Government inspector found that the dwellings were, for the most part, well built and their interiors cleanly kept, but in most of the villages there were old cottages without through ventilation, and with unsatisfactory surroundings. The water supply of Bettws-y-Coed, obtained from the River Llugwy, just above the Swallow Falls, two miles from the village, is frequently insufficient for the summer requirements, and the district council have declined to supply a number of houses near which the water-main passes on its way to the village. There was no system of sewerage at Capel Curig, nor any public water supply, water being obtained from springs and courses flowing down the mountains, and also from the Llugwy. Dr. Wheaton describes in detail the insanitary condition of many of the houses in the different districts which he visited, and says it is remarkable that such unsatisfactory water supplies should have been selected as those which are obtained from the Llugwy, the Lledr, and other rivers in the locality, especially in view of the fact that the district abounds in lakes, the water of which is, in nearly all cases, free from risk of pollution. Capel Curig and Cwm Penmachno are without sewers, and at Bettws-y-Coed there is a whole district known as Pentrefelin unconnected with the public sewers, the sewage from the dwellings being either discharged into the Llugwy or allowed to escape into the ground through leaking rubble drains. The Government inspector gives particulars of the outbreaks of enteric fever and diphtheria which have occurred in the district during the last two years, and states that the condition of the village of Cwm Penmachno is an illustration of the results of the complete neglect in the district of all sanitary matters. The roads and paths in this village are

unmade and untended; the water supply, as already mentioned, is very unsatisfactory; there is no system of sewerage, and the refuse from the houses is either thrown into the Machno or allowed to accumulate on the banks until a flood washes it away. Dr. Peter Fraser, the local medical officer of health, has frequently drawn the attention of the district council to the urgent sanitary needs of the district, but hitherto his recommendations have not been carried out.

HOLLOWAY, CRICH, SOUTH WINGFIELD, AND PENTRICH WATER SUPPLIES.—During the past few months negotiations have been proceeding between the Belper Rural District Council and Mr. J. B. Marsden-Smedley, J.P., the proprietor of the Dethick estate, for the acquisition of a water supply. It will serve the villages of Holloway, Crich, South Wingfield, Pentrich, and probably others. The population is about 7,000, and provision has to be made for 60,000 to 70,000 gallons per day. Mr. Frith, C.E., of Baslow, is the engineer, and he has gauged the springs on the Dethick estate, which yield about 200,000 gallons per diem. Provision is made for the Lea Mills, and there will be no expense in well-sinking, no pumps, or rams, while the wayleaves are all on the Nightingale property. The agreement was laid before a special meeting of the Belper Council on Saturday, and received the seal of the authority, who are taking steps to obtain the sanction of the Local Government Board to the requisite loan.

The Bishop of Winchester reopened, on Wednesday, the parish church of New Alresford, Hants, which has been restored at a cost of £6,000.

The Mersey Docks and Harbour Board sanctioned at their last meeting schemes for improvements at the Huskisson, Coburg, and Brunswick Docks, at an aggregate cost of £200,000. It was also decided to increase the passenger shelter and waiting-room accommodation on the landing-stage at an expense of £7,500.

On a corner site in Brookley-avenue, Colwyn Bay, on Friday, the foundation-stone was laid of a new Roman Catholic church to be erected at a cost of £6,000. The architect is Mr. Curran, of Warrington, and the contractor Mr. Thomas Browne, Chester. Prior to the stone-laying, Bishop Mostyn was presented with an oaken mallet by the contractor, the mallet being made from an oaken beam 300 years old, taken from one of the houses pulled down in Chester by Mr. Browne.

At the instance of the Woolwich Board of Health, John Baglow was summoned on Friday to the local police-court to show cause why closing orders should not be made in respect to four dwelling-houses. Evidence for and against having been given, Mr. Paul Taylor, the magistrate, said he had examined the houses, and found them in a very fair condition, and there was no reason why they should be closed. The local board had acted with great caprice, the prosecution showing to what an extent the sanitary craze could be carried. The summons was dismissed, and the board ordered to pay twenty-five guineas costs.

A project is being considered for throwing a permanent bridge across the Hooghly at Calcutta, near the site of the present floating bridge. It is proposed that the piers shall take up one-tenth of the present waterway.

The corporation of Deal have had under consideration the danger which menaces the town from the encroachment of the sea, and have decided to at once proceed with important new works of defence near Sandown Castle, at the north end of Deal. Instructions have accordingly been given to a London engineer. The borough surveyor has stated that, unless those works of defence are undertaken at once, the encroachments of the sea will undermine the existing wall and cause it to collapse.

The rumours that the beautiful Ken Wood, abutting Parliament Hill and Hampstead Heath, is to be covered with bricks and mortar are without foundation. Earl Mansfield writes from Scone Palace, Perth, that it is not his intention to place the estate in the market, but that he intends to make the place his summer residence. With this object in view, the interesting old mansion is at once to be put into a thorough state of repair.

Ridler's Family Hotel, High Holborn, formerly known as the Rose and Crown, is about to be pulled down, the site having been absorbed, together with that of Furnival's Inn and other adjacent buildings, by the directors of the Prudential Assurance Co., who will erect thereon a north wing of their premises from Messrs. A. Waterhouse and Sons' designs. The furniture and effects of the inn were disposed by auction on Wednesday and Thursday last week. The new block of the Prudential, a portion of which is being roofed in, will occupy, with the existing premises, the entire area bounded by Holborn, Brook-street, Greville-street, and Leather-lane.



## Our Office Table.

THE curriculum of the London Architectural Association for the session 1898-99 has just been published. The list of lecturers and instructors includes many of the ablest and best-known teachers in the profession, among the number being Messrs. Henry Adams, who undertakes the classes in mensuration, land-surveying, and levelling; Percy Buckman (elementary water-colours), Max Clarke (hygiene, professional practice, specifications, and estimates), Frederic R. Farrow (elementary construction and material, English Gothic Architecture, and Mediæval and Renaissance Architecture in Europe), Alfred H. Hart (colour decoration), Professor F. E. Hulne (plane and solid geometry), H. J. Leaning (quantity surveying), W. B. G. Lewis, by whom the management of the studios, as in former years, conducted; F. W. Pomeroy (modelling), H. B. Ransom (elementary physics, strains, and stresses), Herbert A. Satchell (nature and application of materials), R. Elsey Smith (Greek and Roman Orders), and A. W. Weedon (water-colours). The system of lectures is thorough, and the fees, owing to the partial retention of the voluntary system on which the association was founded, are moderate, while many valuable prizes are offered as incentives to application and study. Every architectural pupil articulated in the Metropolis should, for his own benefit, and also for the sake of *esprit de corps*, enrol himself in the ranks of the Architectural Association.

THE temporary bridge which is to accommodate a large proportion of the traffic of South London during the rebuilding of Vauxhall and Lambeth bridges was opened to the public yesterday (Thursday). The new structure will be tested for a few days, and then, all being well, Vauxhall Bridge, which was built in 1816, and cost over a quarter of a million, will be finally closed towards the end of the month. The materials are being put up for sale, and at the end of the first week in September it will be handed over to the contractors for demolition. The new bridge will be five years in construction, and a similar period will be required to rebuild the ungainly and utterly inadequate suspension bridge at Lambeth.

IN a letter to the *Times* of yesterday, Sir J. Charles Robinson again refers to the Louis XIV. bronze medallions, recently discovered at Kew Palace, and lent by the Queen, it will be remembered, to the recent Art-Metal Exhibition at the Royal Aquarium. Sir Charles Robinson agrees with Lady Dilke that the five reliefs in question in all probability formed part of the series of 36 ordered for the decoration of the four groups of columns, which originally stood (or were designed to stand, for it is not certain if the scheme was fully carried out) at the four corners of the Place des Victoires in Paris. They were an accompaniment to the bronze statue of Louis XIV. erected in the centre of the Place at the cost of the Duc de la Feuillade, and which was destroyed during the Revolution in 1795. The pedestal of the statue was ornamented with six reliefs of similar style to those now in question. These were saved from destruction at the time by the celebrated art bronziest, J. J. Caffieri, and are now in the Louvre. By the courtesy of the authorities of that museum photographs are now being obtained of them. These Louvre reliefs are the work of the sculptor Desjardins; whether the Kew medallions are by the same hand will doubtless soon be made evident.

THE mention of the well-known artist Caffieri in connection with these works is, says Sir Charles, interesting and suggestive in more than one way. As yet we know nothing definite as to the circumstances under which the Crown became the possessor of the Kew bronzes. It is almost certain, however, that they were acquired during the regency of King George IV. The fact that his Royal Highness the Prince Regent was the principal collector of the splendid series of French decorative bronzes at Windsor and Buckingham Palace, amongst which are many specimens of Caffieri's work, seems to render it not unlikely that the eminent artist may have had a hand in the purveyance of the present series as he had in those now in the Louvre. According to the late Lord Willoughby d'Eresby, hereditary Lord Chamberlain, who had been one of King George IV.'s colleagues and allies in his collecting pursuits, that monarch's acquisitions from Paris were brought over from France soon after 1795

to an English frigate stationed at Guernsey to receive them.

THE Department of Science and Art announce that the following candidates have been awarded Royal exhibitions (art) and local scholarships (art) for 1898:—To Royal exhibitions: William R. S. Stott, 19, art student, Aberdeen, Grays; Charles G. Lowther, 18, art student, Hull; John M. Aiken, 18, art student, Aberdeen, Grays; Septimus E. Scott, 19, art student, Royal College of Art; Herbert Slinger, 22, art student, Bradford, Technical College; Thomas Jones, 23, art student, Royal College of Art; Percival H. Portsmouth, 23, art student, Reading; Ada Erwood, 22, art pupil teacher, Brighton; Frank Nowill, 24, draughtsman, Sheffield; and John E. Sutcliffe, 22, art student, Royal College of Art. To local scholarships: George E. Kruger, 17, art student, Bath; William H. Helm, 19, art student, Royal College of Art; Janet M. G. Brennand, 21, art student, Bournemouth (West); Frank H. Round, 18, art student, Birmingham; Leonard T. Howells, 20, art student, Lydney; Arthur W. Pope, 20, art student, Nottingham; Adwin A. Morrow, 21, house decorator, Belfast; Harold Wilson, 19, art student, Birmingham; Isabella McGregor, 21, art student, Royal College of Art; James Darden, 20, art student, Royal College of Art; Alfred Bentley, 19, art student, Bristol, Merchant Venturers; Walter W. Rawson, 21, art student, Royal College of Art; Sylvan G. Boxsius, 19, art student, Royal College of Art; Edward Walker, 19, art student, Bradford, Technical College; Marguerite E. E. Iggesleden, 21, art student, Torquay; Gertrude M. Siddall, 21, art pupil teacher, Chester; Gordon M. Forsyth, 18, glass stainer, Aberdeen, Greys; James Sparks, 21, art student, Bristol, Queen's-road; Alexander McN. S. Richardson, 20, art pupil teacher, Dundee, Technical Institute; and Henry T. Pike, 21, art student, Southampton, Hartley Institution.

THE librarian of the Shakespeare Memorial, Stratford-on-Avon, Mr. W. Salt Brassington, F.S.A., has just issued his report for the year ended March 31 last, from which it appears that the total number of visitors to the library during the preceding 12 months was 13,085. The collective editions of Shakespeare's works have been arranged and catalogued, and also all collections of Shakespearana, and a full index compiled. The recent additions to the library are numerous and valuable. Some forty items, however, are still wanting to complete the collection of English editions of Shakespeare printed before 1800, and some American. The collective editions—i.e., editions or selections of Shakespeare's works—number 325 in 2,199 volumes. The total additions during the year reach 261, against 214 in the previous year. Of this number there were 209 volumes, the remainder consisting of pamphlets, pictures, engravings, photographs, &c. Among the more interesting acquisitions might be noted a fine copy of Wright's (1807) facsimile of the Folio of 1623, containing a list of errors of the press, signed by W. Upcott, librarian of the London Institution, 1817; also a collection of Italian novels from which Shakespeare is said to have taken the plots of at least two of his plays; and seven original sketches made by Sir George Scharf, late director of the National Portrait Gallery, from the Chandos Portrait of Shakespeare, the Droeshout engraving, &c. Describing the various alterations and improvements to the building carried out during the year, the report mentions the construction of a new study adjoining the principal staircase, and considerable structural repairs carried out in the theatre and library, including the provision of new dressing-rooms in the basement, partial reseating of the theatre, and various improvements effected on the stage. An addition to the main staircase is the new stained-glass window, Queen Victoria in her Coronation Robes, the gift of the chairman, Mr. Edgar Flower, the subject a fitting companion to the Queen of Shakespeare's Day at the foot of the same staircase. The presentations to the library number 99, and 108 works have been bought. The pamphlets number 77—39 bought, 38 presented.

THE North-Eastern Railway Company are maturing arrangements for the construction of a new high-level bridge across the Tyne at Newcastle. The proposal is that the new railway bridge shall cross the Tyne about midway between the High Level and Redheugh bridges. Its northern end would be in the vicinity of the Forth Banks, while the southern end would be

in the neighbourhood of the eastern end of Askew-road. The project is to have four lines of rails, so that the new bridge will provide accommodation for a large volume of traffic. The existing High-Level Bridge was built between 1846 and 1850, from Robert Stephenson's design, and cost about half a million; the Redheugh Suspension Bridge, which crosses the Tyne a mile west of the High Level Bridge, was designed and built by Sir Thomas Gooch in 1868-'71, and cost £35,000. It is now being reconstructed.

WHEN the memorial stones of the Independent Wesleyan (Wesleyan Reform Union) Chapel, High-street, Rushden, were laid in 1873, some official documents, current newspapers, and coin minted that year, were sealed in a bottle and placed in a crevice prepared for that purpose in one of the stones. The chapel is now being demolished to make room for a more commodious structure. The members of the committee assembled to witness the removal of the old memorial stones, and to secure the papers, coins, &c., which had been placed there twenty-five years before. A surprise awaited them, however, for it was found that the bottle was missing, and that, instead of the papers and coins, there was a rough piece of slate, on which had been scratched a message. "Oohkes (? hoax) to the poor foundation-stone. We had no beer, and that made us all feel very queer." This purported to be signed by four or five of the men employed on the building.

AN accident illustrating afresh the risk attending excavating sites adjoining old premises, even where precautions as to shoring are adopted, occurred in Edinburgh on Saturday afternoon, when the greater part of a three-story tenement at 77, Nicolson-street, collapsed. A married couple and their two children were in the building at the time, but all were rescued without serious injury. The premises consisted of a shop on the ground floor, and two flats and attics of dwelling houses. The tenement immediately to the south of the building had recently been demolished, and for some time workmen in the employ of Mr. John Martin, contractor, Dundee-terrace, had been engaged making excavations with a view to laying down the foundations of new premises. For constructing cellars excavations to the depth of about 10ft. had been made, and as the result of these operations the foundation of the adjoining building had been affected. Indications of this had shown themselves for a day or two, and on Saturday morning workmen were engaged shoring the building, while it was considered advisable to warn the occupants of the dangerous state of the premises. About two o'clock, while some of the burgh engineer's men were making an inspection of the premises and overlooking the work of shoring, the gable wall sank on its own foundation, and the entire south half of the building collapsed, carrying everything with it from the attic to the ground floor. Fortunately the workmen employed outside had observed the dangerous condition of the wall, and had just time to escape before the crash came.

THE rifle ranges on Morpeth Common, constructed in 1888, have just been reconstructed, changes having become necessary owing to the greater carrying power of modern weapons. They now consist of a 200 yards range of five targets, trench marking, and fitted up with Ralston's canvas targets, and of a long range, constructed on the same principle, and also fitted up with ten Ralston targets. The marking trenches are constructed of substantial brick-work with concrete floors, and drained. A ricochet mound, backed up by iron target plates, and iron roofing over the markers in the trenches, secures safety in front, and a high stop-butt, backed up by the hill behind each range, provides safety in the rear. The ranges were laid out, and their construction superintended, by Captain R. Cecil Hedley, instructor of musketry to the 1st V.B.N.F. The excavation works and the masonry have been carried out by Messrs. Beattie and Hogg, contractors, Morpeth. The outlay on both ranges will aggregate about £500. The first prize meeting of the Northumberland Rifle Association on the new ranges commenced yesterday (Thursday).

THE scheme for the widening and improvement of Berryden-road, Aberdeen, the principal means of communication between Rosemount and the Kittybrewster district, has at length been brought to completion by the town council of Aberdeen. The thoroughfare was formerly an ill-paved lane, only from 15ft. to 16ft. in width, but has now



a carriageway with a uniform breadth of 25ft., with a 9ft. footpath on both sides except at one point. The roadway, and also the continuation thoroughfare along Belmont-road to Great Northern-road, has been laid with tar-macadam, and is the longest stretch of public thoroughfare yet laid with this material in Aberdeen. It is of a total length of 450 yards, and of tar-macadam there has been laid down 1,800 tons. There is a foundation, 8in. deep, of hand-set rubble. Above that is laid 4½in. of round tar-macadam, and a topping is laid of 1½in. of smaller tar-macadam. Each layer as it was laid down was solidified by use of the steam roller. The work of widening the thoroughfare, forming footpaths, and laying the tar-macadam, has been carried out by the corporation workmen. The only contract in connection with the improvement is that for laying the hand-set rubble, as the foundation of the roadway, which has been carried out by Mr. James Leith, jun. Mr. Bruce, inspector of the North Division of the city, has been in charge of the work, under the supervision of Mr. Dyack, burgh surveyor.

A DEMONSTRATION of the usefulness of expanded metal as a fireproof building material is being given in Birmingham on the ground that has recently been cleared for building operations in connection with the widening of Digbeth, Birmingham. Expanded metal, as most of our readers are aware, consists of sheets of metal mechanically slit or opened out, so as to produce trellis-work which can be utilised for a great number of purposes to which wirework is applied. It is now used extensively instead of laths for plastering, and as a binding material in the construction of concrete floors. In the latter case the metal used is drawn steel, and it is claimed that floors so constructed will bear in proportion to their thickness a far greater weight than ordinary concrete floors, while half the usual number of supporting girders may be dispensed with, and the fire-resisting property is very considerably increased. Plastering on the same system can be used, in an ornamental form if desired, to protect the structural ironwork, the simplest plan being that of a false ceiling a few inches below the floor. A structure has been provided in Digbeth illustrating the use of the system in concrete floors, suspended ceilings, and roofs. This is being tested by piling up pig-iron to weights greatly exceeding those usually provided for, and by keeping up fires underneath, with the object of showing how great a heat the expanded metal floors will endure without giving way, and the long period for which the portions protected by the false ceilings will remain cool in such circumstances. Observations on the result of the experiments are being made by Mr. H. Price, building surveyor to the Birmingham Corporation, and Mr. Teviotdale, assistant superintendent of the fire brigade in that city.

A new sash-fastener has been patented in the United States by Mr. George Feltham, of Waycross, Ga. The object of this invention is to provide a sash and fastener arranged to exclude dust and the like from a room, and to lock both sashes securely in any desired position without danger of the fastener being unlocked or opened from the outside. The fastener comprises a casing adapted to be secured to the lower sash, a laterally-movable bar in the casing, a pivoted head on the outer end of the bar, and adapted to engage the upper sash, and a spring for holding the head in position when not in use.

A new clock having four dials is being placed in the tower of the parish church of Normanton, near Wakefield. Messrs. Potts and Sons, of Leeds, are carrying out the work.

New brickworks on a large scale are in progress of construction at Llanfynydd, a village between Coed Talon and Wrexham, on the recently-extended passenger route between Mold and Wrexham. The new works, which are expected to be completed in the course of a few months, are being promoted by Messrs. Payne Brothers, of the St. Alban's district, Liverpool.

At Monday's meeting of the Morecambe Urban District Council, letters were read from the Local Government Board consenting to the council borrowing the sum of £3,540 for works of water supply. The Local Government Board further wrote saying that it was desirable that Mr. Nicholls, engineer for the new sewerage scheme to be adopted at Morecambe, should have an interview with Major-General Carey, their chief engineering inspector, at the Local Government Board Office, with regard to the proposed scheme.

## MEETINGS FOR THE ENSUING WEEK.

**SATURDAY (TO-MORROW).—**London Architectural Association. Visit to Queen Anne and Georgian Mansion at Arno's-grove, Palmer's-green.

Northern Architectural Association. Excursion to the Dunston Flour Mills. Members to assemble at the Tyne General Ferry Co.'s Landing, Quayside, Newcastle, at 2.55 p.m.

## Trade News.

### WAGES MOVEMENTS.

**LABOUR DEPARTMENT RETURNS.**—The monthly report for July of the Labour Department issued on 2,425 returns, states that employment generally has been good, except in industries affected by the coal dispute in South Wales. In the 117 trade-unions making returns, with an aggregate membership of 464,754, 12,137 (or 2.6 per cent.) were reported as unemployed at the end of July, as in June compared with 2.7 per cent. in the 113 unions, with a membership of 465,561, from which returns were received for July, 1897. Employment in the building trades continues brisk, and has slightly improved in most branches. The percentage of unemployed union members at the end of July was 1.0, compared with 1.2 in June and 1.3 per cent. at the end of July last year. The furnishing trades, though scarcely so brisk in some branches, are still well employed. The percentage of unemployed union members at the end of July was 1.6, compared with 1.3 in June and 1.9 per cent. in July, 1897. Changes in the rates of wages of about 95,000 workpeople were reported during July, of which number 94,000 received advances and 1,000 sustained decreases. The net result was an increase estimated at about 1s. 1½d. per head in the weekly wages of those effected. Thirty-three fresh disputes occurred in July, 1898, involving 8,283 workpeople. The corresponding number of disputes for June was 49, involving 12,087 workpeople; and for July, 1897, 62 disputes, involving 46,520 workpeople. Of these, only six disputes took place in the building trades.

**WAGES AND HOURS OF LABOUR.**—A Board of Trade report relating to changes in rates of wages and hours of labour in the United Kingdom in 1897 was issued on Tuesday. The upward movement in wages which was noticed in 1896 continued with greater force in 1897. Only 13,855 persons are reported to have had their wages reduced, as compared with 560,707 whose wages were increased, the total gain to men being £31,507 per week. In the building trades increases averaging 2s. 1½d. per week were gained by 84,219, the highest rise being to 10,032 bricklayers, 2s. 6½d. per week each, and the smallest painters and decorators (6,609) 1s. 10½d. per week. As regards hours of labour, 69,572 had their hours reduced and 1,060 had their hours increased, the total net reduction in hours weekly amounting to 284,675. The hours worked in the building trade have shown a progressive decrease each year since 1892. These figures are exclusive of workpeople employed by London engineering firms whose hours were reduced temporarily to 48 per week, and who early in the present year reverted to hours previously in force.

**BRISTOL.**—In connection with the termination of the Bristol building trade dispute, a specially-convened meeting of the Master Builders' Association was held on Friday, at which the recommendations of a committee of the association were considered. Mr. C. A. Hayes presided, and, on the motion of Mr. E. Walters, seconded by Mr. George Wilkins, the following resolution was agreed to:—"That, as the Bricklayers' Society has eventually accepted the mediation of his Honour Judge Austin, the members of the Bristol Master Builders' Association are prepared to act upon his Honour's suggestion—viz., to give the rise in wages forthwith, and as the federated trades and the Masons' Society have honourably stood by the award of the Board of Trade arbitrator (Mr. A. A. Hudson), the committee of this association is prepared, as an act of grace, to recommend its members to grant a similar concession to those trades after next pay-day."—At a meeting of the Bristol Building Industries Federation, held on Tuesday evening, a report was received from a deputation which had waited on the master builders respecting the late dispute in the building trades. The report was to the effect that the employers had decided the halfpenny per hour advance to the whole of their employees should begin from the last pay-day instead of from September 1st, as per the arbitrator's award. This report was received with satisfaction, and the secretary (Mr. W. A. Pitt) was instructed to forward a letter to the secretary of the Master Builders' Association acknowledging this act of courtesy on their part, and expressing the high appreciation felt by the members of the federation

at the manner in which the whole question in dispute had been settled.

**LANCASTER.**—After being on strike since April 30, the operative masons of Lancaster have resumed work this week at an advance in March next from 9s. to 9½d. per hour. The men were holding out for an immediate advance, and thereby disobeying the rules which affected a settlement at the Manchester Conference. The Lancashire and Cheshire Federation put pressure on the executive of the men in London, intimating that if the Lancaster men did not come in there would be a lock-out. The executive decided that the strike must be stopped on Saturday last, and no more strike pay would be paid after that date. The men accordingly came to terms with the masters, agreeing to the advance in March. They came out on a question of working short time, and the trade has been at a standstill all the summer, excepting a few contracts which the masters have combined to carry out.

**SCOTTISH CABINETMAKERS.**—The cabinetmakers and upholsterers on strike in Scotland have balked on the question of accepting the principle of piecework, which the employers insist upon as a preliminary to a conference for settling the present dispute. The votes of the men have been cast almost solidly against acceptance of the piecework principle, the ballot showing 1,023 negative and only 71 affirmative votes.

**SHREWSBURY.**—The strike of labourers in the building trade at Shrewsbury, which has very seriously affected operations in the trade for some months past, has been brought to a termination by the men accepting the masters' terms. The strike was the outcome of a demand by the men for an increase of wages from 5d. to 5½d. per hour. The masters offered 5½d., but the men refused to accept these terms, and left work. The men have now accepted these terms, and resumed work on Monday. The masters have also gained an advantage in matters of detail. Whilst agreeing to pay all union labourers 5½d. per hour, they reserve the right to employ non-union labour on their own terms. The end of the dispute has given general satisfaction except to the labourers.

### CHIPS.

The new fever hospital, Wallington, Surrey, is being warmed and ventilated by means of Shorland's patent Manchester stoves with descending smoke flues (some single and some double-fronted) and patent Manchester grates, the same being supplied by Messrs. E. H. Shorland and Brother, of Manchester.

The Ambleside (Lake Windermere) Urban District Council have engaged Mr. Harry W. Taylor, A.M.I.C.E., of St. Nicholas Chambers, Newcastle-on-Tyne and Birmingham, as their engineer, for the preparation of a scheme of sewerage and sewage disposal for their district. Pumping will have to be resorted to to raise the sewage from the low-lying portions of the district.

The new bells of the parish church of Chaffcombe were dedicated by the Archdeacon of Taunton (Dr. Ainslie) on Monday. Anterior to this there were only three bells which were tuned to a minor three, and by the addition of two more bells they are now transformed into a major peal of five.

The annual excursion of the Aberdeen Master Builders' Association was held on Saturday. The party, to the number of thirty, left Aberdeen by the 6.45 Caledonian train in the morning. On the arrival at Comrie brakes were waiting to convey the party to Loch Earn, a distance of 12 miles. The party travelled up the north side of the loch to the head. When half the distance had been covered luncheon was served. Mr. George Hall presided, and Mr. Robert Mile, jun., was croupier. Returning to Comrie tea was partaken of, and the party joined the last train for Aberdeen.

The death is announced, at the ripe age of nearly 87, of the famous American geologist Professor James Hall, of Albany. As far back as 1836 he became attached to the Survey of New York, and in 1843 was appointed State Palaeontologist. His series of large folio volumes on the "Palaeontology of New York," issued between 1847 and 1874, forms a monumental work. Professor Hall became director of the State Museum of Natural History at Albany. Forty years ago the Geological Society of London awarded to Professor Hall the Wollaston medal.

The Corporation Baths, in Lombard-street, West Bromwich, which have been enlarged and improved, were reopened on Friday by the mayor. The baths are capable of accommodating about 800 people. The first-class swimming-bath has been entirely remodelled, being 28ft. longer than the old one; and the second-class and private baths have also been improved. The contract for the improvements was let to Messrs. R. and E. Woodward for £3,449, and has been carried out under the superintendence of Mr. Greatorex, the borough surveyor.



# THE BUILDING NEWS

## AND ENGINEERING JOURNAL.

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### DEVELOPMENT OF DETAILS.

PERHAPS the more skilled and competent the artist, the less is he inclined to be satisfied with his work. It has been aptly said that "it requires no small degree of ability to know when to conceal it." Like other professions, there are a number of perfunctory men who practise architecture, and they are generally the most satisfied with results. Mr. Bombast has the tact to lay any blame that may attach to his work on the shoulders of others—perhaps on the "cheese-paring" closeness of his clients, on the scamping builder, or on any other cause than perhaps the true one. He is clever, too, in minimising defects—even trying to persuade himself and others they are merits rather than faults, and we know of one individual who had this trait so largely developed that he would shrug his shoulders and say: "Well, really, the builder's way is better than mine." The fact is, his knowledge of a rational or reasonable way of framing a joint, or his selection of a material, was somewhat doubtful or "misty," and what he specified or drew was more from custom or habit than from knowledge. But the man who has learned his profession and the motives for doing things—who has a definite knowledge of his business, not a hazy or nebulous one—immediately and quickly discovers little errors in design or execution, or finds out how much he could have improved this or that detail if he had his opportunity over again. We make no hesitation of saying that our leading architects are seldom quite satisfied with their designs when they have been executed. They pass muster with less critical people, who look only on general features, or on what captivates their imagination; but there is something in the profile or in the detail of some part which offends the designer. It may be the outline of a tower or a doorhead, or even a moulding near the eye, that to his mind is unsatisfactory. There is the designer of the spur of the moment, who repeats something that he has seen somewhere and takes his fancy, but on after-consideration it disappoints. Emerson has said: "A foolish consistency is the hobgoblin of little minds, adored by little statesmen and philosophers. With consistency a great soul has nothing to do. Speak what you think now in hard words, and to-morrow speak what to-morrow thinks in hard words again, though it contradict everything you said to-day." The same writer says Pythagoras, Socrates, Jesus, Copernicus, Galileo, and Newton promulgated their opinions on this principle. "They were misunderstood, and to be great is to be misunderstood." But they were misunderstood because they exposed fallacious teaching, not because they spoke hard words. The dictum can be carried too far. In architectural matters it has not answered. It would subvert the principles of all art. We would see one style to-day, another to-morrow.

Many of those whose buildings were erected thirty or forty years ago would see much to find fault with. Take the plan of an ordinary residence. Domestic wants and ideas have developed so much that it would be exceedingly unlikely that a house built in the "fifties" would suit a client now. He would want large bay windows, ingles, spacious bath-rooms, and lavatories; conservatories constructed on the newest principles of glazing, heating and ventilating apparatus, fittings up to date, schemes

of decoration unknown forty years ago. The evolution of the domestic residence has completely changed our forefathers' ideal. A comparison of design and specification for a house at that period will show how much we have advanced in the matter of fittings and decoration alone. More marked is the difference observed in public and commercial buildings. The development of ideas has proceeded *pari passu* with the introduction of new materials and improved fittings. How much, for example, has the structural engineer suggested to the architect in flooring, roofs, galleries, columns? The design of a wide, open roof over a large hall or exchange is no longer restricted to timber, king and queen post trusses, but to combinations of timber and iron, admitting of an almost endless variety of forms. The architect who repudiates iron will be disappointed if he finds someone else has forestalled him, and has grappled with the problem; and so it is with hundreds of the details of ironmongery and smiths' work which are now used in buildings. Our electric-lighting installations alone have possibly led to many interior rearrangements of walls and ceilings. In the wiring of a building, the architect has to arrange the lines of his conductors, where they should be, or how the inclosing casings may be treated to harmonise with the decorations. Even the forms of electroliers, pendants, and brackets have called for the exercise of taste. Exhaust and "air-pump" ventilators to many kinds of buildings have prompted the architect to make his roofs prominent, and have exercised his powers of design on turret-like erections which, while serving a useful sanitary office, have added much to the external effect of his buildings. In short, as a new invention forces itself into notice, so the architect has to seize and utilise it, or has to make new arrangements, or invent architectural means, to clothe it.

There is a development, too, in personal relations with men and manners. One instance. In Mr. Alfred Darbyshire's pleasant "Experiences" the author dilates on many sources of information of this kind. His friendship with several public men, notably theatrical managers and others, like the late Mr. Charles Alexander Calvert, the manager of Prince's Theatre in Manchester, was of much value to him in his architectural connection with the stage. In carrying out the enlargement of that theatre, the architect availed himself of visits to London, where he made the acquaintance of H. Stacy Marks, R.A., and that painter's success as a painter of friezes and other decorations induced the architect to enlist his services in the painting of a Shakesperian frieze for the new proscenium at Prince's Theatre. Marks entered heartily into the decorative design, and no doubt the architect's work was considerably enhanced by the association of such talent. How very much more might be accomplished in this way if architects allied themselves with painters, sculptors, and art-workers! The Cinque Cento architect availed himself of the assistance of various artists, such as the Florentine frescoist; they associated themselves together in public and private works, and the result is a development of architecture that has never been surpassed. The French Renaissance, a contemporary period, showed also a similar association of architects, painters, sculptors, and others, and in our own Revival the earlier architects had the assistance of French and Italian modellers and decorators. The modern city professional man has few opportunities. At his club or his society he meets his own *confrères* in the profession—men who are often his competitors, or his rivals, who are not always disposed to give away their knowledge, or to assist him with their advice. But an architect and a painter can meet on different terms: there is a reciprocity of

feeling between them. One can enter into friendly intercourse with the other, and each can learn something of the other. And it is the same with the decorator, who has much need of architectural assistance and advice, and the art metal-worker. Now the great trades have taken the place of the art craftsman. Unfortunately, commercial competition has hindered anything like a frank cordiality and relationship between the architect, and, say, the great ironmonger, who gives tenders and contracts for work under the architect's direction. The two have different purposes to serve. If the large iron firm took the architect's advice in matters of design, he would in all probability lose customers, or his tenders would be too high, and so it is—one cuts against the other. With the decorator and architect it is the same. If our decorators were to accept all the higher teaching of art, and produce designs and colours for wall-papers that would suit the classes, they would probably have to close their businesses, or be content with a very small *clientèle*. And so it comes about that the art ideas are hindered instead of being advanced in the circumstances of commercial strife. Even here, however, the man with his eyes open cannot not fail to pick up a "wrinkle" or two and turn it into account. Even such a thing as a radiator may be made artistic, or suggest new arrangements. A new iron or brass fastening may easily lend itself to decorative effect, as many of the modern hinges and finger-plates have done.

In plan there is an infinite source of development possible. Given the accommodation of a house, several variations are possible. In the hurry of practice an architect has not time to make experimental plans; he sketches out one or two roughly that satisfy him, but he has little time to revise and perfect such. His client occasionally makes a suggestion that can be turned to account; but it is in the course of building, or not till after the house is advanced, that some new idea strikes the mind, as how much better some other position of a wall or a door would have been; and this idea often haunts the designer—how he could have improved this or that. But it is too late. In elevation also the architect is constantly finding out little improvements which connection with other sides of the building may suggest. But often these ideas come too late, or after the architect's plans have passed into the hands of the builder. Owing to the hurry of modern building operations, it is impossible for the most omniscient mind to take cognisance of every detail. Were it not for the modern contract system, the architect might leave many of his details to be designed or arranged for during the progress of the work;—he could design his stone or brick features on the building; his mouldings would be all decided on when they were wanted, and the numberless internal fittings could be arranged to meet the requirements of the client, whose opinions were more likely to be matured when the building was nearly completed. These developments of detail from the building during its progress are now practically impossible, and the architect must see precisely and accurately the end from the beginning.

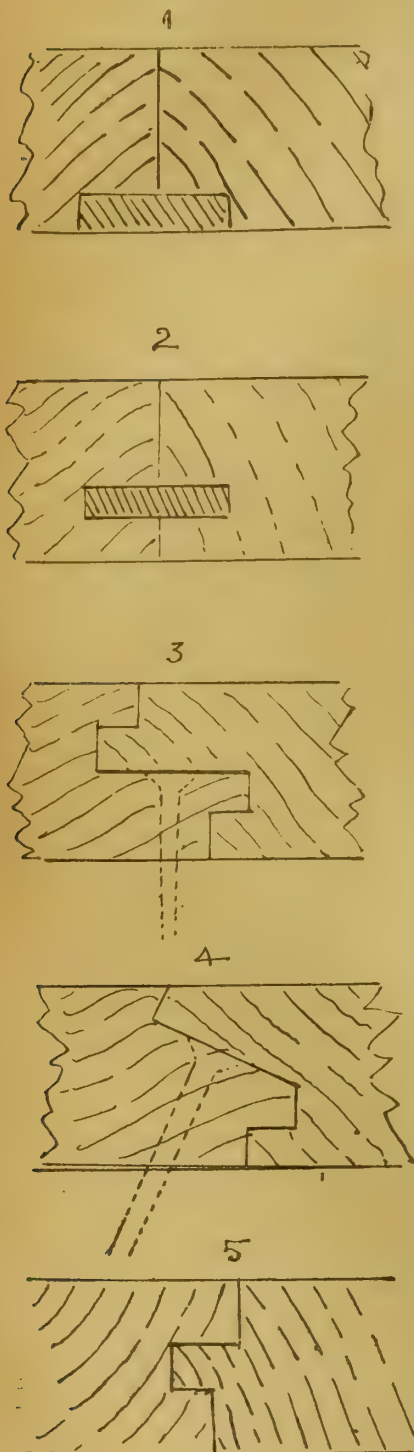
### MODEL SPECIFICATIONS.—XXVII.

THE JOINER: FLOORS, SKIRTINGS,  
ARCHITRAVES.

SEVERAL methods of jointing floors are used. A few of these we illustrate in our sketches, Figs. 1, 2, 3, 4, 5. The hoop-iron tongue (1½ in. galvanised iron) does not require a thick groove, and there is more wear in a floor so tongued. It is better to keep the grooves near the bottom of thickness, about two-thirds down. For ploughed and



tongued floors in which hard wood tongues are introduced, as in sections 1 and 2 are often used; it is better to place the wood tongue near, or at the bottom, for the sake of wear. For warehouse floors, the tongues or fillets may be 1in. by  $\frac{1}{2}$ in., of oak, and placed at the bottom. For superior and polished floors, the boards are fixed by secret nailing. Sometimes they are secured by dowel pins placed at intervals apart, and the boards are secretly nailed through one edge.



Sections 3, 4, and 5 show the principal kinds of secret joints; they prevent dust passing through, and for this purpose ought to be specified. Sections 3 and 4 show how the secret nail or screw is driven, and the proportion of tongue to thickness of board. The boards are edge-nailed in all three cases. Section 4 is supposed to be less expensive, and is sometimes called the "Pavodilos" joint. The boarding for this kind of rebated and tongued joint should be not less than 1 $\frac{1}{2}$ in., and the tongues or

rebates in sections 3 and 5, should divide the thickness into four and three equal parts respectively.

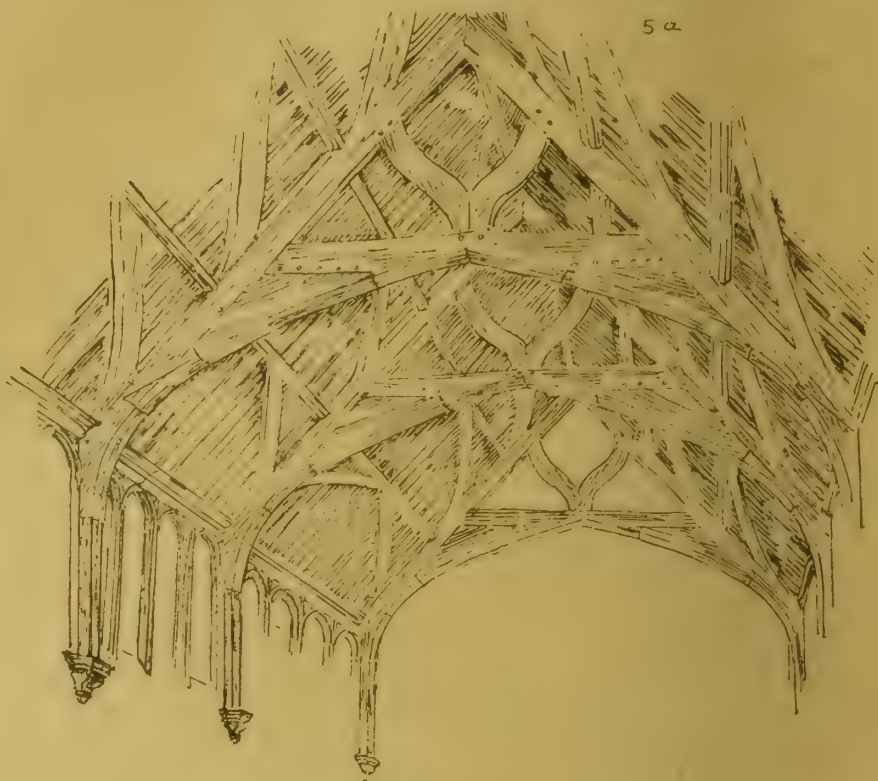
Warehouse and shop floors ought to be in two thicknesses; the lower counter floor 1 $\frac{1}{2}$ in., and the upper 1in., laid crosswise, and fixed so as to be renewable. (Sketch 5a is a roof with braces between principals.)

We give a few sections of skirtings and the method of fixing to grounds (Figs. 6, 7, and 8). The grounds or battens ought to be dovetailed at angles and well plugged to walls. The skirtings to be tongued to floors and tongued and mitred at angles, also tongued at heading joints and housed into architraves. It is better to fill up the space at back of skirting with plaster or cement. Section 8 shows a double skirting consisting of two pieces; the lower one should be wider. The boards are grooved and rebated, the lower one housed to floor; they should

buildings should be fitted to foot-blocks or plinths, so that the mouldings may not suffer injury.

The skirtings are housed into these foot-blocks (see plan 15). The architraves are generally mitred, ploughed, and tongued, or mortised and tenoned. Double-faced architraves are generally specified for large buildings or superior rooms, such as we show in sections 13 and 14. In describing these details, state the width of architrave, how formed, whether single or double-faced, the ground, the projection of base to stop skirting; and it is desirable to give a larger scale or full-size detail, or accompany the specification with a marginal sketch. Of course, the thickness of jamb linings, whether twice rebated or beaded, tongued at angles, and fixed to backings or framed grounds, if splayed, &c., should be stated.

Section 16 shows a panelled jamb-lining



always allow for contraction and expansion without splitting, and this is done by fixing one side of board and tonguing and grooving the other edge. Section 9 shows a dado of wide boards, grooved and feathered. These are hung by thin tongues of hard wood at distances of about 3ft. to the upper ground behind surbase moulding, and are kept together by "keys,"  $\alpha$ , about the same distance apart. The dado being thus suspended can expand and contract without opening the joints. Section 10 is a more decorative kind of dado; the curved dado may be formed in cement or be bracketed out and boarded, or it may be of solid pieces shaped to profile, and grooved and tongued, and suspended to upper ground by tongues of hard wood, as described above.

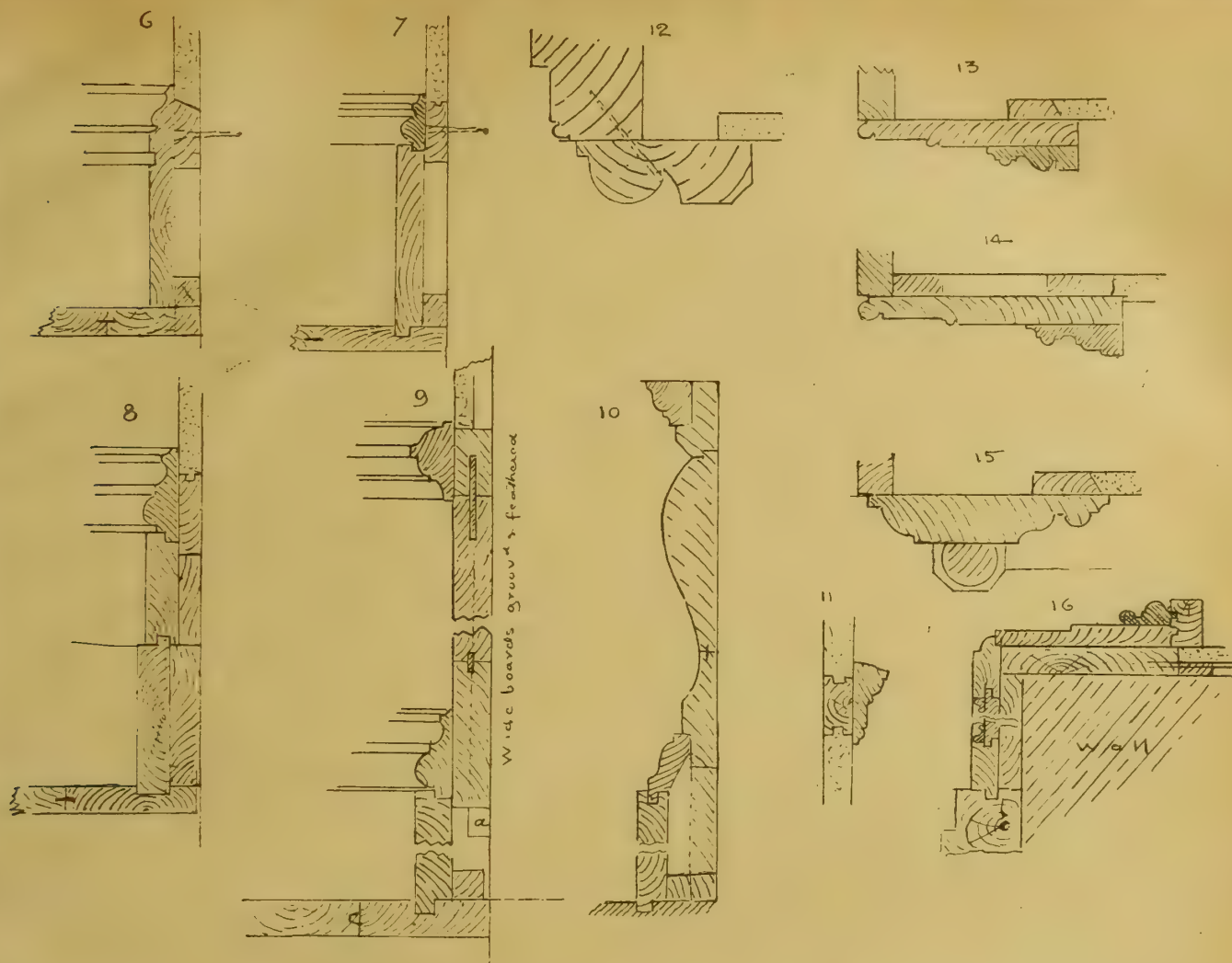
In fixing architraves, a few examples of which we give (section 12-16), care should be taken to fix them so as to allow the pieces composing them to freely expand and contract. For this purpose, in polished work the joints should not be glued, but be fixed at the edges. For superior architraves keyhole slots are made at the back to correspond to screws with projecting heads fixed to ground. The slots in architrave are made to fit over the screws. The bases of architraves in important

for a thick wall. The linings are tongued to door-frame.

Doors and door-frames comprise many varieties. Solid door-frames are never less than 4in. by 3in.; other sizes are 4 $\frac{1}{2}$ in. by 4in., 4 $\frac{1}{2}$ in. by 4 $\frac{1}{2}$ in., 5in. by 4 $\frac{1}{2}$ in., 6in. by 4 $\frac{1}{2}$ in., &c. The specification phrase, "proper door-frame," means one wrought-rebated and twice beaded. State if they are to be let into stone steps, or to have cast-iron shoes; if grooved for jamb-linings, if the door-head is square, or segmental, or semi-circular. If the latter, the head ought to be specified to be put together in two or more pieces, connected by oak keys and wedges or screwed.

For framed and braced doors narrow boards should be specified; both edges ploughed and tongued with galvanised hoop-iron. The braces should be stub-tenoned to rails; they should not be specified less than 2in. in thickness. Ledged doors also should be in narrow batten widths, tongued and beaded; the tongues painted and fixed by brads at top. The ledges should be splayed and painted at the back, and fixed with wrought nails, punched, and clinched. To prevent splitting on shrinking, the ledges should be slot-screwed. These doors are 1in. or  $\frac{3}{4}$ in. in 7in. widths of "matched and beaded" boarding, or grooved and tongued, and are





hung on 16in. or 18in. cross-garnet hinges to a wrought deal rebated frame notched for ledges, and having a 12in. Norfolk thumb-latch and oak stock lock. There are framed and braced doors, with stiles and rails grooved, filled in with wrought, grooved, and tongued boarding (matched boarding); then there are the ordinary four-panel doors from 1½in. to 2½in. thick, usually for decent work from 2in. to 2½in. thick. In specifying, state number of panels—four or six; if the doors are moulded on one side or on both sides; if bolection moulded, with raised panels; if mouldings are rebated to stiles and rails; how hung, whether to plain or panelled jamb linings, with iron or brass butts and screws and mortise locks; or state the name of any maker or tradesman who supplies them and the furniture, and the number or pattern in price-book, as, for instance: "The hinges are to be strong brass butt hinges, 2½in., No 73027 in Young and Marten's Ironmongery Catalogue"; or, provide J. H. Boobyer and Sons' butts, mortise locks, and brass furniture; or the locks and furniture to be supplied by James Hill and Co., or to be Hobbs and Co.'s London-made locks. Describe the dimensions of architraves, the projection of which will depend on the dado and skirting mouldings; if any mouldings are to be planted on lock and frieze rails; if there is an overdoor; if so, a p.c. sum may be stated, as: "The overdoor to be in accordance with design or pattern No. — in Crompton and Fawkes' catalogue, or to be executed by B. E. Nightingale, Albert Embankment."

**61. Deal and Wainscot Floor.**—Lay the floors of reception-rooms with 1½in. wainscot (or Memel) boarding in narrow widths free from knots, no board to exceed 4in. or 5in. wide, skew-nailed on one edge, doweled with oak pins 6in. apart,

beadings ploughed and tongued with wainscot (or parquetry), margin 1ft. 6in. wide; the skirting to be grooved into the same, and mitred at angles, with grain running parallel to the ends and sides of room respectively; or provide the floors to be laid by Messrs. Geary and Walker.

**62. Ground-Floor Skirting** (section 8.)—The skirtings to ground-floor rooms to be in two pieces 10in. (or 12in.) high, 1½in. thick, grooved and rebated and housed to floor, fixed to framed grounds and backings, splayed for plaster at top.

**63. Double-Faced Skirting.**—The reception-rooms to have 1½in. double-faced skirting in two pieces, the plinth 5in. high, with ½in. sinking, grooved into floor, nailed to fillet and to 1½in. grooved grounds, astragal or torus moulding, as shown. Or—

The rooms of ground floor to have 1in. deal skirting, 8in. high, nailed to fillet and grooved grounds, and with moulding as shown. [It is desirable to give a profile of the moulding in every case for principal rooms, and whether the skirting is rebated and backed or filleted. For the side of steps, they should be described as "scribed to steps, with ramped mouldings." Circular work ought to be specially described.]

**64. Dadoes.**—Run round dining-room walls 3ft. high a 3in. by 1½in. moulded deal dado-rail on double-splayed grounds (or double-grooved grounds), plugged to walls, mitred at angles and to floor fillets.

Fix round dining (or billiard) room 1½in. (or 1½in.) deal moulded dado (panelled or otherwise) 2ft. high between skirting and surbase moulding, tongued and grooved at angles, and screwed to plugs in walls (or to horizontal battens 2in. by ½in., plugged to walls, plastered between). The surbase moulding to be 4in. by 2in., moulded as shown on sketch, fixed to double-splayed grounds, plugged to walls, with all mitres, tongues, stopped ends, &c. Or—

(See sketch 9.) Form dado with 1½in. wrought deal boarding, grooved and cross-tongued, with keys 3ft. apart fixed to battens or hung by dowels to upper grounds, as shown, allowing for contraction; or the dado to be 1in. (or 1½in.) deal, keyed, ploughed, and tongued (or feather-tongued). (If scribed to steps or staircase, say so;

or if circular on plan and ramped.) Framed wainscots are now made panelled or carved. If there are any, state.

**65. Panelled Dadoes.**—The framed or panelled dadoes to be of the best selected oak according to drawing, to be executed by H. W. and C. Bassant, Fitzroy-square (or W. H. Lascelles and Co., Bunhill-row). (If any special kind of dado is required describe it, as for example): The dado to be of solid hard wood or teak wood, parquet, to be supplied by H. W. and C. Bassant, Charlotte-street, Fitzroy-square.

**66. Wainscot.**—The wainscot, with fascia and skirting, to be executed according to details, with 1in. (or 1½in.) deal square-framed (dwarf); or with 1½in. deal bead butt (or moulded and bead flush) three (or four) panels high, and state if any is to be raked or made to circular walls.

**67. Wall Panelling.**—The walls of billiard-room or hall to be panelled with 1½in. (or 1½in.) wrought deal three (or four) panel high moulded framing, grooved and rebated at angles and screwed to 2in. by ½in. horizontal battens every 2ft. 6in. high plugged to walls. Put dado and surbase mouldings (see clauses above). The frieze to be of one panel high, 1½in. (or 1½in.) moulded framing as per detail (or specify some particular and ornamental frieze, carved or painted), with 2in. or 3in. by 1½in. necking and moulded cornice, as per detail, 6in. (or 8in.) by 2in. bracketed out, secured to fillet plugged to wall, with all mitres, dovetail tongues, stopped ends, &c.; or the cornice to be built up as shown, curved, &c., to the architect's approval.

**68. Bedroom Doors.**—The doors of bedrooms to be 2ft. 6in. by 6ft. 9in. 1½in. four-panel ovolo, moulded and square, hung with 3½in. iron butts to 1½in. double rebated jamb linings. Fit the doors with Colledge and Bridgen's (or Hobbs, Hart and Co.'s) 6in. mortise locks and strong brass furniture. Each side to have a 3in. by 1in. architrave moulded.

**69. Doors.**—The doors of rooms marked A to be formed four-panel, 2in. stiles and rails, and inch panels, moulded ovolo, and bead both sides hung with 3½in. best iron butts to 1½in., jamb linings double rebated and beaded, and 6in. moulded architrave on framed and splayed



grounds, and to be provided with a mortise lock with brass knob, supplied by Boobbyer and Sons.

70. *Ground-Floor Doors.*—The ground-floor doors are to be 2in. (or 2½in.) wrought deal, square-framed, four-panel, moulded both sides, hung on 4in. iron (or ½in.) bolts, with mortise lock and furniture, p.c. 12s., supplied by James Hill; Hobbs, Hart, and Co.; or Boobbyer and Sons; or with 1½in. (or 1¾in.) wrought twice rebated and beaded (or moulded) jamb linings and heads, tongued at angles and fixed on backings with ½in. by 1in. wrought sunk and beaded, framed grounds, and 4in. by 2in. moulded architraves on both sides, mitred at angles and with stop plinths; or with 1½in. wrought deal twice rebated and beaded (or moulded), two-panel jambs, and one-panel head lining, tongued at angles, and fixed to dovetailed framed backings, with 4in. by ½in. framed grounds, with moulded architraves 5in. by 2in. on both sides, mitred at angles, &c.

71. *Jamb Linings.*—The doors of main rooms to have 1½in. (or 1¾in.) jamb linings, double rebated, twice beaded, framed and moulded in two (or three) panels each jamb, and tongued at angles.

#### A LARGE MONOLITHIC FACTORY BUILDING.

THE factory of the Pacific Coast Borax Company at Constable Hook, Bayonne, N.J., has a principal building covering an area 200ft. by 250ft. in extreme dimensions, and a height of four stories for about one-quarter of its length, the remainder being one story high. It was at first proposed to build it with brick walls and mill construction or slow burning floors; but as a large amount of heavy tanks, bulky stock, and large machinery was to be sustained in the different stories, the floor loads were very heavy, and necessitated strong and expensive construction. Estimates were made according to the original design and for other systems of construction, and it was finally concluded that the interests of safety, economy, durability, and rigidity would be consulted by making it of fire-proof construction throughout. The difference in first cost was computed to be less than the capitalisation of the insurance premiums, which could thus be entirely saved. Competitive bids were received, and upon them the contract for the entire construction and completion of the building was awarded to Ernest L. Ransome, M.Am.Soc.C.E., of Chicago, Ill., for a monolithic structure, built entirely of concrete, reinforced by steel rods designed to take tensile strains and to develop the strength of the concrete for its maximum service in compression. This design embraces the construction of solid concrete floors supported on reinforced concrete beams and joists, and carried by hollow concrete walls and solid concrete columns and beam piers in the hollow concrete walls. The essential feature of the construction is the use of twisted square steel bars for the reinforcement of the concrete and the adoption of many details and methods of design and construction which are in the main patented inventions of Mr. Ransome. The typical features of the building, together with the special methods and apparatus for executing the work, are characteristic of advanced practice in a class of construction work not now generally familiar, and the following description of its important features and details has been prepared from the working drawings and from the data secured by study of the work in progress.

The completed building will cover an area of 50,000sq.ft., and will rise to a height of 70ft. above the surface of the ground, contain a total volume of 1,944,800c.ft. of inclosed space, and impose a dead load of about 25,000 tons, which is carried on a foundation surface about 35,640sq.ft., loaded to a maximum limit of 2,500lb. per square foot. The contract for its construction was awarded in December, 1897, and the detailed plans were immediately begun. Operations at the site were begun in January last, and it is expected that the building will be ready for occupancy in August, and will have cost about 110,000dols. The general diagram of plan and elevation is shown in Fig. 1, and the characteristic details of construction are shown in Figs. 3, 4, 7, and 8 inclusive. Enlarged partial sections and elevations, showing the general floor and wall construction, are shown in Fig. 2. As the concentrated load of the walls and columns was too great to be supported directly upon the soft, marshy soil, the wall foundations and column bases were extended by wide reinforced footings to diminish the unit pressures, which were allowed

to reach a maximum of 25,000lb. per lineal foot on the front wall, which was carried by the footing shown in Fig. 3. Elsewhere the footings were 6ft. and 7ft. wide. The columns were supported by extended footings, shown in Fig. 4, which consisted of shallow concrete pyramids reinforced by horizontal bars of twisted steel imbedded in the concrete in successive layers parallel to the sides and diagonals. The walls of the building were built solid at the ends of the main-floor beams, where they constituted piers and were hollowed out, so as to leave air-chambers in the intermediate portions. Both walls and columns were bonded by vertical bars of twisted steel ½in. square extending through them continuously from top to bottom, and united in convenient lengths by turnbuckles, and similar horizontal rods were carried through the building from side to side transverse to the beams imbedded in the different floors about 12ft. apart, so as to provide a certain transmission of strain across the building and assure the resistance of the structure as a whole under eccentric loads or pressures.

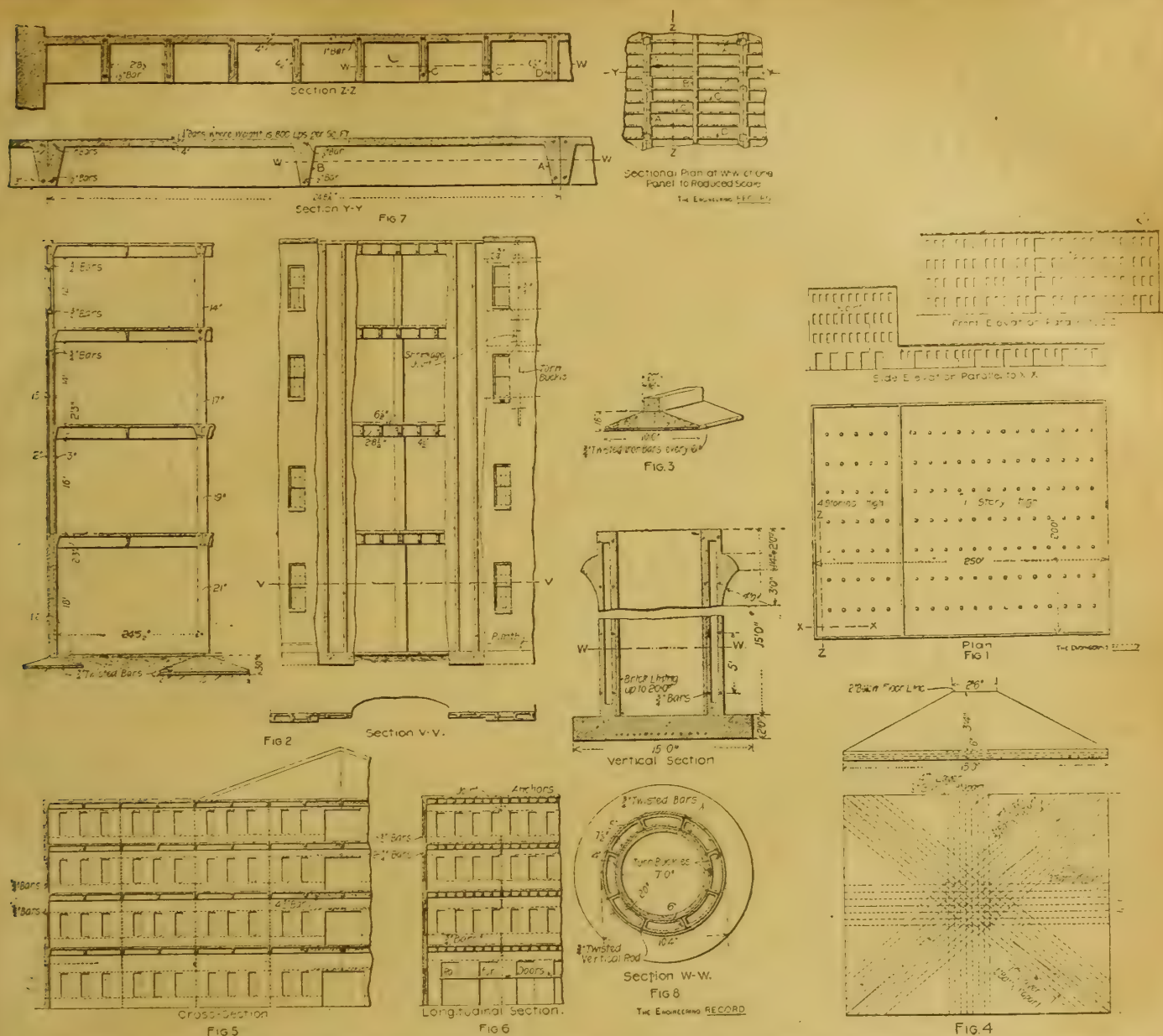
The floors were built in separated sections, each 25ft. square, which were made distinct to provide definite expansion and shrinkage lines, and to preclude the development of the cracks usual in ordinary large concrete surfaces. These lines were also carried through the sides of the building by close vertical joints at every panel of the floor system where the main beams intersected the walls. These division lines are shown in Figs. 1 and 2 and in Fig. 5, which is a general half cross-section through the high part of the building at Z Z, Fig. 1. Fig. 6 is a corresponding section of X X, Fig. 1. The construction of the floor is shown in detail in Fig. 7, which gives a general plan of one full panel and cross sectional details. Every main panel is subdivided by a centre beam, B, into symmetrical halves, each of which consists of eight nearly duplicate sub-panels about 3ft. 1in. by 12ft. 4½in. on the bottom. Each main panel, 24ft. 8½in. by 24ft. 9½in., is bounded on all sides by a vertical space ½in. wide through the centre of beams A and D that separates each of them into distinct halves, and the panel itself is comparable to a large cast plate 4in. thick, with longitudinal and transverse web ribs 2in. deep; or it may be considered as a concrete slab 28in. thick, with about three-quarters of the material cored out from the under side. The regular beams C are 4½in. by 28in. by 24ft. long and about 3ft. apart, with one 1½in. square twisted bar imbedded in the bottom to take up the regular tensile stress of the beam when considered as a girder supported at both ends, and with one 1in. square twisted bar in the top to provide for possible strains due to the cantilever action of the beams, and enable it to develop the maximum compressive resistance of the concrete under all conditions. U-shaped verticals of twisted 1½in. square bars are also introduced at intervals to connect the top and bottom rods, and for increasing the strength of the web. Beams D are similar to C, except that they are made double, with smaller dimensions and reinforcement bars, as shown in the sketch, and the vertical U-bars are omitted. The intermediate beams B serve more to stiffen the floor than as true beams, and are comparable to the "bridging" braces between wooden joists. They are reinforced by a ½in. bar top and bottom. Beams A are made in halves, symmetrical as a whole about their adjacent sides. Their clear span is about 11ft., and they are 25ft. apart centre to centre. The two together form a member 9in. wide at the bottom, 19in. wide at the top, and 28in. deep, with two 1½in. square twisted bars at the bottom, and calculated to be able to safely sustain a total working load of 72,000lb. In all beams all the chord reinforcement bars are connected from panel to panel by screwed ends and turn-buckles, so as to be continuous from side to side of the building.

Wherever heavy concentrated loads are to be imposed upon the floor, or where the distributed loads exceed 800lb. per square foot, ½in. square twisted bars are imbedded in the 4in. floor slab at distances corresponding to the loads, usually about 1ft. apart. The floor is designed for a uniform distributed load of 800lb. per square foot throughout. The roof is made substantially the same as the floor, except that the main slab is only 2in. thick and the beams are of smaller dimensions and have smaller reinforcement rods. It is in the main nearly flat, with a maximum pitch of 1 in 24, and a small moulded cornice at every wall. In the centre of the high part, how-

ever, there is a hip or pitched roof that forms a finish to the central part of the structure, and is constructed similarly to the rest of the roof. The floor of the first story consists of a bed of concrete 6in. thick, without reinforcement rods, laid on a rammed level surface of the natural soil, and divided by separation planes into 12ft. squares. The walls of the four-story portion are 16in. in extreme thickness up to the third floor, and 15in. above that. Where the main floor beams A, Fig. 7, intersect the wall (see Fig. 2) it is made solid, so as to form a pier about 4ft. wide, but elsewhere it is made cellular by coring out portions of the interior, so as to form vertical chambers about 31in. wide and 9in. thick, extending continuously from the ground to the roof, and arranged so as to leave an equal thickness of concrete on the exterior and interior surface (3in. or 4in., according to the thickness of the wall) and about 4in. of concrete between adjacent cells. The wooden window frames are built into the wall as it is constructed, and just above and below them are built four twisted ½in. bars, two on each side of the core in every wall. At about every 25ft. a vertical space of ½in. is made, extending from top to bottom and separating the wall into distinct sections, which are thus provided with definite boundaries and shrinkage joints corresponding with those of the floor panels. At each of these joints a continuous vertical rod of twisted ½in. iron is imbedded from top to bottom on each side of the space, and a similar rod is built in each corner of the building where the side and end walls intersect. All the reinforcement bars in each wall are made 2ft. longer than the total length of the wall, and have their ends bent at right angles so as to anchor back into the adjacent walls at the corners. At every window opening five wooden nailing blocks transverse to the wall are imbedded in the concrete for attaching the trimming. On the side walls of the building iron staples are built in alongside the doorways to attach the fastenings and trolley tracks of the wooden doors, which are also provided with nailing blocks similar to those set for the windows. Throughout the building there are various lines of partitions 2in. thick, made of solid concrete reinforced by a framework of twisted ½in. bars about 2ft. apart, both vertically and horizontally. These partitions are built in moulds, and are set so that the face comes exactly even with the edge of a shrinkage joint in the floor, and they are thus set always over a main floor beam. Where the vertical shrinkage joints occur in the outside walls, the continuity of the structure is preserved by carrying through them horizontal longitudinal pieces of twisted ½in. square rods about 2ft. long, and set about 2ft. apart throughout the height of the wall. The windows and doors of this building are of ordinary construction, and constitute all the combustible material in its permanent structure. In the north wall of the lower story partition, between the high and low parts of the building, some columns are omitted, and an open space is formed over which there is a special concrete girder of 23ft. clear span, supporting three stories of wall and roof above it, and carrying an estimated maximum load of 60 tons. This girder virtually consists of a solid mass of concrete 16in. wide and 50in. deep, with ½in. twisted square rods reinforcing it top and bottom.

Throughout the building there are various special provisions required for the particular service of the manufacture to be conducted there. They include heavy tanks, reservoirs, foundations, vaults, &c., most of which are built with reinforced concrete, but are not of a nature strictly applicable to the general features of this system. The chimney, however, is of somewhat novel construction, and may be considered standard for this method of building. A general vertical and horizontal section of it is shown in Fig. 8, which gives the essential details and dimensions. In it the same principles of reinforcement have been carried out that obtain in the rest of the building, and temperature expansion is provided for by the use of double concentric shells, in which provision is made for a small amount of buckling on the unsupported sides of the internal one without distortion or undue strain to the exterior. Only the hottest zone of the chimney is protected by a firebrick lining. The reinforcement of this stack consists of ½in. rings 2ft. apart vertically, and of eight ½in. vertical bars in each wall of the chimney. This chimney is built inside the factory, which thus protects it from wind strains up to a height of 70ft., above which it rises 80ft. exposed to





CONCRETE AND STEEL FACTORY BUILDING OF THE PACIFIC COAST BORAX COMPANY, BAYONNE, N.J.

ERNEST L. RANSOME, ASSOC. M. A. M. S. O. C. E., CHICAGO, ILL., ENGINEER AND CONTRACTOR.

wind pressures. The exterior surface of the main walls is pointed to represent coursed ashlar work by means of wooden strips inserted in the moulds. After the concrete has set it is dressed by a pneumatic hammer, so as to give an appearance of pick face or rough-pointed masonry. One man was able to cover from 300 to 600 sq. ft. in ten hours, or to dress from 100 to 200 sq. ft. by hand in the same time. Several different aggregates are adopted for the concrete in different parts of the structure. It is all made with Atlas cement and broken basaltic rock, all of which will pass through a 2 in. ring, and most of it will pass through a 1 in. ring. This broken rock is unscreened, and is mixed with the cement in the following proportions:—For foundations, 1 to 10; for the walls, floors, and most of the work, 1 to 6½; for the columns, 1 to 5, and for the lower chords of the floor beams, 1 to 6, using very fine stone. The 1 to 6½ concrete when made into 3 in. cubes and when tested at a week old, ordinarily sustained a pressure of about 900 lb. per square inch for a breaking load.—*Engineering Record.*

#### PUBLIC HEALTH CONGRESS IN DUBLIN.

THE annual congress of the Royal Institute of Public Health was held in Trinity College, Dublin, on Thursday and Friday in last week. A reception was held by the Lord Mayor, the President of the Congress (Sir Charles A. Cameron, medical officer of health for Dublin),

and the committee in the examination hall of the college. The Lord Mayors of Belfast and of Leeds and the Mayors of Cork, Drogheda, and Barnsley were also present, on behalf of their respective towns. The proceedings were opened by Professor W. R. Smith, M.D., President of the Institute, in a brief address. Sir Charles Cameron, the President, then delivered his inaugural address. The members of the Institute had, he said, done noble work in devising and carrying into effect measures for the mitigation of human suffering and for the amelioration of the conditions under which the lower and more dependent classes existed.

#### THE HIGH URBAN DEATH-RATES.

The aggregation of a large mass of people on a limited area operated injuriously on their health and lessened the duration of their lives. Many years ago Dr. (now Sir William) Gairdner, of Glasgow, pointed out that whilst the death-rate in England was 15 per 1,000 persons living on every square mile, it rose as the density of population increased until it became 27 and upwards when the population came to be 2,900 per square mile. The death-rates in purely rural districts had not been very largely reduced since the beginning of the present century. In the towns the case had been different. From the "Bills of Mortality" of London we learn that the death-rate in that city during the period 1728 to 1780 was about 50 per 1,000 persons living. The deaths, therefore, greatly exceeded the births, and were it not for the great immigration into the city from the

country its population would have become extinct, as the mean age at death of the citizens was only 20 years. According to Sir William Petty, the deaths in London in six years of the 17th century exceeded the births by about five-eighths. At the same period the same relative proportions between births and deaths existed in Dublin. For centuries the urban death-rates greatly exceeded the rural rates, in many cases by from 20 to 50 per cent.; but during the last 40 years they had been approximating, although a gap far too wide still divided them. In 1896 the death-rate in the urban districts was 18, and in the rural districts 15.3 per 1,000, the difference being 2.7 per 1,000. The mean rates in the previous ten years were 19.7 and 17.2, a difference of 2.5. In the decade ended in 1860 the urban rate was 24.7, and the rural 19.9, the difference being 4.8. Gratifying as it was to find the gulf between the urban and country death-rates narrowing, it was unsatisfactory to observe that the rate of mortality should be so much greater in some towns than in others. In 1897 the rate in Eastbourne was 8.2, in Bournemouth 10.1, Croydon 13.62, and even in the manufacturing town of Darlington 15, whilst in Liverpool it was 26.76, and in Salford 26.88. Brighton had a death-rate of 15.23; but Wakefield, Stockton-on-Tees, and Jarrow—all manufacturing towns—had almost the same rate.

#### CAUSES OF THE HIGH DEATH-RATES IN TOWNS.

The causes which raise the urban death-rates so much above the rural ones were numerous, and had, perhaps, not been fully discovered. The



contagion of the fevers was clearly more readily conveyed from the sick to the sound in towns. The town atmosphere was less pure than the air in the country; its soils were generally contaminated with filth. In its narrow streets and courts direct sunlight and thorough ventilation were wanting. The effete matter from dwellings and workshops, and the sweepings of the streets, were sometimes allowed to accumulate and to pollute the air by their noisome exhalations. Many of the occupations of townspeople were of a more or less unhealthy nature, and the majority of them were sedentary. In the towns a dozen families often occupied as many rooms in the same house, whilst hundreds of similar houses invested it on all sides.

#### THE SANITARY CONDITIONS OF TOWNS IMPROVING.

The appallingly high death-rates in towns which continued for many centuries had greatly decreased in the present one. The improvement was partly due to greater attention to personal hygiene and a higher standard of comfort, partly and chiefly to improved public sanitation. The causes which rendered so many of the handicrafts unhealthy and even dangerous had been removed, or their effects lessened. In all parts of the world the mean duration of human life was decidedly less in the towns than in the country. Notwithstanding the fact that an increase in the density of a population was unfavourable to health, the rapid increase in the English urban population had not sensibly counteracted the good effects produced by improved public and private hygiene. The density of the population of London had been doubled since 1851. It was truly wonderful that its vast population of 6,291,667, located on only 693 square miles, should have in 1897 so low a death-rate as 17.7 per 1,000. This rate was not greater than that of a fairly healthy rural district.

#### MORTALITY RATES IN IRELAND.

The death-rate in Ireland was, for the whole country, very low. In the ten years ended in 1896 it was only 18. In the same period the rate in Hungary was 35.6, and in Austria 30. The low rate in Ireland is largely due to the circumstance that by far the larger portion of the population reside in the open country. In the decade ended in 1897 the death-rate was 24.65 per 1,000 in the 23 largest Irish towns. In the five years 1876-80, the Dublin death-rate was 29.5; in the period 1881-85, 27.4; in the next five years, 26.8; in 1891-95, 26.1; and in 1896-97, 26.3. Notwithstanding several epidemics, the zymotic death-rate for the five years ended in 1897 was slightly below that of the English towns, the figures being thirty-three largest towns, 2.84; London, 2.82; Dublin, 2.80.

#### HOUSING OF THE VERY POOR.

The improvement in the viability of the working classes of Dublin which had taken place within the last 30 years was, to some extent, due to the better dwellings provided for them. Owing to the benevolence of the late Mr. Peabody, Lord Iveagh, and other philanthropists, a considerable number of healthful dwellings had been built for artisans and labourers. A still larger number had been erected by companies, some of which have been founded on semi-philanthropic, semi-commercial lines. In the city and its suburbs the Dublin Artisans' Dwellings Company owned dwellings occupied by 2,194 families who pay from 1s. 9d. to 12s. per week. This company was now constructing 188 additional dwellings. The City and Suburban Artisans' Dwellings Company had provided dwellings for 284 families, who paid from 2s. 6d. to 6s. per week; the Industrial Tenement Company owned a block of buildings in which there were 46 separate tenements, let at from 2s. to 4s. per week. Many employers of labour, such as railway companies, brewers, distillers, &c., had erected improved dwellings for their employés. Although so much had been done in providing improved dwellings for the working classes, the vast majority of them were still lodged in wretched tenements. A few years ago 32,000 families were located in about 7,000 houses in Dublin, affording 1½ rooms per family. On the other hand, the remaining 22,000 families of the city occupied 17,000 houses. Practically nothing had been done to improve the miserable state of the homes of the very poor, and it was in the wretched homes of the poorest of the poor that the seeds of fever were developed as in a hotbed. The dwellings of the very poor demanded nearly all the attention of the sanitary inspector. Since 1879

more than 3,000 houses had been detenanted and closed in Dublin on account of their insanitary condition; of these, not one-half had been rebuilt or rendered fit for human occupation. The closing of insanitary houses and the clearing of unhealthy areas had, however, been of little benefit to the poorest of the poor. The people who lived on the unhealthy areas had not returned to occupy the neat dwellings which replaced their wretched tenements. The rents of the new dwellings were beyond their means. The unhealthy areas had been cleared, but the condition of the people who dwelt on them had remained unchanged. They had sought on other areas low-rented tenements as insanitary as those from which they had been ejected. The replacement of unhealthy by healthy habitations meant less illness, longer duration of life, and diminished pauperism. The municipal authorities should be encouraged to provide workpeople's dwellings.

#### PREVALENCE OF TYPHOID FEVER IN DUBLIN.

The mortality caused by typhoid fever was greater in Dublin than in nearly every other town in the United Kingdom. In Ireland Belfast alone had a higher death-rate from this disease. On the other hand, diphtheria was very much less fatal in Dublin than in the English towns. He had come to the conclusion that both diseases had to a great extent a telluric origin; they seemed to be in some way intimately connected with the soil. Why should there be so much enteric fever in Dublin? He had long been of opinion that the micro-organisms of this disease had an abiding place in its soils, which for so long a period were polluted by leakage from the filth receptacles and defective sewers of former times, and under certain conditions, these malignant organisms escaped from the soil into the atmosphere, from which they passed through various media into the bodies of human beings.

#### THE "GOOD OLD TIMES."

The belief that former ages were happier than the one we live in did not rest upon a foundation of fact. During many centuries Europe was periodically devastated by pestilences. In that long and gloomy period, so truly named the "dark ages," the towns were the hotbeds of disease, from which their poisonous seeds were spread throughout the land. Leprosy and malarial fevers had vanished from these countries. Typhus fever, which once filled the wards of the Dublin fever hospitals with patients, was now rarely met with. Fifty years ago people disfigured by smallpox might be seen in every street; now that loathsome disease was disappearing under the influence of vaccination and improved hygienic conditions of towns and people. Although a great improvement had taken place in the state of public health in these countries, a further improvement was required and was attainable. We required, perhaps, some additions to and amendments of our sanitary laws, but what was most required was the thorough enforcement of the laws such as they were—and they conferred great powers upon the sanitary authorities. The notification of infective diseases and the laws relating to disinfection should be strictly enforced. The proper isolation of fever patients should be secured. Healthy dwellings and cheap baths and washhouses for the most dependent classes of the community should be multiplied. The "unhealthy occupations" should be rendered innocuous, or, at least, less unhealthy. The injurious emanations from certain kinds of works should be prevented or reduced to a minimum.

At the close of the address the delegates adjourned to the Royal University buildings, Earlsfort-terrace, to take part in the opening of the Health Exhibition by the Lord-Lieutenant of Ireland.

On Friday, the various sections of the congress were opened in various rooms of Trinity College.

#### SANITATION IN IRELAND.

In opening the conference, the President (Dr. T. J. Stafford, medical commissioner of the Local Government Board) delivered an address on the state of sanitation in Ireland. In the course of it he said that, although considerable improvement had been effected in the sanitary condition of the country since the passing of the Act of 1878, yet no one interested in the matter could shut his eyes to the fact that 20 years of really capable administration of the Act would, from a sanitarian's point of view, have effected a vast change for the better in the public health of Ireland. No doubt in some of the larger towns

and cities a great deal of useful work had been accomplished; but to anybody who was acquainted with country villages and rural districts nothing was more striking than the unwholesome surroundings of the homes of the people, the proximity of manure heaps, and the dirty condition of cowsheds and pigstyes near the houses. The houses themselves were deficient of light and ventilation. As soon as the new bodies took over the administration of the Medical Health Acts, it was to be hoped that more attention would be directed to the working of the Acts.

#### THE HOUSING OF THE WORKING CLASSES

formed the theme of discussion in the Municipal and Parliamentary section, which was presided over by the Right Hon. J. M. Meade, a Dublin contractor. In the course of his presidential address, Mr. Meade dealt at some length with the public health of Dublin, and gave a review of the work of the corporation during the last 50 years. In his reference to the provision for the better housing of the working classes, he emphasised the sometimes forgotten distinction between the artisan and the very poor.

A discussion on the subject was initiated by Sir Charles Cameron. It was generally agreed that the chief difficulty on the whole question lay in the unwillingness of the working classes to respond to any outside efforts to improve the condition of their dwellings.

In this section a paper was read by Mr. W. Field, M.P., on "The Terminable Leasehold System in Regard to Municipal Sanitation."

In the section of Preventive Medicine and Vital Statistics, Dr. K. B. Mahon, medical officer of the Ballinrobe Fever Hospital, read a paper on "The Causes and the Management of Outbreaks of Typhus Occurring in Rural Sanitary Districts."

Professor T. W. Moore took as the subject for his presidential address to the section of Chemistry and Meteorology "The Climatology and Scenery of Ireland and its Capital."

In the Engineering and Buildings Construction section Mr. Charles P. Cotton, chief engineering inspector, Local Government Board of Ireland, delivered an address on "The Sanitary Acts of Ireland."

In the afternoon a meeting was held in the Apothecaries' Hall for the purpose of conferring Honorary Causa, the diploma of the Hall, upon Dr. William Robert Smith, professor, King's College, London, president of the Institute of Hygiene; Dr. Matthew Hay, Professor of Medical Jurisprudence, Aberdeen; and Dr. Alexander Crum Brown, Professor of Chemistry, Edinburgh.

In the evening the members of the congress and a host of other guests were present at a ball in the Mansion House.

On Saturday, the subjects discussed covered a wide range of hygienic subjects, and most of the meetings were largely attended. In the section of preventive medicine and vital statistics, Dr. Grimshaw, Registrar-General of Ireland, delivered a presidential address on State medicine. This was followed by a paper in which Sir William Stokes advocated the treatment of infectious diseases in isolation hospitals. Several English delegates denounced the Irish system of hospital treatment, and a very warm debate followed, in which that system was alternately defended and condemned.

Professor Smith, president of the institute, proposed a resolution condemning the practice existing in Dublin of treating infectious diseases in general hospitals. All who had at heart the interests of public health must agree that they would not be doing their duty to the town, whose hospitality they were enjoying, if they hesitated to say that the present system of dealing with infectious diseases in Dublin was altogether wrong and indefensible.

The resolution was seconded and supported by Dr. Kaye (West Riding of Yorkshire), Dr. S. Marsden, and others, and carried *nem con*.

Sir William Thomson vigorously denounced what he described as an aspersion upon the country to which he belonged, and claimed that in Dublin everything possible was done, and the patients could not be more isolated than they were now unless they were carried six miles.

In the afternoon a special meeting of the Fellows of the Royal College of Physicians of Ireland was held in the buildings, Kildare-street, for the purpose of conferring the honorary Fellowships in connection with the congress of the Royal Institute of Public Health, and the occasion was also taken advantage of to confer honorary



diplomas in State medicine conjointly with the Royal College of Surgeons in Ireland. The following are the names of those on whom the honours were conferred:—Honorary Fellowships: Dr. Alexander Crum Brown, F.R.S., M.R.C.P., London; Sir Charles Cameron, M.D., F.R.C.S.I.; Dr. Matthew Hay; and Sir Richard Thorne-Thorne, K.C.B., M.B., F.R.C.P., London. Honorary Diploma in State Medicine: Dr. T. W. Grimshaw, C.B., F.R.C.P.I.; Sir Henry Littlejohn, M.D.; Dr. John W. Moore, F.R.C.P.I.; Dr. W. R. Smith, D.Sc.; Dr. T. J. Stafford, and Dr. J. C. Thresh.

In the evening the congress banquet took place at the Royal College of Surgeons. Sir Charles Cameron occupied the chair, and the Lord Lieutenant was the guest of the evening.

On Tuesday papers were read and discussed in four sections, and the general business of the congress was brought to a termination. In the section of Preventive Medicine and Vital Statistics a discussion took place on the subject of workhouse hospitals. Dr. Grimshaw, Registrar-General of Ireland, said that workhouse hospitals in Ireland were in a very unsatisfactory condition. They must not rest until the hospital was separated from the workhouse.

#### COUNTY MEDICAL OFFICERS OF HEALTH.

In the same section Professor W. R. Smith, president of the institute, proposed:—"That this section regrets that no steps have been taken in the Local Government (Ireland) Act to render the appointment of county medical officers of health obligatory upon county councils, and they feel that urgent representations should be made to the Government pointing out the serious disadvantages that the people of Ireland thereby incur." Dr. Willoughby seconded the resolution, which was adopted.

At noon a general meeting of the Congress was held in the examination hall. The first business was the consideration of the resolutions passed by the various sections. These were ratified in almost every case, except the resolution in reference to the adoption of Greenwich time against local time, which was rejected. In the evening a lecture was delivered to the congress in the theatre of the Royal Dublin Society by the Rev. Monsignor Molloy, D.D., D.Sc. The subject was "Signalling through Space by Means of Electric Waves Without the Aid of Wires," and the lecture was illustrated by an exhibition of Signor Marconi's apparatus for wireless telegraphy. The congress is devoting the remainder of the week to recreations of various kinds, and will disperse to-morrow (Saturday).

#### PLUMBERS' REGISTRATION CONGRESS AT GLASGOW.

THE ninth annual Scottish Congress in connection with the national registration of plumbers began on Thursday in last week, in the Corporation Galleries, Sauchiehall-street, Glasgow. About 280 members were present. At the opening proceedings Bailie Dick presided, and offered a hearty welcome to the visitors. This was acknowledged by Mr. Robert Crawford, the president of the congress, who afterwards delivered his inaugural address. He observed that Glasgow was a very good place for the congress to visit, because it had been from the first active in regard to plumbers' registration; had kept a keen eye on the plumbers themselves; and was far advanced in sanitary reform.

#### PLUMBERS' RESPONSIBILITIES.

The supply of water was intrusted to the water committee, and the sewage committee dealt with the disposal of that water after it had been used. Intermediary between these two authorities came the plumber, who was what might be called the missing link. Up till now the plumber occupied what he might call an absolutely important yet irresponsible position. This movement was practically one to constitute the responsibility of the plumber between the two ends of which the local authorities acted in relation to the water supply of a great city. For many years the Sanitary Department of Glasgow had given themselves to drain-testing. During his period as chairman of the health committee, he observed that the percentage of cases in which the plumbing work was found to be right was extremely small: from 60 to 70 per cent. were in some way found to be defective—he did not say always through the fault of the plumber—and had to be renewed or greatly repaired. Mr. Crawford

referred to the various steps which had been taken to improve the state of matters in Glasgow, and particularly of the advance in the standard of plumber work since the framing of the building regulations. Glasgow plumbers, if not interfered with in regard to price or quality, might now be trusted to turn out, on their own responsibility, a first-rate, reliable job. The president next sketched the origin and progress of the movement for the

#### REGISTRATION OF PLUMBERS,

and described the system by which it is promoted. The movement, he said, began in 1884 with a conference held in connection with the International Health Exhibition of that year. That conference was attended by plumbers from all parts of the country, and by representatives of various classes interested in sanitary arrangements and public health. Its purpose was to consider whether something practical could not be done to lessen, if not to cure, the grave evils arising from the defective sanitary conditions of dwellings. The evil was admittedly general and serious. The triune combination of employers, operatives, and representatives formed to bring about an improvement had been a success, and no serious difficulties had emerged of a kind likely to imperil the permanence of the movement. An immense amount of valuable work had been done in a most harmonious and loyal manner, and, while no one could honestly say that the work was yet fully accomplished or that all difficulties were removed, yet enough had been done to justify the past and to give confidence for the future. The operatives had had placed before them a stimulus to higher education in the technicalities of their craft, and had been encouraged to a higher sense of duty and responsibility, and a pride in good workmanship. Short hours and good wages were no doubt good things, but there were even better things and things more to be desired. Surely it was worth while to strive after excellency in craftsmanship and honesty in doing work all day and every day. Of course it would follow—must follow—that the greater the skill and education required for any occupation or business the better ultimately would the payment become. This all in good time—meantime the ambition should be to elevate the whole status of the craft by each individual member carrying with him the sense of responsibility for himself and every other member, and an active, whole-hearted support of education and registration seemed the straightest and shortest road to this end. Large numbers of the operative plumbers in all parts of the kingdom, and very specially in Scotland, had joined the movement and steadily supported it throughout. Others had been passive—not from any good and sufficient objection or well-founded reasons, but from that inertia which was so common a heritage of man. The master plumbers had, as a rule, fairly appreciated the fact that registration had marked the advent of a new era in the development of the new business, and had supported it manfully and well. As to the public and their representatives on this movement, he could say with great confidence that their part in this threefold combination had been a success. Through them the health authorities throughout the kingdom had maintained a lively and permanent interest in the progress of registration and the higher technical education of the plumber, while their representatives on the various district councils had been treated with cordiality and respect, and had earned the entire confidence alike of the masters and operatives who acted with them.

#### WHAT IS THE PRACTICAL OUTCOME OF THE MOVEMENT?

The material questions for the public were, of course, Is there any actual improvement going on along with all this talk? Is there more knowledge? Is the work better done? Are we safer than we were? His answer to all these questions was, unhesitatingly, Yes. While that was so, he deplored that Parliament had not yet been able to give the effect of law to the Plumbers' Registration Bill. That Bill had for its object the permanent constitution of the movement—to fix a working organisation—to legalise by statute the use of the diploma and title conferred by registration, and to give powers of discipline in the case of those who commit acts unworthy of the craft. What seemed to him to be wanted was a firmer cohesion and more energy among the plumbers themselves—outsiders were almost at one on the subject. If the various organisations

of plumbers of all classes throughout the United Kingdom would unite in a long pull, a strong pull, and a pull altogether, they would rapidly force the Bill through Parliament in spite of its tardy methods. Scotland, so far, had done its part well. In Scotland a plumber was a plumber, not a tinsmith or a brazier, an oil and colour merchant, an ironmonger or furniture dealer, as was so often the case in England or Ireland. "Advance, Scotland," was his motto. Let them teach the rest of the kingdom one more lesson in loyal combination—clear seeing and straight doing. For the sake of operatives, masters, and the public, he once more counselled the sinking of all minor things in the old motto, "Register, register, register."

On the motion of Mr. Cameron Corbett, M.P., the President was thanked for his address.

#### HOW CAN THE PASSING OF THE REGISTRATION BILL BE EXPEDITED?

Mr. Lees Knowles, M.P., narrated the progress which had been made and the ill-luck which had attended the Plumbers' Registration Bill, of which he is the principal promoter. He pointed out that the measure did not propose monopoly. Its action would be merely analogous to the University power of conferring degrees, and would enable members of the public to know at once those plumbers who had given evidence of their competence. The Bill had been read a second time in three different Parliaments; it had the sympathy of the Local Government Board; but in the present condition of Parliament it was almost hopeless to get the measure through as a private Bill, and he believed the only method to attain success would be to appeal to the Government to adopt the Bill. Mr. Knowles thanked the Scottish members for the almost unanimous support they had given.

Bailie Dick warmly commended the registration movement. If its purpose had been merely to make additional profits for the employers or larger wages for the operatives he would have had nothing to do with it; but its purpose being to secure healthy homes, they had abundant reason to join in pushing forward the movement.

The congress thereafter proceeded "to consider what means can be taken to secure the early passing of the Plumbers' Registration Bill into law." In the course of the discussion Mr. Galloway remarked that the first thing to be done was to improve the procedure of the House of Commons. Mr. Lees Knowles suggested that a deputation should wait on the various Local Government Boards, and thereafter on the Prime Minister. Personal interviews had more weight than petitions, and if it were pointed out that the Bill had been three times read a second time—the principle thus being affirmed—the measure might be adopted by the Government. Mr. J. G. A. Baird, M.P., concurred in that suggestion, and said pressure might be brought to bear through the Worshipful Company of Plumbers.

The congress then adopted a resolution renewing its approval of legislative sanction being given to the registration movement; recognising that an effort should be made to induce the Government to adopt the Bill; and calling upon the Scottish District Councils to take prompt and energetic action for the same object, particularly by enlisting the co-operation of the local members of Parliament.

It was agreed, on the proposal of Mr. Galloway, to request the promoters of the Bill to correspond with the various Master Plumbers' Associations and with the executive committees of the Associated and Amalgamated Operative Plumbers' Societies, or any other association, as to the best method of securing the opinions of their members on the Bill.

The congress then adjourned. The delegates were thereafter entertained at luncheon by the Corporation of Glasgow, Bailie Dick presiding.

#### EXHIBITION OF PLUMBING WORK.

In connection with the congress, a new feature was introduced this year in the shape of an exhibition of plumber work and appliances. For the purposes of the exhibition the drill-hall of the 1st V.B.H.L.I., 24, Hill-street, Garnethill, was secured, and the arrangements were in charge of a special committee, of which Mr. James Anderson (of Messrs. Ingleton and Co.) was convener. The exhibition consisted of three main divisions—sanitary goods and appliances exhibited by manufacturers; specimens of modern plumbing work made by journeymen and apprentices; and specimens of ancient and of defective plumber



work taken from old buildings and the like. In order to give a fair chance to the various competitors, the plumbing work was divided into four sections—viz., the work of apprentices who have not been four years at the trade, that of apprentices over that time, that of journeymen, and tools and appliances, and lead-burning. Amongst the specimens of plumber work, general notice was attracted by a clock-tower, standing about 12ft. high, with the arms of the Worshipful Company of Plumbers wrought in lead, an imitation of an ancient battlemented wall with lead roof and turret, finials, rainwater heads, specimens of pipe-bending and jointing, and pipes showing proper arrangements for ventilating sanitary apparatus; also specimens of various designs for lead-roofing, lead-bossing, &c. Among the samples of lead-burning were rainwater heads and spiral staircases. There was also a large and excellent collection of students' work from the practical workshop classes in Glasgow and Ayr. The samples of old and defective plumber work were of extreme interest from a sanitary point of view. An ancient rainwater-head from Fort George, bearing the date 1761, was among the exhibits in the section.

Messrs. Dent and Hellyer, of Newcastle-street, Strand, W.C., show beautiful specimens of plumber work, including a replica of one of the scrolls of the dome of Brompton Oratory, London. A splendid display of sanitary goods is made by various firms, including Messrs. Evered and Co., Ltd., London and Smethwick; The Falkirk Iron Company; J. and M. Craig, Ltd.; and M'Dowall, Steven, and Co. Stands are also shown by Messrs. W. P. Buchan, R. Boyle and Son, and others. Mr. George Low shows a patent drain-testing apparatus, and Mr. John Scott, St. Ninians, patent hydraulic rams.

The exhibition will remain open free to the public till 10 p.m. to-morrow (Saturday).

Mr. Crawford presided at the opening ceremony, which was performed by Professor M'Kendrick, F.R.S., of Glasgow University, who commended the exhibition as stimulating the inventive abilities of the younger members of the craft, and showing the public the many admirable sanitary appliances now available. He also dwelt on the importance of the registration movement, which, despite many difficulties and certain misunderstandings, had steadily advanced, and had placed the technical education of the young plumber on a secure footing. In this connection the Professor expressed his appreciation of the valuable work of the Glasgow and West of Scotland Technical College, and alluded to the immense strides which had been made in plumbing as in most other industries during the last twenty years, and particularly to the work of the late William Paton Buchan, whose name was known all over the world.

#### ANNUAL DINNER.

In the evening, under the presidency of ex-Billie Crawford, the members of the congress dined together in the Windsor Hotel to the number of about two hundred. Professor Glaister gave the "Houses of Parliament," to which Mr. Lees Knowles, M.P. for Salford, replied.

Mr. James Mitchell gave "Burgh and County Authorities," and spoke on the duties of these bodies in administering the Government grants on behalf of technical education. Mr. Hutcheson, Perth, in replying, said that if the burgh and county authorities did their business in the same way as the House of Commons did they would never get through it at all. Bailie M'Leish, Perth, proposed "The Corporation of Glasgow," on behalf of whom Councillor Primrose responded.

Dr. Dyer, Glasgow, in giving the "National Registration of Plumbers," said that the plumbing class in the Glasgow Technical College was the most successful class they had. This arose from the fact that it was managed by those who were interested in plumbing. The Chairman acknowledged the toast.

The congress was resumed on Friday in the Corporation Galleries, Sauchiehall-street, Mr. Andrew Hutcheson, vice-convenor of the county of Perth, in the absence of Mr. Robert Crawford, in the chair.

#### TECHNICAL EDUCATION.

The congress took up the question of the allocation and amounts of grants in aid from Imperial funds available for education in Scotland, and the consideration of how to obtain towards the technical education of plumbers the proportion of these grants due to the importance of the subject from a public health point of view.

Mr. Henderson, Dundee, opened the discussion, in which Mr. Watson (Perth), Mr. Mitchell (Fife), Bailie M'Leish (Perth), Mr. Cuthbertson (Ayr), Mr. Isaac Low (Glasgow), and Mr. Foggie (Dundee) took part, and the following resolutions were unanimously adopted, on the motion of Messrs. Henderson and Watson: "That this congress recommends the Scottish Education Department to give the new grant to county councils and county burghs for use in technical education only for the whole country, and to arrange that the administration of the secondary and technical education grants should be combined under the same committees; this recommendation to be carried into effect by the committee appointed last year at Perth, and now reappointed with power to add to its numbers."

#### MODEL PLUMBING AND DRAINAGE REGULATIONS.

Mr. Archibald Craig, the secretary, reported that the annotated edition of model regulations and by-laws for plumbing and drainage work had been issued to local authorities throughout Scotland, and that the cost of producing this valuable work had been borne by the Plumbers' Company.

Mr. James Hislop, Dumfries, moved, and it was agreed, that a committee be appointed to ascertain the building regulations adopted by local authorities under the Public Health Act of 1897, and to compare the plumbing regulations therein with the model regulations, and if so advised, to make representations to these authorities where matters of principle were involved.

#### PLUMBERS' REGISTRATION.

Mr. W. R. E. Coles, clerk to the Worshipful Company of Plumbers, said the whole fabric of the congress rested on the two broad facts that registration was one of the most elementary conditions of organisation, inasmuch as there could be no corporate body without it; and the necessity for registration of plumbers had been affirmed by common consent of the plumbing craft throughout the kingdom, the medical profession, the sanitary authorities, architects, and others particularly acquainted with the subject, as well as by increased majorities in the House of Commons whenever the Plumbers' Registration Bill had been before Parliament. He further urged that the necessity for registration should be impressed on the employers and workmen, on the sanitary authorities, on the educational authorities, and particularly on the architects. It was agreed to refer this matter to a committee composed of the secretaries of the six district councils.

#### NEXT CONGRESS.

It was remitted to the Education and Grant Committee to determine as to the time and place of meeting of next congress. Mr. Henderson, on behalf of the District Council for the counties of Forfar, Perth, and Fife, invited the congress to hold a three-days' meeting and exhibition in Dundee in 1900.

The members lunched together in the Windsor Hotel, under the presidency of Mr. Crawford, and afterwards drove to the Corporation Sewage Works, Dalmarock, and the refuse destructor at Haghill.

#### EXCURSION TO AYRSHIRE.

The delegates spent Saturday in an excursion to Ayrshire. To the number of about 120, they were the guests of the Ayrshire local committee of the organisation. Leaving Glasgow at 9.35, the delegates travelled by saloon carriages to Ayr Station, where brakes were in waiting to convey them to the Town House. There Councillor William Beveridge, on behalf of the corporation, welcomed the delegates, for whom Alderman Hind, Master of the Worshipful Company of Plumbers, responded. The visitors then drove to Burns' Cottage, Alloway Kirk, and the Monument, and thence by May of Minishant to Maybole, where, at the King's Arms Hotel, they dined. Councillor Beveridge, who presided, in responding to the toast of "The Corporation of Ayr," proposed by Bailie M'Farlane, Port-Glasgow, described the various municipal enterprises recently undertaken by the burgh. He dwelt particularly on the steps which had been taken to clear away the uninhabitable houses, in which a few years ago 2,000 of the population were located. Another matter which demanded attention was the drainage of houses erected about fifteen or twenty years ago. The drive was continued by way of the picturesque ruin of Crossraguel Abbey to Kirkoswald. In the old churchyard at the latter village visits were paid to the graves of the prototypes of "Tam o'

Shanter" and "Souter Johnny," as well as to those of some of the poet's ancestors. The party returned by the shore road to Ayr.

#### THE NEW CONGRESSIONAL LIBRARY, WASHINGTON, D.C.

IN illustration of Mr. W. E. Foster's article, entitled "New Ideas in Library Buildings," in our last issue, we published five woodcuts showing the sumptuous library which has been built during the past nine years for the United States Congress in Washington, reproduced from the building edition of the *Scientific American*. We now give from the same journal some further descriptive details of this remarkable building, which occupies an area of ten acres of ground on a plateau south-east of the Capitol.

The library was begun in 1889, and was completed in the spring of 1897, under the management of the late General Thomas Lincoln Casey and Mr. Bernard R. Green. The plans were originally prepared by Messrs. Smithmeyer and Pelz, and were carried out by Mr. Pelz, and finally by Mr. Edward Pearce Casey, a son of General Casey, and to whom is due the credit for the series of decorations which renders the building the most notable in America. Owing to the excellent management of the architects and engineers, the structure was built for £1,260,000 sterling, or £28,000 within the limit set by Congress.

The building is a modification of Italian Renaissance in style, is three stories in height, and the central portion is crowned by a lantern. The building measures 470ft. by 340ft., thus covering nearly 3½ acres of ground. The plan of the building is as follows: It consists of a great central rotunda, which is used as a reading-room, and is entered from a magnificent entrance. From this rotunda radiate three book-stacks and the entrance-hall, and this star-shaped combination of rotunda and bookstacks is increased by a parallelogram of galleries and pavilions which mask in the plain bookstack buildings with their countless windows.

The ground plan of the building was suggested by the British Museum, where the central reading-room is surrounded by a quadrangle, but in the London prototype of the Washington Library this was an afterthought. The exterior is of white granite from New Hampshire, and Maryland granite and white enamelled bricks are used on the inside. The interior is largely decorated with the choicest groups and the finest productions of the brush and chisel which American artists can produce, and it has not been necessary to go abroad for either sculpture, mosaic, or painted mural decorations. In designing a library the great essential to be kept in view is to have the building lighted adequately, and this is accomplished by means of spacious courts and a great number of windows, for there are nearly 2,000 in all.

The library is three stories in height, and the third story is crowned by a lantern, the total height of the main structure being 72ft. above the level of the ground. To prevent the monotonous appearance of a square building, the corners are broken up into pavilions, which relieve the severity of the general scheme. The entrance pavilion is 140ft. long, and rises to a greater height than do the other pavilions. The main entrance is through a porch of three arches on the main library floor, and is closed by three bronze doors, and approached by a flight of steps. From the street there are two flights of steps which ascend from either side to a central landing, the visitor thus passing around a fountain designed by Mr. Hinton Perry—"The Court of Neptune." From the landing a single flight of monumental steps leads to the porch. The keystones of the first-story pavilion windows offer an interesting study in ethnology, as the usual Gorgon's heads give place to heads of the various types of races—the Slav, Semite, Circassian, &c., all being represented. There are thirty-three heads in all. This is the first comprehensive attempt to introduce ethnological science into the architectural decoration of a building, and the valuable assistance of Prof. Otis T. Mason was obtained in carrying out the scheme.

The three deep arches of the entrance porch are filled with three bronze doors, each 14ft. high. They are by the late Olin L. Warner, one of them being completed by Herbert Adams and Frederick Macmonnies. The designs represent



respectively the "Art of Printing," "Tradition," and "Light." From the main entrance-hall open the reading-room proper and the various exhibition galleries. The entire central pavilion is given up to this entrance-hall, which contains the stairs and elevators, and is decorated by many mosaics, paintings, and works of sculpture. There is a well in the centre, and the arcades surrounding the well really make two stories of corridors. The second story is reached by two flights of steps. The subjects of decoration in the main entrance-hall and corridors are: "Poetry," "The Book," "Government," "The Family." On the first floor are: "Virtues," "Seasons," "Graces," "Literature," "Fates," "Wisdom," "Science."

The south hall on the first floor (illustrated in our last issue, p. 240) opens from the vestibule on the right after entering the bronze doors. The ceiling is largely decorated with mosaics, and the walls are panelled in Italian marble to the height of 11ft. At the east end of the south hall is a large tympanum, and along the walls are small tympanums. These are occupied by paintings of Mr. H. O. Walker, representing "Lyric Poetry."

Ascending the grand staircase to the corridors of the second-story arcade, we reach the public galleries of the main reading-room, which are to be devoted to the display of drawings, interesting books, manuscripts, autographs, &c. The elliptical-barred vaults are set with square coffers, decorated in blue and gold, divided by double ribs which spring from pilasters. The tympanums at the end of the north-west gallery are painted by Gari Melchers, illustrating "Peace" and "War." We showed (p. 241) last week the latter, which represents a chieftain of a primitive tribe returning home with his clansmen across a desolate tract of open country after a battle; he sits astride a white horse and is crowned with laurel. Some of the soldiers carry the body of one of their comrades, so that it can be buried in his native soil. Two bulldogs, held in leash, lead the way towards home. The companion painting represents an early religious procession.

The central point of the library is the great rotunda, which serves as the general reading-room for the public. The room is magnificent, and the architect, sculptor, the painter, the mosaic and the marble worker have all combined to produce a remarkable unity of effect. Here it should be said that the Library of Congress is not intended primarily for a library for the legislative branch of the Government; it is really a national library, and includes the repository of copyrighted books and the splendid collection of the Smithsonian Institution, which is a scientific library unrivalled in the United States. As every book of any importance in the United States is copyrighted, the Library is enabled to accumulate, without expense, the entire current product of the American Press, which alone would result in making a remarkable collection of books. The works shelved upon the Library are open to the public at reasonable hours.

The reading-room is octagonal, and is 100ft. in diameter and 125ft. high. The pillars are 40ft. high and the windows are 32ft. wide. Eight massive clustered piers step forward from the corners of the octagon and support lofty arches. Between these piers is a marble screen divided into two stories by arcades. The piers are connected with the wall of the octagon by partitions. The gallery of the rotunda enables the visitors to view the room and its decorations without disturbing the readers on the first story. The piers are finished with marble from Numidia and are of a dusky red; the bases of the clustered piers are covered with Tennessee marble, while the screens are built of Sienna marble. At the top of the screen is a balustrade, also in Sienna marble, with a platform that affords the promenade for visitors already referred to. There are sixteen bronze statues along the balustrade, two to each bay, and these are portrait statues, and symbolise the art to which they refer by representing the illustrious men in those arts; thus, "Art" is represented by Michel Angelo and Beethoven, "Poetry" by Homer and Shakespeare, and so on. There are eight symbolic statues upon the entablature over the engaged columns, the subjects being "Religion," "History," "Art," "Poetry," &c., and on each side of them rise the deep arches, which contain large round-headed windows of painted glass. The entablature, the soffits of the windows, and the windows are richly decorated. The latter are of such great size, and are filled with such

lightly-coloured glass, that the readers can enjoy their books in comfort on even the darkest day. In the middle of each window is the great seal of the United States, surmounted by an eagle, and around it are the seals of the various States, six to each window, while torches alternate with the seals, and fasces and rosettes are worked around the border. The glass varies on the outside, for the windows are double; thus, on the sides which receive the most sun heavy-ribbed skylight glass is used, on the south ground glass, on the north clear glass, &c.

The surface of the dome proper is filled with square coffers; the body of the dome is ornamented with arabesques, and the whole tone of this part of the building is of old ivory. Just under the lantern is the frieze or collar of the dome, which contains the most important decoration in the Library, Mr. Blashfield's "Evolution of Civilisation," a ring of twelve seated figures arranged against a wall of mosaic patterning. The figures follow each other in chronological order, beginning with Egypt, typifying "Written Records"; Judea, "Religion"; Greece, "Philosophy," &c.; and America, "Science." The ceiling of the lantern contains a figure representing "Human Understanding," a partially-draped female figure who is lifting a veil and looking upward from intellectual achievement, which is typified by the figures in the collar below. This is also by Mr. Blashfield. These decorations exactly match the colour scheme of the reading-room, and, unlike nearly all other decorations, they are painted upon the wall, and not upon canvas which is cemented to the wall.

Special reading-rooms for the Congressmen are on the first floor, the Representatives' reading-room occupying the space between the south curtain and the exterior of the building, while the Senators' reading-room takes up the greater part of the south-west pavilion. No apartment in the whole library is more handsomely decorated than this special reading-room, of which we gave last week two illustrations on p. 239, and which has been set aside for the members of the House of Representatives. The floor is of quartered oak, laid in patterns, and large rugs prevent a bare look. There is a dado of heavy oak panelling around the walls, which rises to a height of about 11ft., and the dado runs around into the window recesses. Above the dado the walls are covered with olive green silk. The ceiling is divided into panels by decorated beams; it is finished in gold and colours. The seven panels are filled with decorations by Carl Guthertz, representing the "Spectrum of Light." Each of the seven colours shown in the spectrum is typified by a figure which stands for some phase of human or divine achievement; there are also subsidiary figures. There are three doors, and over each is a carved oak tympanum, the sculpture being by Mr. Charles H. Niehaus. The general view of the room depicted the large mosaic panel of Mr. Frederick Dielman over one of the two fireplaces, one at each end of the room. At one end the composition represents "Law," and at the other "History"; our illustration showed the latter. Above the mosaic panel is a heavy cornice supported by columns of Pavanazo marble. In the centre of the cornice is a small cartouche of green onyx in the mantel to the south and of Labradorite in the other, the latter being remarkable for its beautiful deep peacock blue chatoyant colours, which change with every point of view.

#### THE BRITISH ASSOCIATION AT BRISTOL.

THE meeting of the British Association at Bristol will be inaugurated on Wednesday, September 7th, by an address by the President (Sir W. Crookes), which is to be delivered at Colston Hall.

In the Geological section the papers for the most part deal with the geology of Southern Britain, and are of exceptional local interest. Mr. A. Strahan will contribute a paper on "The Revision of South Wales and Monmouthshire by the Geological Survey," Professor E. Hill on the "Sub-Oceanic Physical Features of the North Atlantic," Mr. R. Etheridge on the "Relation and Extension of the Franco-Belgian Coal Field to that of Kent and Somerset," Mr. E. B. Wethered will explain the "Action of Microscopic Organisms in Building-up Rocks," Mr. W. H. Wheeler will deal with the "Action of Waves and Tides on the Movement of Material on the Sea Coast," Mr. H. Bolton on "Pleisto-

cene Mammals," Professor H. F. Osborn on "The Early Lake Basins of the Rocky Mountains and their Fauna." The president of the section (Mr. W. H. Hudleston) has a paper on a similar subject to that to be introduced by Professor Hill—"On the Eastern Margin of the North Atlantic Basin"—and an interesting exchange of views may be anticipated. Papers on mineralogical subjects will be read by Mr. L. J. Spencer. Mr. A. Somervail will deal with "The Age and Origin of Dartmoor Granite," and Professor Lloyd-Morgan will give some notes on local geology. Mr. T. Groom will discourse on the geological features of the Malvern and Abberley ranges, so that with the reports of research committees to be presented in this section, a full programme has been arranged. A collection of photographs of geological interest has been carried out for some years in the British Isles, through a British Association Committee, by Mr. W. Watts, whose report is issued this year, and a similar committee was initiated in Canada last year. In the Geographical section, Colonel Earl Church, the president of the section, is expected to deliver an interesting address relating principally to the primeval physical geography of South America. In the Mechanical section Sir John Wolfe Barry, who is the president, is expected to devote a considerable part of his address to the consideration of the Bristol river and docks. The address will be given at the Merchant Venturers' College on September 8th, at noon. In the anthropological section a paper will be read by Mr. A. Krauss, jun., F.G.S., the son of Mr. August Krauss, the well-known president of the Bristol Master Builders' Association. The paper will be on "Tarahmire Indians of Mexico," a tribe with whom Mr. Krauss, while prospecting for the route of a railway in Mexico, spent about ten months in 1896-7. These Indians, who had never before seen a pale face, allowed Mr. Krauss to bring away with him a collection of native skulls, and the author is able to supplement and illustrate his remarks with some interesting photographs.

#### THREE-HINGED MASONRY ARCHES; LONG SPANS ESPECIALLY CONSIDERED.\*

By DAVID A. MOLITOR, M.Am.Soc.C.E.

(Continued from p. 204.)

HAVING thus dealt with (a) changes in length of arch ring; (b) analytical, and (c) graphical solutions; we may pass on to consider:—

(d) Values of  $e$ ,  $\alpha$ ,  $E$ , and  $E'$  in Equations (46) to (48).—While it is always best to make accurate determinations of the above values for the material to be used in any particular structure, especially when close agreement is desired, yet a brief summary of the meagre data on this subject may be useful, as furnishing values for preliminary computations.† Values of  $e$  for German Portland cement mortars, sixteen weeks old‡:—

Mortar mixed 1 part cement to 0 part sand .....	$e = 0.0012$ to $0.0034$
Mortar mixed 1 part cement to 3 parts sand .....	$e = 0.0003$ to $0.0015$
Mortar mixed 1 part cement to 5 parts sand .....	$e = 0.0008$ to $0.0014$

Values for  $\alpha$  for one degree of temperature (Centigrade)—

Cement mortar (Brunicean) .....	$\alpha = 0.00001$ to $0.000014$
Portland cement concrete 1:2½:5 (Bauschinger) .....	$\alpha = 0.0000088$
Stone and brick (Brunicean) .....	$\alpha = 0.0000053$ to $0.0000083$

Regarding the values of  $E$  and  $E'$  it will be necessary to recite briefly the results of the interesting set of experiments made in 1894 by Professor C. Bach, of Stuttgart, which are of vital importance to subject here treated. These experiments showed that any concrete when subjected to stress would undergo a permanent set and an elastic deformation, the magnitude of which become constant after several repetitions of the same stress. The number of repetitions

\* Read before the American Society of Civil Engineers.

† See article by David Molitor on "Properties of Concrete under Compressive Stress," Jour. Assoc. Eng. Soc., 1898.

‡ See report of Committee on Compressive Strength of Cements, &c. Transactions Am.Soc.C.E., Vol. XV. p. 717.



necessary to produce constant deformations appeared to be a function of the breaking strength of the concrete, and of the intensity of the applied stress. The greater the ultimate strength, the fewer repetitions were required; and the greater the applied stress the greater the number of repetitions. However, for each kind of concrete a maximum stress was reached (about 0.7 of breaking stress) for which seven to eight repetitions would still continue to increase the deformations. Presumably more repetitions would have restored constancy; but this point may be regarded as a natural limit of allowable stress, though there does not appear to be a definite limit of elasticity. The tests were made on cylindrical samples of concrete, 1m. long and 25cm. in diameter, mixed 1 part Portland cement to 2½ parts sand to 5 parts broken limestone, and 1 part cement to 3 sand to 6 stone, age two to three months. The breaking strength was in every case determined from the cylindrical samples. The strength of the same concrete developed by cubic samples would have been about one and one-half times the strength obtained from the long cylinders. The following tables give values of  $E$  and  $E'$  for various values of ultimate strength and applied loads. These values are given in metric atmospheres.

VALUES OF  $E$  IN THOUSANDS (THREE CIPHERS SHOULD BE ADDED TO TABULATED VALUES.)

Ultimate Strength in Atmospheres.	Applied Loads in Atmospheres or Kls. Per Sq. Cm.								
		8	10	15	20	25	30	35	40
Found from Cylinders. Estimated for Cubes.									
60	90	228	223	214	204	193	181	171	163
80	120	262	258	246	234	222	210	200	191
100	150	296	290	278	266	255	244	235	224
120	180	320	314	298	286	276	267	257	247
140	210	340	333	317	303	291	280	270	260

VALUES OF  $E'$  IN THOUSANDS (THREE CIPHERS SHOULD BE ADDED TO TABULATED VALUES.)

Ultimate Strength in Atmospheres.	Applied Loads in Atmospheres, or Kls. Per Sq. Cm.								
		8	10	15	20	25	30	35	40
Found from Cylinders. Estimated for Cubes.									
60	90	1 230	1 180	1 030	910	810	720	636	545
80	120	1 800	1 710	1 500	1 320	1 150	1 020	870	755
100	150	2 500	2 400	2 100	1 880	1 680	1 480	1 300	1 130
120	180	3 400	3 210	2 800	2 500	2 220	2 010	1 820	1 650
140	210	4 400	4 190	3 600	3 160	2 780	2 500	2 280	2 100

The important conclusions arrived at by Tourtay,\* regarding compressive properties of masonry, are here given.

1. The ultimate strength of small cubes of cement mortar is considerably less than the compressive strength of blocks of masonry made with the same mortar. 2. The pressure which crushes the masonry is an inverse function of the thickness of the mortar joint. 3. Stone plates laid loosely upon each other have a much smaller compressive strength than solid cubes. 4. The same stone plates, when cemented together with neat cement grout, possess the same compressive strength as do solid stone samples.

#### PRACTICAL APPLICATIONS: SOLUTION OF A PROBLEM.

(a) *Introductory.*—To illustrate more clearly the method of arch construction as proposed in the foregoing, a problem is solved in sufficient detail to bring out the practical applications of the theory. In designing metal bridges, the dead load is generally known, the more accurate for the forms most in use. This is not the case with masonry arches, for reasons of insufficient experimental data. Also, a steel arch may be designed with any rational centre line, because tensile stresses can be provided for, while in masonry only compressive stresses are safely permissible; therefore, the shape of a masonry arch is of necessity a function of its loading. However, with the dead load known, the three-hinged masonry arch can be analysed and dimensioned with the same degree of accuracy, consistent with the nature of the material, as is possible in steel. But, as the dead load can be obtained in no other

way than by computation from assumed dimensions, the solution must be reached by successive approximations of dimensions until the loading resulting therefrom produces stresses in the arch which are not in excess of the allowable unit stresses. Much depends on the experience of the designer as to the rapidity and directness with which a solution may be obtained. The method which it is believed will lead to a solution with a minimum of useless computation is illustrated in the following problem.

(b) *Statement of the Problem.*—Design a three-hinged concrete arch of 72m. span between pin centres, rise 10m., width of driveway 8m., and footwalks 2m. wide, on each side of the driveway. The profile of the site is given, and the abutments are to be founded on hard clay. The bridge is to carry an electric motor-car weighing 20,000kl. (44,000lb.) on a track of 1.43m. (4ft. 8½in.) gauge, and a uniformly distributed live load of 400kl. per m.² (82lb. per square foot). The maximum allowable working stresses are 40atm.\* (82lb. per square inch) in compression, and 2 atm. (28½lb. per square inch) in tension, for concrete composed of 1 part Portland cement to 2 parts sand to 3 parts crushed limestone. This concrete must attain the following compressive strengths on 20cm. cubes: 220atm. in 28 days, 350atm. in six months, and 500atm. in two years. The tensile strength of mortar composed of 1 part cement to 3 parts sand must be at least 20atm. in 28 days.

(c) *Outline of the Method* (see Plates XLV. and XLVI.).—In this, as in all bridge designs, the details of the roadway and its supports on the arch ring are first designed. By so doing the dead loads may be computed, involving the weight of the arch ring as the only variable subject to correction. A diagram of the half-span (see dimension diagram Plate XLVI.) is then prepared, and the roadway and its supporting columns drawn, to which is fitted an arch ring of seeming good proportions for the given span and rise. Herein the experience of the designer is practically his only guide; but reference to a completed design or a solution once made will assist wonderfully in making close approximations. It will be seen from the side elevation, Plate XLV., that the centre line (a three-centre curve) is almost a complete circular arc, slightly flattened at the crown. The concentrated dead loads  $q$  are now computed by using the dimensions scaled from the preliminary diagram. These values, together with values of  $a$ ,  $d$ , and  $e$ , are tabulated together with computed values of  $q d$  (see Table No. 1). Then, assuming the maximum case of loading over the entire span, compute  $S_{max}$  from equation (27),  $H_{max}$  from equation (26) and  $N_{max} = H_{max} \cos. \beta + S_{max} \sin. \beta$ , from which may be found the required thickness of arch ring at the crown

$D_0 = \frac{H_{max}}{k}$ , and at the abutments  $D_A = D_B = \frac{N_{max}}{k}$ . If it appears that the assumed dimen-

sions differ widely from those computed, it is well to make a second approximation before proceeding further with the solution, though no correct idea can yet be formed of the required arch thickness at the quarter points. The arch thicknesses at the crown and springing should be chosen about 20 per cent. greater than found by computation, since these sections will be adjacent to the hinges, and some allowance must be made for unequal distribution of pressure due to friction in the hinged bearings. When the solution appears satisfactory to this stage, the assumed arch ring should be tested at two or three points between the crown and springing. The maximum thickness of the arch ring will occur at a distance of about 0.3  $l$  from the crown. This and two other sections, distant about 0.15  $l$  and 0.4  $l$  from the crown, should be dimensioned, after which it will usually be possible to proceed to the final design and computation, unless the agreement with the preliminary design was not sufficiently close, in which case the process should be repeated by approximating a new arch ring, using the dimensions last obtained. In this latter case some allowance should be made for the probable effect of the new dead-loads. The larger the ratio between dead and live loads, the less will be the divergence  $\Delta y$  of maximum and minimum thrusts, though an increase in dead loads will also increase the resultant normal thrust  $N$  on

any section. The method of dimensioning just referred to consists in computing maximum and minimum  $y$ 's and the corresponding  $H$ 's for each of the three points, using in the present problem equations (32) and (34). The differences of the  $y$ 's give the  $\Delta y$ 's in Fig. 16. Then, finding  $S$  from equations (33) and (35) for each of the three points, compute  $N_c$  and  $N_s$  from equation (36). From equations (40), (41), and (42), the values  $D$ ,  $w$ , and  $y_c$  respectively may be found. The value of  $c$  in equation (40) is equal to

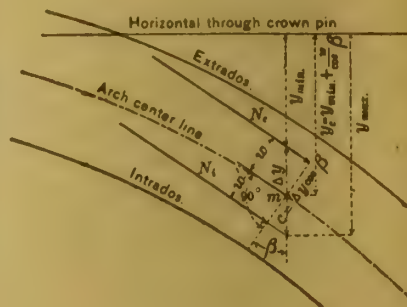


FIG. 16.

$\Delta y \cos. \beta$ , as may also be seen in Fig. 16. All the factors for five points, including crown and springing, being now fully determined, the intermediate values can easily be interpolated in making the final dimension diagram. The new diagram is now accurately drawn, and the design carefully computed, in the manner just outlined for the three test-points, by application of the method to as many points as may be deemed necessary or desirable to fully determine the dimensions and stresses throughout the arch. There is still one other point which is interesting to know, and is illustrated in the final computation. The centre line of the arch-ring and the line of thrust for the case of one-half the uniformly distributed live load or  $\frac{p}{2}$  acting over the

entire span, are so nearly alike that no appreciable error would be introduced by accepting this line of thrust for the centre line. The above outline of the method to be followed is now applied to the problem in hand. In the following computations, the arch ring is assumed 1m. wide, and the live load thus becomes 400kls. per metre, combined with a concentrated live load of  $W = 10,000$ kls.

(d) *Design of the Roadway.*—From æsthetic considerations and for economic reasons, the roadway is designed to the parabolic curve whose equation

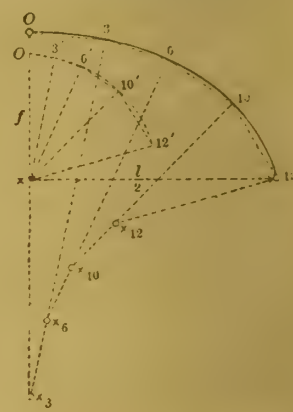


FIG. 17

is  $-y = 0.001 x^2$ , making the same 1.3m. higher at the crown than at the abutments (see Plate XLV.) The roadway is made up of concrete floor arches of 2.4m. span, carried by small concrete piers resting on the arch ring. The cross-section of the driveway is the arc of a circle having a middle ordinate of 0.12m., and is covered with 6cm. of asphalt composition. The footwalks are sloped toward the bridge axis with a slope of 1:100, and are finished in cement mortar. The car track is placed in the centre of the driveway, and hard paving brick laid adjacent to the rails. The horizontal thrust of the floor arches is taken up by steel rods 2.5cm. in

\* Ann. des Pontes et Chaussées, 1885, ii. p. 15.

\* Stresses and pressures will be given throughout this problem in metric atmospheres equal to 1 kl. per cm.² (14.22lb. per square inch).



DESIGN FOR A THREE-HINGED CONCRETE ARCH.

OF 72 METERS SPAN  
BY DAVID MOLITOR, MEM. AM. SOC. C.E.  
SIDE ELEVATION

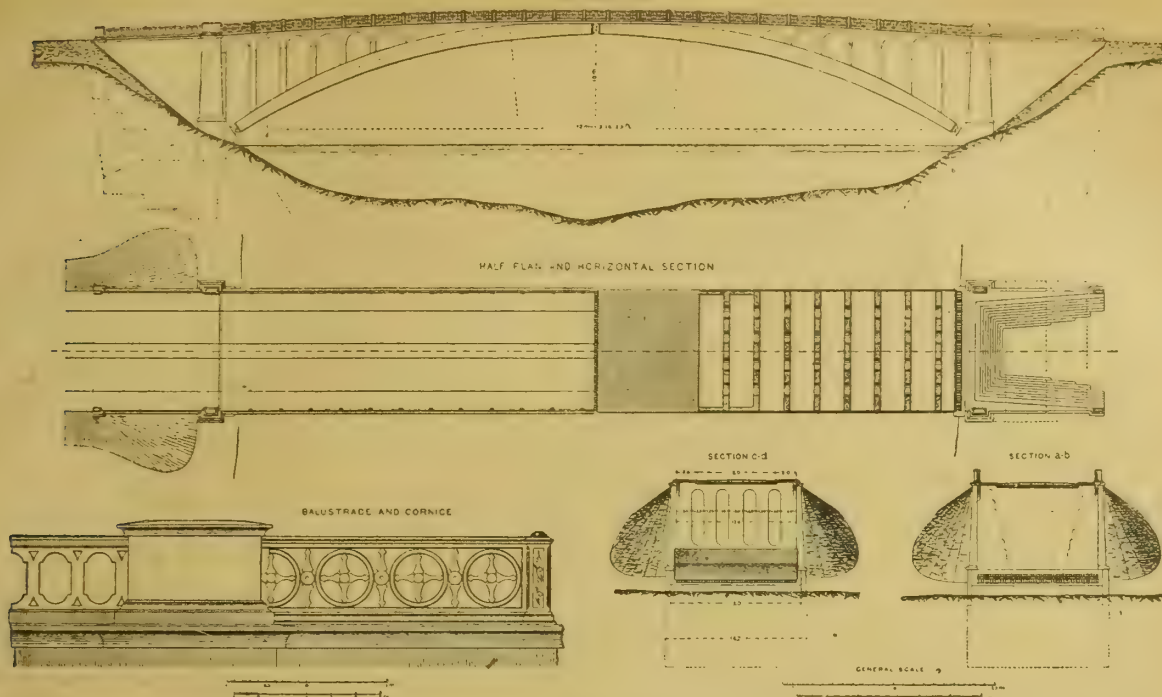


PLATE XLV.

DESIGN FOR A THREE-HINGED CONCRETE ARCH.

OF 72 METERS SPAN  
BY DAVID MOLITOR, MEM. AM. SOC. C.E.

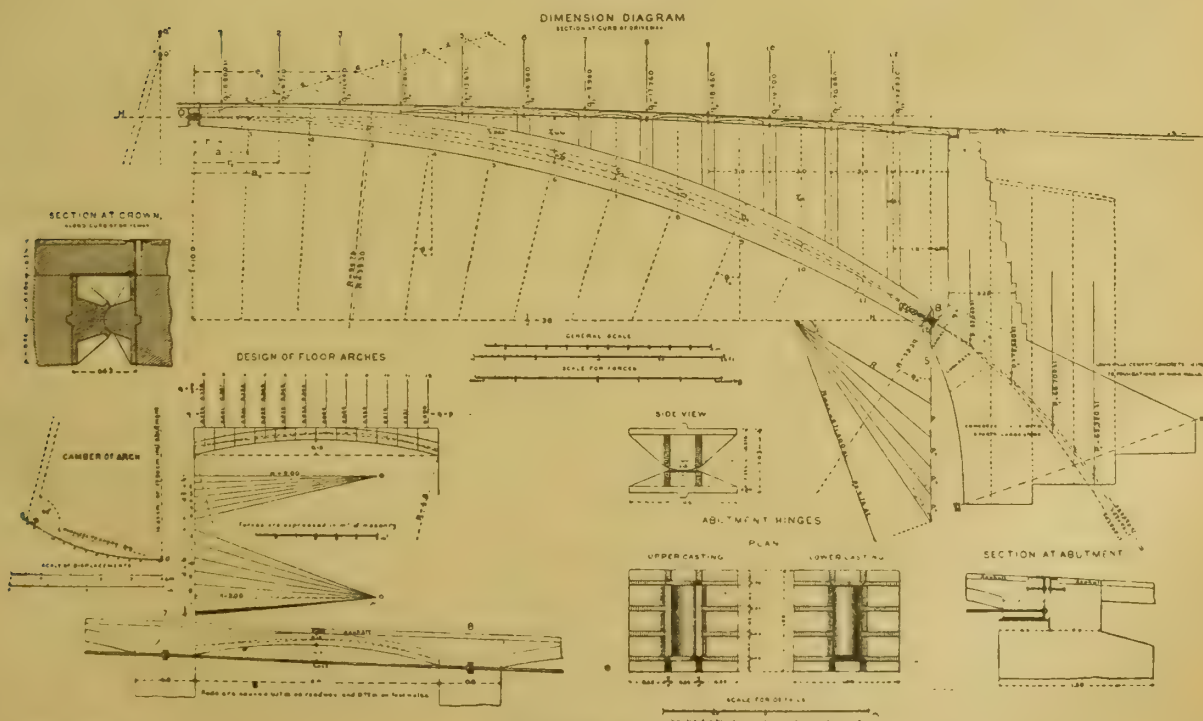


PLATE XLVI.

diameter, and spaced 17cm. apart under the driveway and 75cm. under the footwalks. Expansion joints are provided in the roadway at the crown and at the abutments, all as shown on Plate XLVI. Drainage of the roadway is provided by cast-iron pipes placed in the first piers adjacent to the abutments, one for each gutter. In accordance with this design the weight of the floor, complete, to the springing of the arches and between the pier centres, is estimated as follows:

Concrete for arch and portion of pier to springing, 0.57m. <sup>3</sup> at 2,360 kls.	1,311kls.
Six steel rods, 2.5cm. diam., 3m. long	71 "
Rails and I-beam	105 "
Six cm. asphalt composition at 2,200 kls. per m. <sup>3</sup>	396 "
Total weight to be carried by one pier	1,883kls.

The round number 1,900kls. was used. The floor arches are designed to carry 10,000kls. evenly distributed over the half-span (unsymmetrical load  $q + p$ , diagram Plate XLVI.), and the centre line corresponds to the line of thrust following from 10,000kls. distributed over the entire span (loads  $q + \frac{p}{2}$ ). These lines of thrust for

these loads are drawn for arch horizontal, also for the inclined position between piers 7 and 8. The maximum horizontal thrust is 9m.<sup>3</sup> of concrete, or 20,700kls. for an arch 1m. wide. The maximum compression at the crown is 17atm., and at the haunches and quarter-points it is 36.8atm. No tension occurs anywhere. The longitudinal section investigated is at the curb

of the driveway where the minimum thickness of arch (15cm.) is possible. However, this portion of the roadway, according to the above computation, is amply strong enough to carry a 20-ton road roller. As a result of the crowning of the roadway, the floor arches attain a thickness of 27cm. in the axis of the bridge.

(e) *Design of the Arch Ring.*—A preliminary diagram similar to that shown on Plate XLVI. is now drawn, and the dead loads  $q$  are computed and tabulated, together with values of  $a$ ,  $e$ ,  $r$ , and  $\beta$ , as far as these may be necessary for the points 3, 6, and 10 in the present problem. The points 4, 7, and 10 would have been somewhat better; but those chosen are quite suitable for good interpolations of immediate values. The preliminary



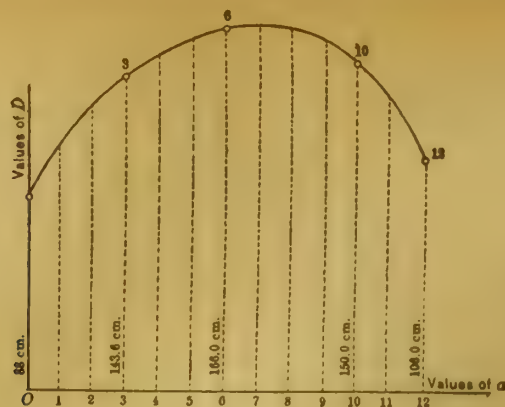


FIG. 18.

investigation for the crown, the points 3, 6, and 10, and the springing is given in Table No. 1, the results of which indicate fully to what extent the assumed design was in error. In the preliminary diagram certain values of  $D$  and  $y_c$  were assumed; these are tabulated, together with the results just found:—

Point	Preliminary Values.		Computed Values.	
	$D$	$y_c$	$D$	$y_c$
	m.	m.	m.	m.
0	0.82	0	0.880	0
3	1.40	0.38	1.436	0.423
6	1.63	1.00	1.660	1.034
10	1.40	6.30	1.50	6.394
12	1.00	10.00	1.060	10.000

From this comparison, which shows a remarkably close first approximation of shape and thickness of arch ring, it will be seen that it is perfectly now safe to proceed to the final design and the detailed computation thereof. This could have been done even with a less satisfactory coincidence in the above values of  $D$  and  $y_c$ . From the values of  $D$  and  $y_c$  just found in Table No. 1, the intermediate values must now be interpolated, preparatory to constructing the final dimension diagram on Plate XLVI. To find the arch centre line, plot the five points, whose co-ordinates  $a$  and  $y_c$  are now known, and connect them by circular arcs, using the method indicated in Fig. 17. Connect the plotted points by straight lines forming the polygon  $O-3-6-10-12$ . Then inscribe in any circle with convenient centre  $\times$  on the vertical, through  $O$ , a polygon  $O'-3'-6'-10'-12'$ , having its sides respectively parallel to those of the foregoing polygon. The radii  $\times-3'$ ,  $\times-6'$ , &c., will be parallel to the required radii  $\times_3-3$ ,  $\times_6-6$ , &c., and the latter, when drawn, will intersect in the centres  $\times_3$ ,  $\times_6$ ,  $\times_{10}$ , and  $\times_{12}$  of the arcs sought. Usually a three-centre curve will be found to fit an arch of this type, as was done in the present example (see Plate XLVI). To interpolate values of  $D$  between those already found, plot the found values as ordinates with the corresponding values of  $a$  as in Fig. 18, choosing a vertical scale about twenty times the horizontal. By joining these points with the use of an irregular curved ruler, and noting that maximum  $D$  should occur at 0.37 from the crown, or at about point 7, the intermediate values of  $D$  may then be scaled from the diagram with considerable accuracy. The diagram, Plate XLVI, can now be drawn, and all necessary dimensions for the final computation are then scaled therefrom. Any slight differences that may be found between these scaled dimensions and the final computed arch dimensions will be too small to warrant a reconsideration, especially as the knowable accuracy with which the dead loads can be determined is far in excess of any differences still to be expected at this stage of the solution. The final drawings should, of course, be constructed with the use of the dimensions resulting from the final computation.

(To be continued.)

## COMPETITIVE DESIGN FOR THE MEXICAN FEDERAL PALACE.

[WITH ILLUSTRATION.]

THE competition for the Legislative Palace for the general Government of the Republic of Mexico has been decided by the jury of award, and although the promised official report of the jury has not been published in the *Diario Oficial*, the general proceedings and results of the competition are now public property.

The limited portion of the Mexican people that keeps informed of important public matters has taken an unusual interest in this competition, and it has seemed to be the opinion, even among some educated engineers and architects, that the jury would be almost deluged with designs from many of the leading architects of the world. They must have been disagreeably surprised, if they really understand, that, with the exception of that by Piacentini and Nataletti, not a design was received from even an architect of note in his own country, and that, with possibly one exception, no Mexican architect of note participated in the competition, although the country can count quite a number of scholarly architects of large experience in their style of building. The reason for the non-participation of leading architects was freely expressed by a correspondent of the *American Architect* to some of the profession as soon as the programme was published. That the result has more than confirmed his predictions cannot be doubted. To the architect who has followed the courses of competitions in Europe these reasons were evident at a glance.

In the first place, an unusually complete set of working-drawings and specifications was demanded, and as a reward there was offered as a possible first prize one-half of 1 per cent of proposed cost among a probable fifty to seventy-five competitors, a possible one-fifth of 1 per cent. for the next two prizes, and a gold and silver medal respectively for the fourth and fifth prizes; the design classed first was to receive an additional one-half of 1 per cent. on making complete detailed plans and specifications for execution of the project.

Few, if any, reputable architects can be induced to make even preliminary drawings at one-half of 1 per cent., unless they are reasonably assured of the commission at a reasonable rate, and that to furnish practically working-drawings at this rate, and to gamble among fifty or seventy-five others, with their 5,000dols. to 7,000dols. invested in their drawings as a stake, was a preposterous proposition. With this view as to the first prize, what kind of a lottery would it be as to the second, third, fourth, and fifth prizes, where the gambler stakes his 5,000dols. to 7,000dols. value of drawings against a chance of one in seventy-five for 2,000 pesos or a medal? Again, it may be possible that those who had been burned by contact with the fire of previous competitions noted that while three of the jury were directly selected by different departments of the Government, the four others were to be elected by the competitors from a list of ten experts proposed by the Ministry of Public Works, which practically, in spite of its seeming fairness, put the whole matter under the control of the Government, and unfortunately, when it came to the selection of the ten from whom to choose, none but Mexican engineers were in the list. Add to the above the fact that not the slightest information was given as to the nature of the soil at the site, although an accurate dis-

tribution of pressures on foundations was required, and there is presented a rather difficult and indefinite proposition to solve.

Designs were received up to the 1st of April, 1898, and one was sent in after that date, when, as it had been stated by the Press of the city, the jury had already reached a decision. These drawings were all accepted on equal terms with those received on or before November 30, 1897, the statement being made that they were deposited with some Mexican foreign representative before the date last named, though it does seem a little mysterious how it could require from two to four months for so many of them to reach Mexico City. The awards made by the jury were as follows:—

No. 27. Motto "St. Georgius, Equitum Patronus," architect, Adam Boori, 2nd prize.

No. 26. Motto "Minerva's Head," architect, J. P. Weber, Chicago, 2nd prize.

No. 41. Motto "Roma, Mexico," architects, Pio Piacentini and Philippo Nataletti, 2nd prize.

No. 52. Motto "Majestas," architect, Pietro Paolo Quaglia, Mexico, 3rd prize.

No. 18. Motto "Golden Star," architect, Antonio Rivas Mercado, 4th prize—gold medal.

No. 45. Motto "Roma, Roma," architect, —, 5th prize—silver medal.

None of the premiated designs show indications of various loads on foundations, only one design, in an obscure corner, making a feeble attempt to comply with this requirement.

Aside from those premiated there were not more than two or three designs worthy of even a passing glance. The authors of the remainder may be classed as young or struggling architects, civil engineers, with no experience in design, contractors and wall-paper artist. Many of the drawings were such crude pencil sketches that it was impossible to decipher the intentions of the authors. The designs were exhibited to the public in the colonnaded *patio* of the old Custom House, which was roofed with white cotton cloth, thus giving a strong well-diffused light from above only. The *patio* was divided by numerous low partitions, against which the plans were arranged, and it would have been difficult to show them to better advantage. The rendering of the elevations and perspectives of the premiated designs was fairly good, those of Piacentini and Nataletti being especially noteworthy for the delicate treatment of pen-and-ink work in a warm brown colour.

No specifications or estimates were to be had by the public.

It is the opinion of many good judges that the cost of any of the premiated designs would have exceeded by 50 per cent. the limit of 1,500,000 pesos, and that some would cost double that sum.

The jury unanimously decided at first not to award the first prize to any of the competitors, as none of them had complied with the programme of the competition, and also voted, as before indicated, to divide the second prize of 6,000 pesos among the three named as entitled to that position. At a subsequent meeting the jury reconsidered this action, and voted to divide the 15,000 pesos, first prize, among the three named for second place.

We reproduce from the *American Architect* one of the designs submitted, the authors being Messrs. F. S. Glover and Glenn Allen.

The numerous friends of the venerable Professor T. Hayter Lewis, F.S.A., will regret to read of the bereavement he has just sustained in the death, on Friday last, of his only son, the Rev. Edward Thomas Lewis, rector of Caythorpe, Lincolnshire.

Holme Lane Congregational Chapel, Tong, has been closed temporarily whilst a new organ is being erected, the building re-lighted, and the gallery re-seated. Mr. Andrews, of Bradford, is building the organ.

This week the committee of the Castleton Liberal Club, Milkstone-road, Rochdale, have placed in the hands of Messrs. E. B. Edmundson and Son, of Manchester, an order for a stained-glass window, to be fixed in the club as a memorial of the late Right Hon. W. E. Gladstone. The approved design shows a portrait of the great statesman, surmounted by a laurel wreath and an ornamental streamer borne by doves, and bearing the words "Peace and Reform."

A recumbent statue of alabaster is about to be erected on an altar-tomb in West Stafford Church as a memorial of the late Canon Reginald Smith. The architect is Mr. C. E. Ponting, F.S.A., of Marlborough, and the work will be executed by Messrs. Harry Hems and Sons, of Exeter.

New county schools are about to be built in York-road, Llandudno, from plans by Mr. G. A. Humphreys.

The sanitary committee of the Leeds Corporation have decided to recommend the purchase of six lots of property in the York-street insanitary area, at a total cost of about £5,000.



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ILLUSTRATIONS.

NEW OFFICES FOR THE METROPOLITAN ASYLUMS BOARD, VICTORIA EMBANKMENT.—POLO PAVILION, RANELAGH CLUB, BARNES.—NATIONAL DESIGN FOR A MEMORIAL CHAPEL.—VILLA, WEST KILBRIDE.—JUBILEE CRECHE, HOUNSLOW.—COMPETITIVE DESIGN FOR FEDERAL PALACE, MEXICO.

Our Illustrations.

HEAD OFFICES FOR THE METROPOLITAN ASYLUMS BOARD.

THIS building has a frontage of 93ft. to the river, and 127ft. to Carmelite-street, covering an area of 11,811ft. In style it is Renaissance, with facings of red brick and Portland stone. The floors and staircases are to be of fire-resisting construction. The main entrance, approached by a flight of steps, is at the corner, opening into a spacious hall, in which will be placed a hall-porter to give information. The entrance floor is 7ft. above the footways. Beyond the hall lies the staircase hall, wide and well lighted, with a bay window on each half-landing. To the left of the staircase hall is the messengers' room for general callers, and adjacent are the offices of the clerk, assistant-clerk, and their immediate deputies, with a waiting-room attached. To the right two rooms are tentatively assigned to the children's department, and beyond this is the ambulance department, with telephone boxes, &c. The ambulance has a separate external entrance at the north end from Carmelite-street; this has the advantage of enabling the department to be kept open all night if it should be so desired, while the rest of the offices may be closed. There are altogether 15 rooms on this floor, besides two waiting-rooms. The ground floor (beneath the entrance floor), approached by the main and two subsidiary staircases, has a similar number of rooms available as offices, in addition to messengers' mess-room, stores, and other rooms; the floor level is only about 4ft. below the pavement. For the use of these two floors adequate lavatory and w.c. accommodation is provided in two groups. Ascending the main staircase by a central flight, and then branching right and left, the first floor is reached. This floor is devoted entirely to the managers' use. One branch of the stairs goes straight to the ante-room or loggia of the boardroom, the other to the smaller rooms. This ante-room is separated only by an arcade from the landing; it is available for the assembly of managers, for deputations, and also for divisions. The boardroom is 52ft. by 42ft., in form an elongated octagon. The chairman's seat is in the centre of the longest side, and all the managers' seats radiate from that centre—a more convenient plan than having parallel seats facing one another, with the chairman at one end. The room is lofty. It is lighted by windows on six sides, their sills being 17ft. from the floor, avoiding cold draughts immediately at the backs of members. There is a coved ceiling, with a lantern light and ventilator in the centre. At the ends of the room are galleries, one with direct access from Carmelite-street for the public, the other facing it for the reporters. Accommodation is provided for

"aye" and "no" lobbies if divisions are to take place—the one being the loggia at the head of the stairs, the other being behind the chairman's seat. There are on this floor four committee-rooms, one 33ft. long, available as the tea-room. The library is placed in the centre of the river front, and a room is provided for the chairman of the board. A large cloak-room and a waiting-room are conveniently placed. There are w.c.'s and lavatories for the managers, and a small retiring-room, fitted with fireplace, for lady managers, with lavatory and w.c. attached. A passenger lift communicates with all floors, as well as a paper-lift and a tea- or service-lift. A messengers' box is placed outside the entrance to the boardroom, and in a similar position on the other principal floors. The second floor, approached by the main and subsidiary staircase, as well as by the lift, contains ten rooms, proposed to be appropriated for the accountants' department. The third floor has eight rooms and a self-contained residence for the housekeeper, consisting of four living-rooms, a bathroom, w.c., &c.; groups of w.c.'s and lavatories are provided for these two floors. A fourth floor, formed in the roof, is for muniments, for which a large space is and will be required. The access to this is by a staircase at each end. In the accommodation provided, not only has regard been had to the immediately proximate wants of the board, but provision has been made for the certain growth of the board's work within a few years. Such provision can be made now at a relatively small extra outlay, whereas, to make additions hereinafter, would be both expensive and inconvenient. The estimated cost of the building complete, including the terraced floor, seating, panelling, and other fittings and decoration of the boardroom, electric lighting and drainage, boundary walls and railings, the concrete and steel raft all over the site for foundation, the ventilating tower over railway and work in connection therewith, is £49,543. Mr. Edwin T. Hall, F.R.I.B.A., is the architect.

POLO PAVILION, RANELAGH CLUB, BARNES  
ELMS, S.W.

THIS building was erected this spring to fill a long-felt want of better accommodation for spectators and exponents of the game of polo at Ranelagh Club. It overlooks the old polo ground. As the present site was the only one available for this building, protection from the afternoon sun had to be considered. This difficulty has been dealt with by the roofs over the ground-floor and first-floor seats projecting considerably; 250 spectators can conveniently be accommodated. There are three staircases to the first floor, giving ample opportunity for quick ingress and egress. A large tea-room on the first floor is provided. A service staircase leads from this room down to the still-room and kitchen department. Luxurious accommodation is provided for the polo players. There are separate dressing-boxes besides a large general dressing-room; seven bath-rooms, ample lavatory accommodation, and a drying-room are provided. Sheds for the ponies are arranged at each corner of the building facing the drive. The whole structure is built of wood, stained and varnished. The roof is covered with Major's double Roman tiles. The building was erected very quickly by Messrs. Battley, Sons, and Holness, of Old Kent-road, S.E., from the designs and under the superintendence of the club's architect, Mr. Alfred Barr, F.R.I.B.A.

GOLD MEDAL DESIGN FOR A MEMORIAL CHAPEL.

THE dignified and graceful proportions of this composition, illustrated herewith from the original drawings, for which a National Gold Medal was awarded last year to Mr. Geo. A. Paterson, form the leading characteristics of his proposal. The plan is ingenious, and there is a dignity about the entire scheme which is not spoiled by needless enrichments or features hampering the sky-line. The accompanying illustrations show the design well, and its parts are so clearly set forth as to require little by way of description. As an Academic design Mr. Paterson's work has distinct interest.

VILLA, WEST KILBRIDE, AYRSHIRE.

THIS villa is being built, for Mr. A. P. Blyth, of red stone from Ballochmyle quarry, Mauchline, and the roof is slated with green Elterwater slates, and red tiled ridges. The contractors for the work are:—Mason, Messrs. R. Jack and Son, West Kilbride; joiner, Mr. Wm. Craig, West Kilbride; plumber, Mr. Wm. Weir, Glasgow;

plaster, Messrs. Murray and McCallum, Saltcoats; asphalte, Mr. William Wells, Leith. Mr. H. H. M'Lachlan, of Edinburgh, is the architect.

NEW JUBILEE CRECHE, HOUNSLOW.

THIS building, erected in memory of their little boy by Mr. and Mrs. Ellis, is intended to fill a want much felt in the neighbourhood. The building is constructed of red brick with Bath stone dressings. Red hanging tiles cover the upper wall surfaces, and the roof is covered with dark Broseley tiles. The crèche is 24ft. by 18ft., and has communicating with it a cot-room and scullery, bath-room, with kitchen, copper, &c. There is a small committee-room close to the entrance, and separate lavatory accommodation is provided for the matron and children. A matron's residence and maid's room is arranged on the upper floor. The building has been carried out by Mr. Billins, builder, of Hounslow; the carving is by Mr. Roselie, of Clayton Works, Kennington; and Mr. H. Ward, of Hastings, is the architect.

COMPETITIVE DESIGN FOR THE MEXICAN FEDERAL PALACE.

(See description on page 282.)

CHIPS.

The parish church of Rettendon, Essex, was reopened by the Bishop of St. Alban's after restoration last week.

Hawick Town Council have unanimously resolved to invite the Sanitary Association of Scotland to hold the congress of 1899 at Hawick.

The remains of Mr. Patterson, the sculptor of what is well known in Dysart and Kirkcaldy as the "Man in the Rock," have been interred in Dysart churchyard. Deceased, who in his youth was employed as a handloom weaver in Kirkcaldy district, during his spare hours in the summer of 1851 carved on the rock, near the road between Dysart and West Wemyss, a representation of "The Prisoner of Chillon," taken from Lord Byron's poem. Several years after the work was completed, a railing was erected round the monument, which has since been kept in good repair at the public expense.

The north-east corner of the eastern chapel of Peterborough Cathedral has been successfully underpinned during the present week. The battlementing and portions of the sub-structure have been removed for the purpose of rectifying the huge cracks which the subsidence in the building had caused.

The deputy-coroner for Bristol held an inquest at the Bedminster Police-station on Friday afternoon on the body of Benjamin Waters, a workman in the employ of the Bristol Sanitary Authority, who was killed on the previous Tuesday by the collapse of a wall whilst working upon the alterations at the Council House. John Turner, foreman of works, stated that the old wall appeared thoroughly sound, but it had neither footings nor foundations, and fell without warning. A verdict of accidental death was returned.

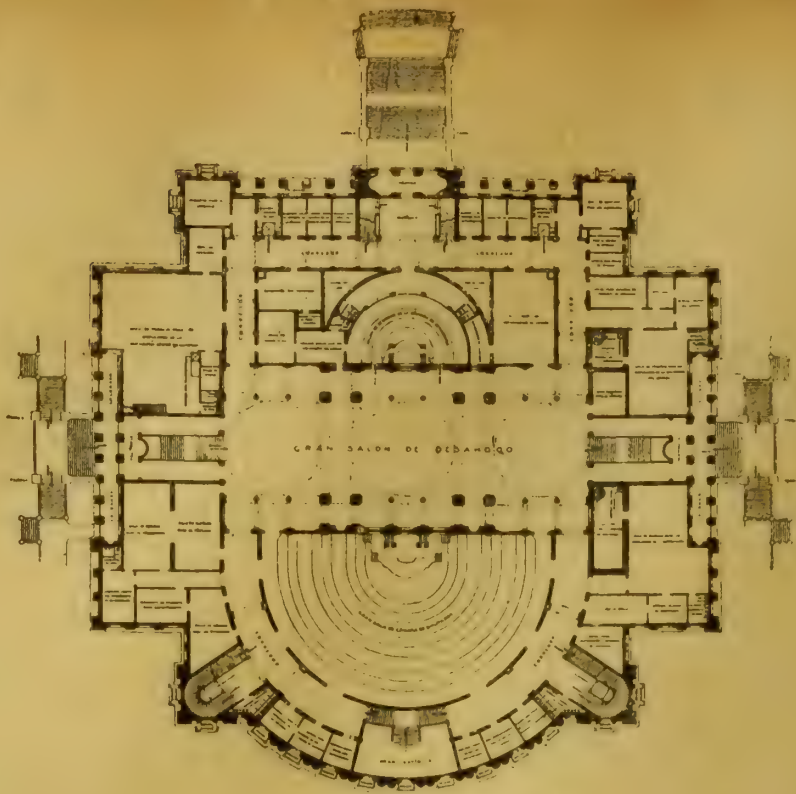
The provisional order applied for by the Crewe Town Council to provide a generating-station and supply the borough with electric light has been granted. The cost of the scheme is estimated at about £25,000. Professor Hopkinson, F.R.S., has been called into consultation.

The opening of the Roman Catholic Church of Our Lady of Perpetual Succour, erected at Gillingham, near Beccles, took place on Thursday in last week. The church has been built in the Roman style by Messrs. Allen, contractors, Beccles, from designs by Mr. F. E. Banham, Mayor of Beccles. It is still incomplete, the designs providing for a campanile as well as the existing sanctuary and nave, sacristy, confessional, and lobby on the south side. The structure is of red brick, with stone dressings, and the dimensions are 77ft. by 22ft. In the interior is a circular apse and circular ceiling, and the walls are divided into bays with pedestals columns, cornices, &c., of the Doric order.

Mr. Samuel Blanton, the chief sanitary inspector of Wolverhampton, died on Wednesday week. The deceased had been in the service of the Corporation for about twenty-eight years, and during the greater portion of the time he had been the chief sanitary inspector. He had been in failing health for some time, and for six months had been unable to attend to his duties. He was fifty-seven years of age, and leaves a numerous family.

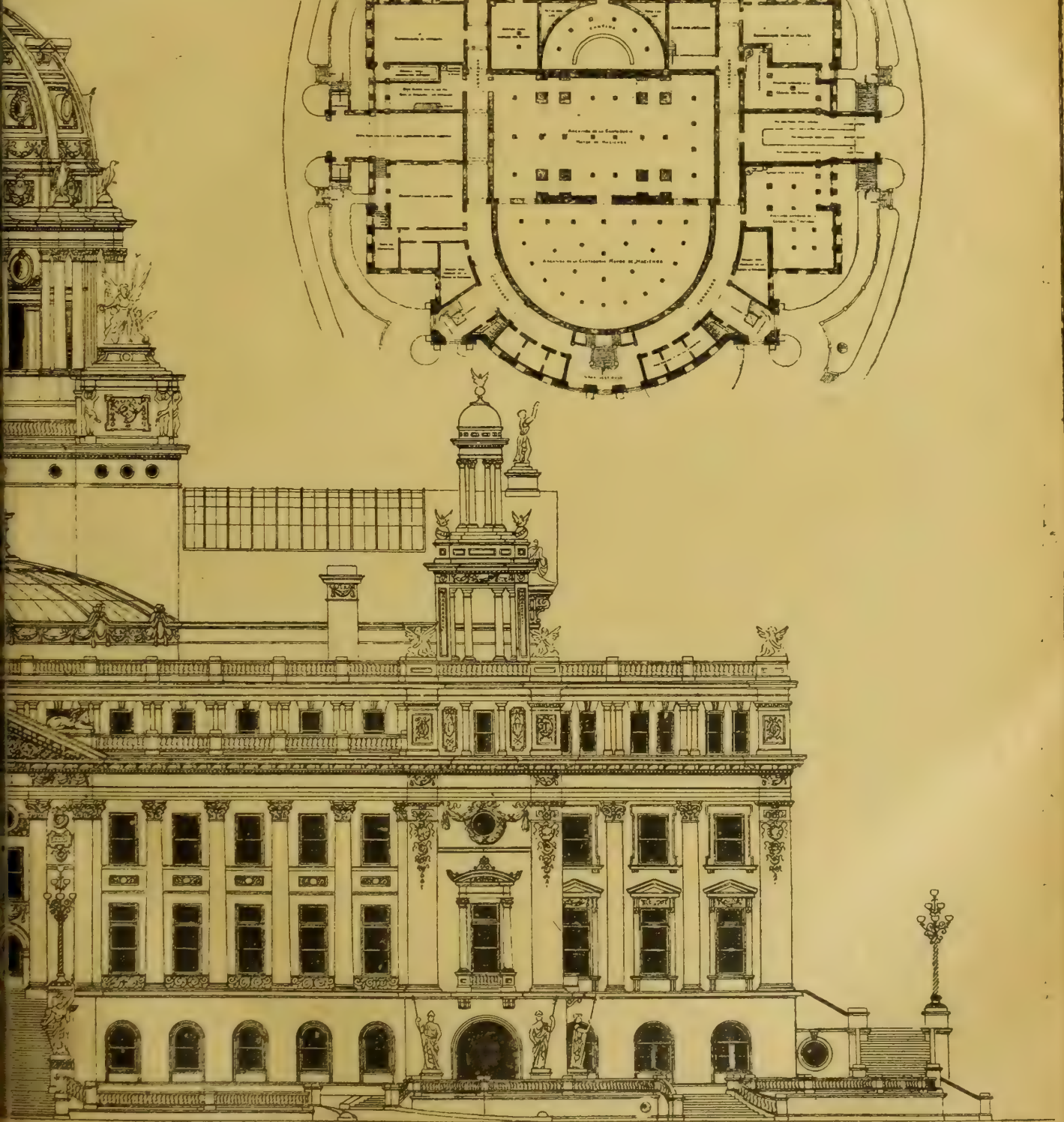
The Grimsby Corporation Public Lighting Committee have recommended the town council to put in an installation for the town, including the supply of current to the tramway company for electric traction, at a total cost of about £40,000.





FACHADA





IDENTAL



## SHEARING RESISTANCE OF RIVETS.

THE shearing resistance of steel rivets has been a subject of much speculation. The merits of low steel rivets have generally been recognised by engineers in America. The ratio of shearing to tensile resistance has long been discussed. It has been assumed to be 80 per cent. Professor Talbot's remarks on this question are of some interest, and his experiments on rivets are important, and go to prove that the ratio of shearing to tensile strength, other things being equal, increased from about 73 to 80 per cent. as the diameter of the rivet decreased from 1 in. to  $\frac{1}{2}$  in. This was difficult to explain. Why the ratios for the small rivets are higher than those for the large can only be explained by the assumption that the larger the diameter of rivet the more pronounced will be the shear in detail. Professor Talbot's experiments confirm this result; the steel he used was very soft. The ratio between shearing and tensile resistance, he thinks, should be taken on an average at 0.75 instead of 0.8, a ratio which agrees with the tests by Kennedy and Kirkaldy, published some years ago.

## EXPERIMENTS REGARDING THE SETTING OF PLASTER OF PARIS.

THE results of experiments undertaken to determine the effect of various agents on the setting of plaster of Paris are given in a United States contemporary by Mr. J. A. Belcher: "Two drachms of plaster, mixed with one drachm of a 5 per cent. solution of sodium chloride, hardened in two minutes. Mixed with one drachm of a 5 per cent. solution of sugar, it hardened in three minutes and a half. Mixed with one drachm of a 1 per cent. sodium chloride solution, it hardened in five minutes. Mixed with one drachm of an 0.5 per cent. sodium chloride solution, it hardened in five minutes. Mixed with one drachm of a 5 per cent. calcium chloride solution, it hardened in six minutes and a half. Mixed with one drachm of tap-water, it hardened in nine minutes. Mixed with one drachm of distilled water, it hardened in nine minutes. Mixed with one drachm of saturated solution of sodium chloride, it hardened in eighteen minutes. Mixed with one drachm of a 5 per cent. solution of glycerine in distilled water, it hardened in nineteen minutes. Mixed with one drachm of a 5 per cent. solution of white of egg in distilled water, it hardened in twenty minutes. Mixed with one drachm of a 10 per cent. solution of white of egg in distilled water, it hardened in twenty-five minutes. Mixed with one drachm of a 10 per cent. solution of glycerine in distilled water, it hardened in thirty-five minutes. Mixed with one drachm of a 25 per cent. solution of glycerine in distilled water, it hardened in sixty minutes. These figures show that where it is of importance to make plaster of Paris set rapidly it should be mixed with a 5 per cent. solution of common salt, and this may be made roughly by adding a tablespoonful of salt to a pint of water."

## BOOKS RECEIVED.

*Dwelling Houses: their Sanitary Construction and Arrangements* (London: H. K. Lewis, 136, Gower-street, W.C.).—This excellent and clearly-written little handbook, by Professor W. H. Corfield, has now reached its fourth edition. The work, which was originally delivered as a course of Cantor Lectures before the Society of Arts, and was reported in our columns from week to week, has been revised throughout, and a number of illustrations are given. The subjects of the principal chapters are the situation and construction of houses, ventilation, lighting and warming, water supply, removal of refuse, sewerage and water closets, sinks and drains. A comprehensive index, prepared by Dr. H. R. Kenwood, adds greatly to the value and usefulness of the book as a work of ready reference.—*Photography Annual for 1898*. Edited by HENRY STURMEY (London: Iliffe, Sons, and Sturmev, Ltd., St. Bride-street, Ludgate-circus).—This is a useful compendium of information for all interested in the progress of this art. It contains several beautiful examples of portraiture and landscape, an illustration of "Strawberries" in three colours; a portrait of a lady as an example of half-tone copper engraving by Fred Downer and Sons; illustrations of "Nature's Woodland School," reproduced from a silver print by the Acme Tone Engraving Co.,

Ltd.; half-tone copper engraving by Jean Malvaux; a view of Ilfracombe, illustrating an orthochromatic emulsion for field-work from a negative by Bedford, &c. The volume is an excellent record of photographic progress. The seven sections contain many useful articles on practical subjects, the latest novelties in apparatus and materials, optical lanterns, and various applications of photography, directories of the trade. This useful manual is published at 2s. 6d.—Mr. HENRY LOVEGROVE, A.R.I.B.A., P.G.S.B., has reprinted as a pamphlet (Margate: *Kebble's Gazette Office*) the interesting article he recently contributed to *Arts Quatuor Coronatorum*, entitled *Batty Langley on Geometry*. Mr. Lovegrove shows that Brother Batty Langley, in his "Introduction to Geometry," only gives a summary of one or more of the old MS. Constitutions, some of which he had evidently seen. It forms the second part of Langley's "Builder's Complete Assistant," published in the second quarter of the 18th century by J. and J. Taylor, at the Architectural Library, No. 56, Holborn. Langley professes to trace the science of geometry back to Jabal, who, according to the author, was the first that wrote on the subject with his brethren Jalah, Tubal Cain, and Naamah, and quotes without question, after the fashion of his day, the vaguest traditions as to the progress of the science from the days of Abraham (who is said to have taught Euclid) to those of St. Alban, who introduced its knowledge into England. The pamphlet, and all other publications of the Quatuor Coronati Lodge, can be obtained of Mr. G. W. Speth, the secretary, of Bromley, Kent.—*Applied Geology*, Part I., by J. V. ELSDEN, B.Sc., of Storrington (London: 5, Arundel-street, Strand, W.C.).—This is a reprint of the earlier chapters of a work which is still in course of publication in the pages of our contemporary the *Quarry*. The work treats on the practical side of geology as judged from the miner's, quarryman's, and stonemason's point of view, and is illustrated with numerous diagrams and woodcuts. Among the subjects dealt with are dip and strike problems; faults, and how to trace them; and ore deposits. Part I., a thin cloth-board octavo of 96pp., is published at 5s., and the second part is announced to be in course of preparation.—*Lessons from Fire and Panic*.—Mr. THOMAS BLASHILL'S practical paper on this subject, read before the Surveyors' Institution a few months since, has been republished in pamphlet form by the British Fire Prevention Committee (London: 1, Waterloo-place, Pall Mall), as one of a series edited by Mr. E. O. Sachs. Mr. Blashill's long experience as the superintending architect to the London County Council and its predecessor the Metropolitan Board of Works, and earlier still as a district surveyor, enables him to speak with authority, and the pamphlet is marked by the bluntness, directness, and commonsense which characterise the author's observations.

The Thrapston Rural District Council having applied to the Local Government Board for sanction to borrow £1,000 for the purpose of erecting a bridge over the Nene at Ringstead, Colonel Luard, C.E., attended at Ringstead, on Thursday last week, to hold an inquiry into the circumstances of the application.

The Board of Trade have recently confirmed six orders authorising light railways, viz.:—(1) Dornoch, for a line between the Mound station on the Highland railway and the village of Embo and the town of Dornoch; (2) Goole and Marshland, for a line from a junction with the North-Eastern Railway near Goole to Swinefleet and Adlingfleet; (3) Isle of Thanet, for lines from Ramsgate through Broadstairs to Margate; (4) North Sunderland, for an extension of an existing line in the parishes of North Sunderland and Shoreston, and the working of the original line as a light railway; (5) Vale of Rheidol, for an extension from Aberystwith to Aberarvon of an authorised railway; (6) West Hartlepool, for an extension line to Seaton Carew.

During excavations for building purposes in a garden in the Welsh Walls, Oswestry, the workmen have come across a portion of the wall which was built around the town in the 13th century, and which was pierced by four gates. The course of the wall runs north and south from the White Lion Hotel, in a straight line towards the old Toll Thorough pillar in Church-street. The portion unearthed and just demolished was over 6ft. in thickness, and about 4ft. in height. It was built of huge blocks of sandstone, bound together with mortar. The remains of a footpath which ran parallel with the wall on the inside are still to be traced by pebble-stones which appear to have been set in hot lime.

## OBITUARY.

WE regret to have to announce the death, on August 5th, of the secretary of the Society of Architects, Mr. MONTAGU BALDWIN, M.A. He was appointed secretary in May, 1896, and was greatly esteemed for his quiet courtesy and wide range of knowledge. He was a Fellow of Pembroke College, Oxford, and formerly Master of All Hallows' School, Honiton. By his literary ability he contributed greatly to the success of the society's *Journal*, which he edited up to the time of his death. In the current issue of that periodical it is remarked: "The society suffers the loss of a scholar and a gentleman who interested himself up to the last for its benefit."

## CHIPS.

The Duke of Devonshire will lay the foundation-stone of an extension of the Keighley Hospital on Saturday, September 3rd.

On Saturday the deputy coroner for West Denbighshire held an inquiry at Ruthin touching the death of William Williams, master plumber, who was killed on the previous day by lightning whilst sheltering under an oak tree near Nantelwyd Hall, the residence of Mrs. Naylor Leyland. Evidence was given to the effect that deceased had left the house of Colonel Mousley, the agent of the estate, to inspect a water tap near the kennels. Immediately afterwards his body was found under an oak tree. Dr. Jenkins stated that death must have been instantaneous. A verdict of accidental death was returned.

From Rome the death is reported, at the early age of 26, of a promising young Dutch sculptor, Johan Hendrik Philip Wortman. Two years ago he won the prize which at the Hague Academy of Fine Arts corresponds to the French Prix de Rome. He continued his studies at the Ecole des Beaux-Arts in Paris, and last year exhibited his life-size Calabrian peasant, which has been acquired by the Academy at the Hague.

The foundation-stone of the new church of St. Cuthbert, at Newport, Middlesbrough, was laid on the 18th inst. It will seat 700 persons, and the cost of building and site is estimated at £7,000. Mr. Temple Moore, of London, is the architect.

The War Department have, contrary to what has recently been stated, decided to pull down Landguard Fort, commanding the mouth of the Orwell, and entirely reconstruct it according to modern requirements, giving accommodation for three batteries instead of one, as at present. When this is done, Landguard will be one of our most important military stations in the country.

The Huddersfield magistrates have committed for trial Billington Firth, a plasterer, and secretary of the local branch of the National Association of Operative Plasterers. It is alleged that he attempted by menace to extort a fine from Messrs. T. Longbottom and Sons, a firm who employed two men who had ceased to be members of the association.

The Bolton Town Council has completed the processes necessary for putting into force the Act of Parliament which gives the town a vastly-enlarged constituency. The new Act adds eleven townships, and has raised the total population to 157,000.

A destructive fire burst out at midnight on Saturday at the Britannia Works, Kensal-road, W., of Messrs. S. Ransom, builders and contractors. A building of one, two, and three floors, extending 50 yards in one direction, and 20 yards in another, which was used by the firm as a manufactory, offices, and stores, became ignited from some unknown cause, and was gutted.

The sales at the Mart last week, as registered at the Stock Exchange, amounted to £22,034. The amount registered in the corresponding week of last year was £15,360.

The Plymouth, Stonehouse, Devonport, and neighbourhood Master Builders' Association held their twelfth annual outing on Thursday last week. Leaving Millbay Station early, the party, numbering about thirty, went by saloon carriage to Bovey Tracey, and after breakfast, char-à-bancs being in readiness, a start was made for a drive through the heart of Dartmoor to Princetown and Burrator. No sooner had the horses started when a drenching thunderstorm broke upon the party, who were thankful when they reached Donsland, where dinner was partaken of, Mr. Albert Lethbridge occupying the chair and Mr. W. G. Laphorn the vice-chair. The return journey was made by train.

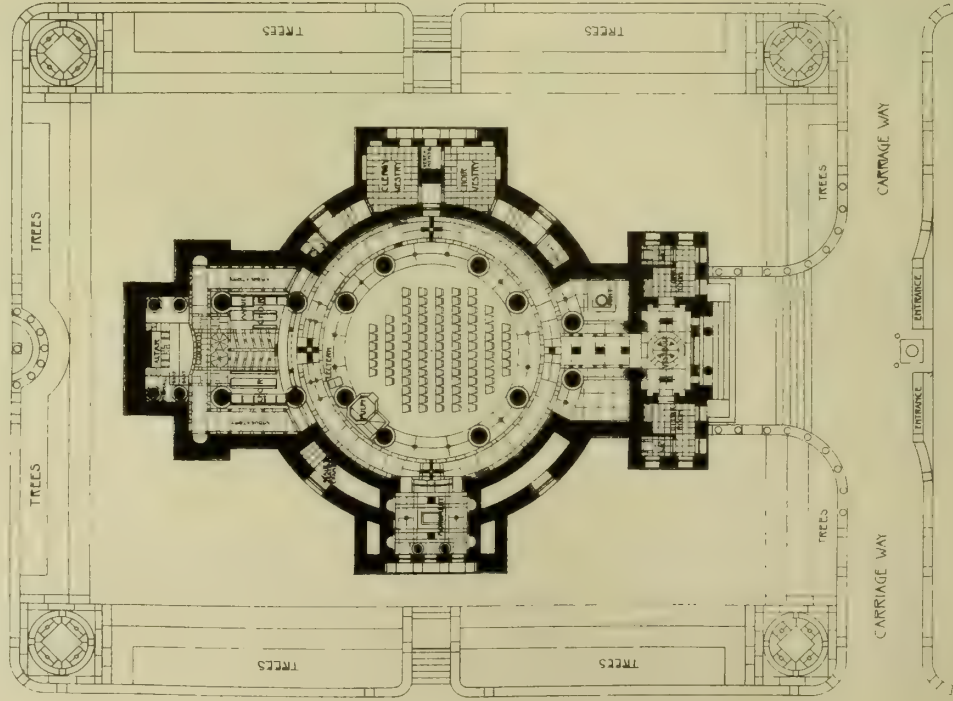
A recent issue of the *London Gazette* announces the promotion of Major Francis Seymour Leslie, Royal Engineers (senior vice-president and for many years previously honorary corresponding secretary of the Society of Architects), to be Lieutenant-Colonel, vice Brevet-Colonel R. M. Barklie.



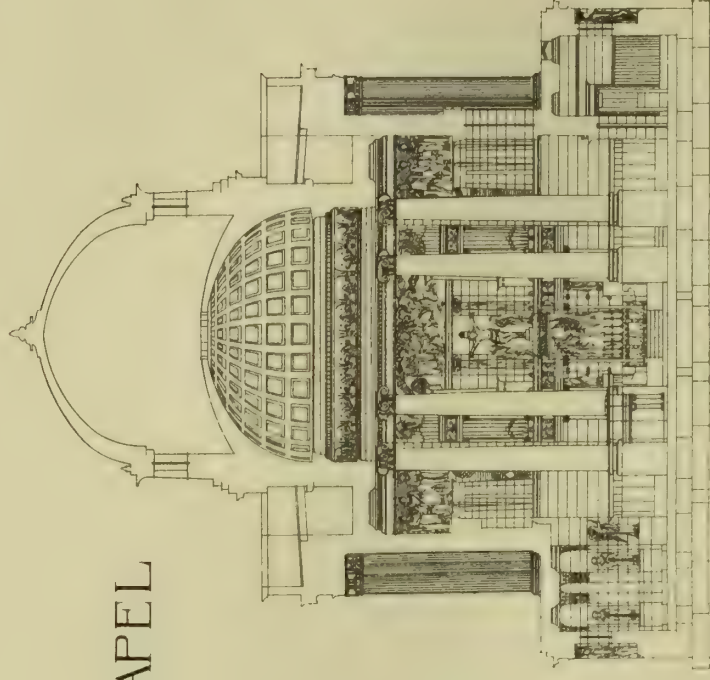




PLAN OF PRINCIPAL FLOOR AND GROUND

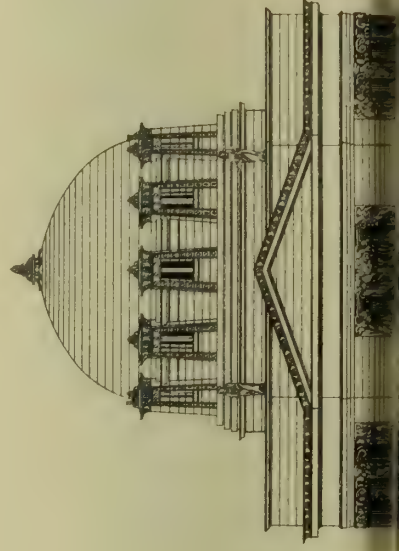


## DESIGN FOR A MEMORIAL CHAPEL

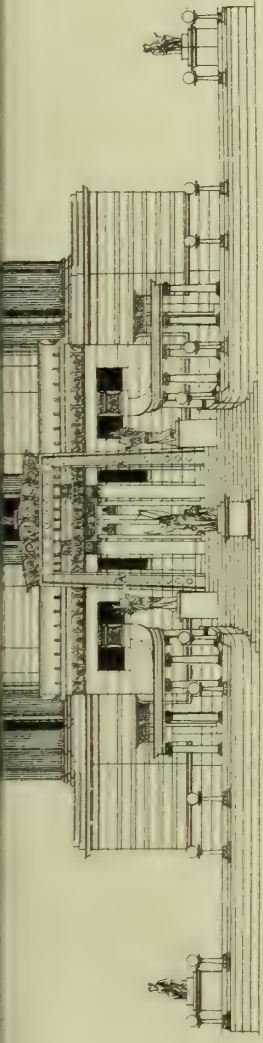


CROSS

SECTION

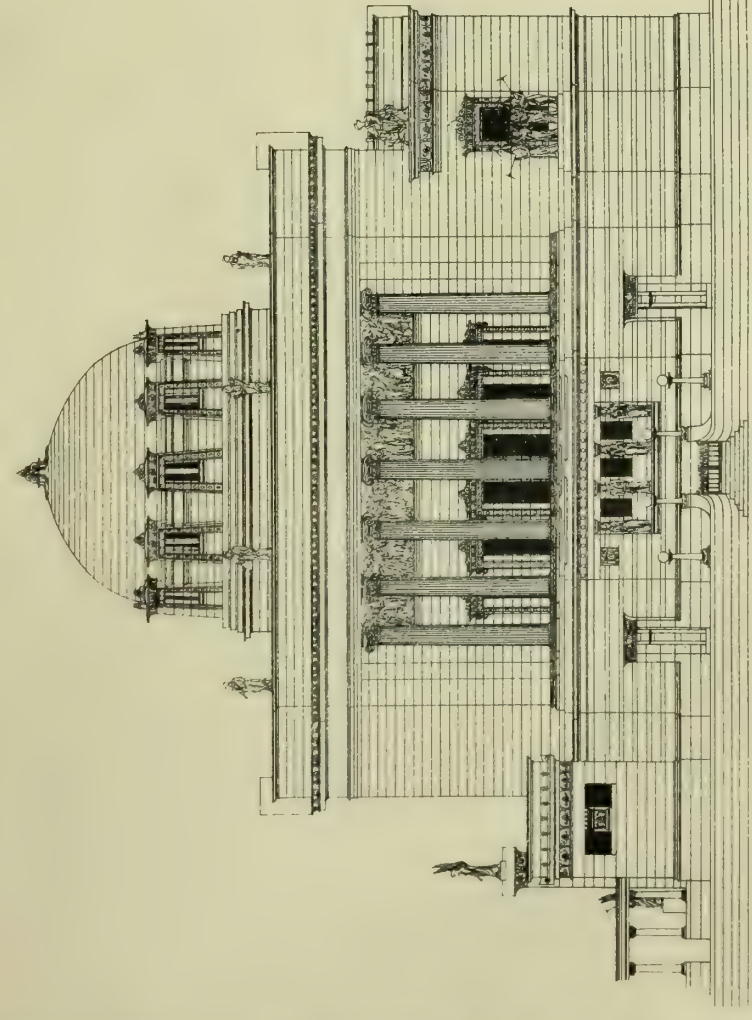




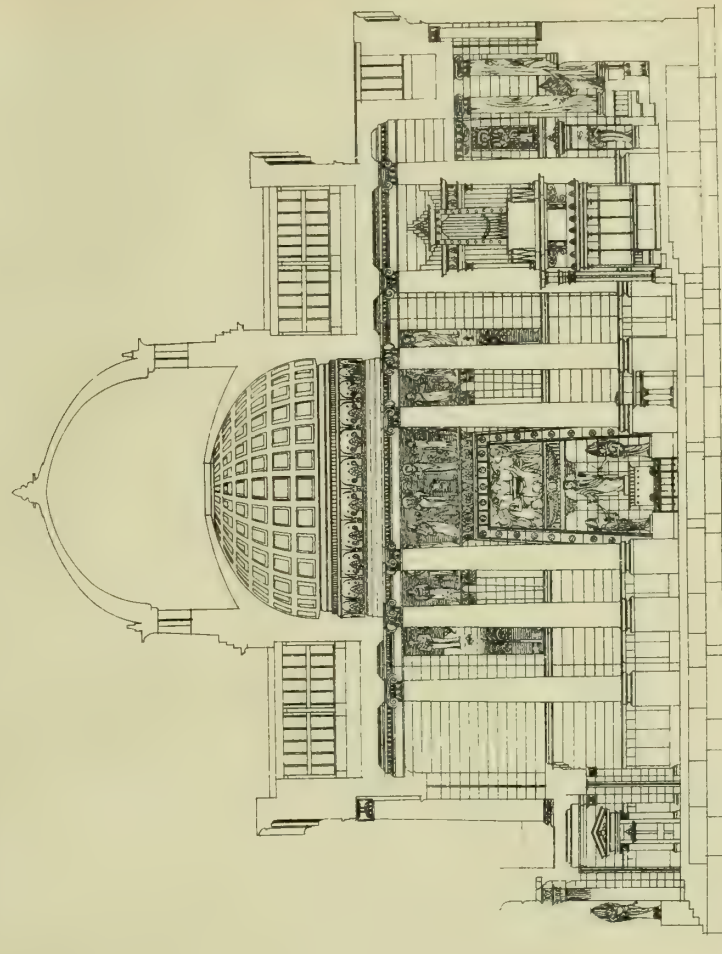


FRONT ELEVATION

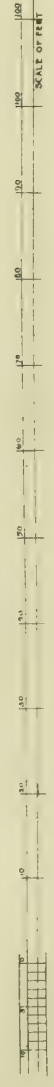
NATIONAL GOLD-MEDAL AWARDED GEO A PATERSON



SIDE ELEVATION



LONGITUDINAL SECTION











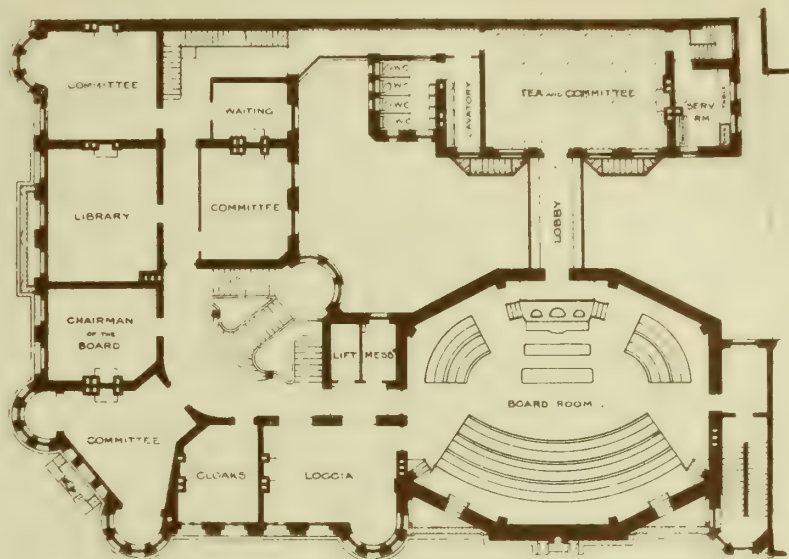




NEW OFFICES FOR THE METROPOLITAN

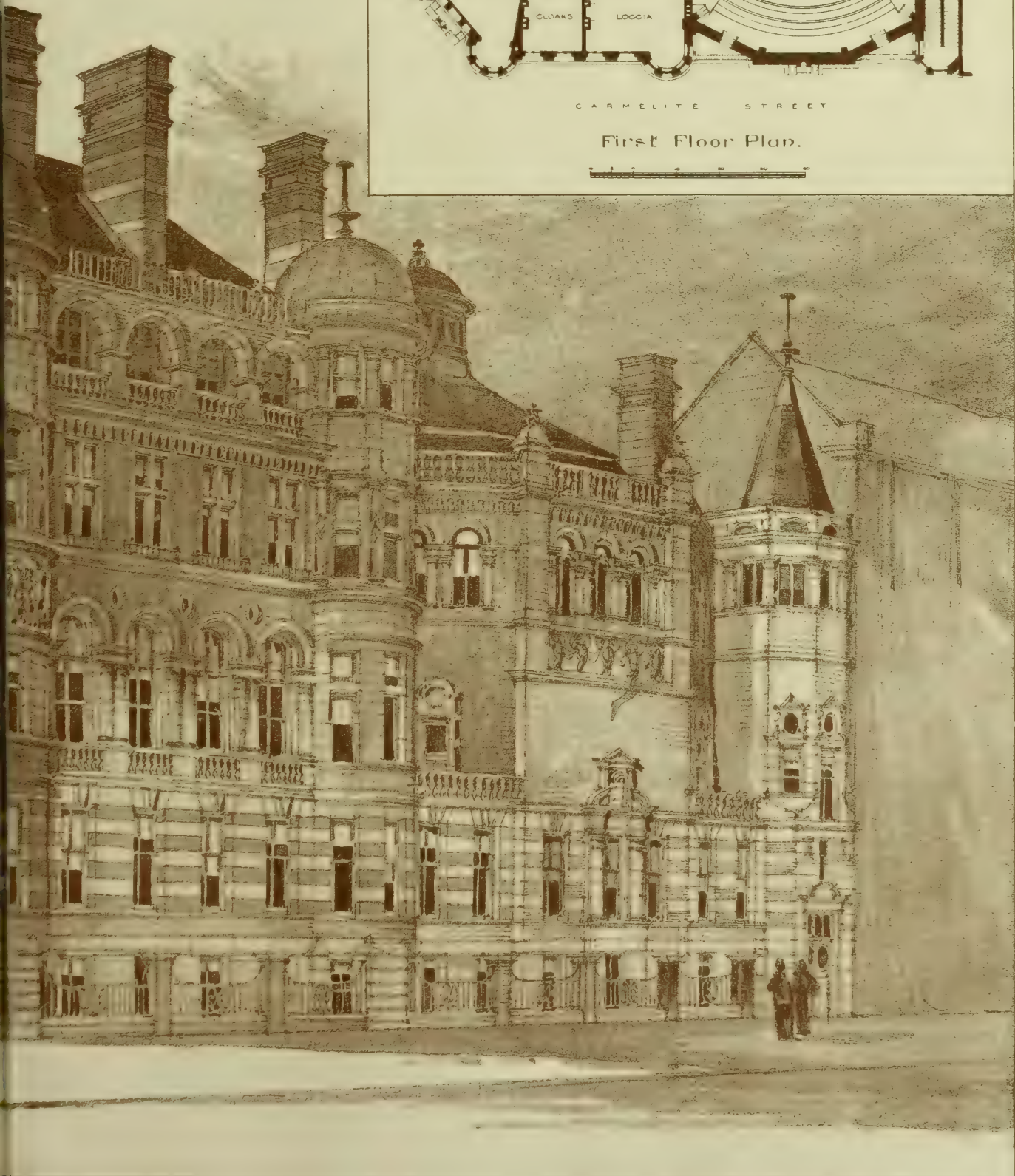
EDWIN T. HALL





CARMELITE STREET

First Floor Plan.













# NEW POLO PAVILION .

## RANELAGH CLUB , 1898 .

BARNES .  
S.W.

Architect, Mr Alfred Burr, F.R.I.B.A.





AUG. 26. 1898.



Photo Lithographed by H. & W. Allen, 6, Queen Square, W.C.





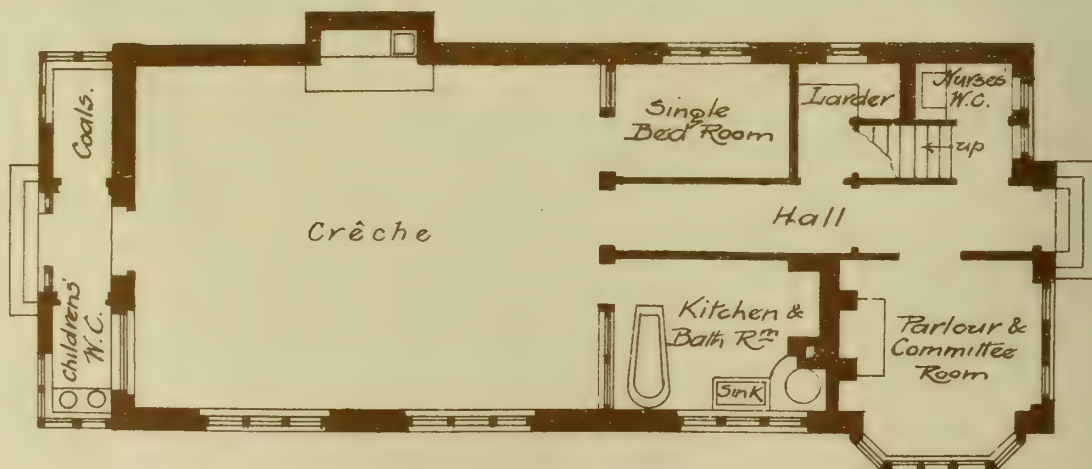




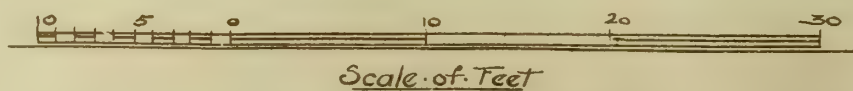




*Hy. Ward  
archt.*



*Ground Plan.*





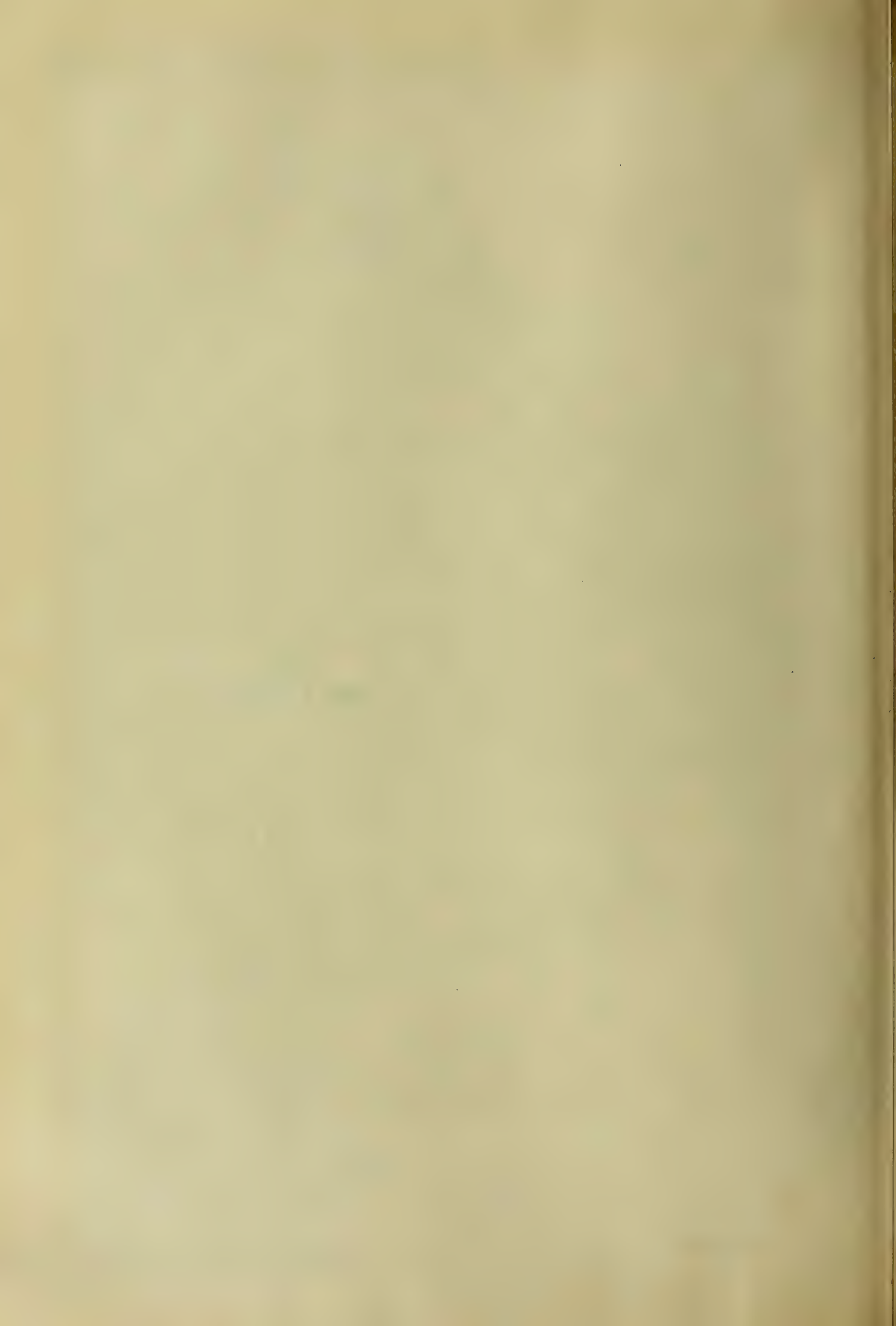
VILLA WEST KILBRIDE, N.B. WM. McLAUGHLAN ARCHT.



First Floor Plan









## Building Intelligence.

**BARNOLDSWICK.**—A new Conservative club, erected in Station-road, from the designs of Mr. J. W. Broughton, architect, of Skipton, was opened last week. The total cost has been about £3,000. The reading-room on the first floor is 23ft. by 16ft. On the same floor is a recreation-room, 17ft. by 15ft., and a committee-room, 15ft. by 12ft. The billiard-room, which contains a couple of tables, is 37ft. by 23ft. Under the ground floor are seven cellars, including those for heating and cooking. On the top floor is situated an assembly-room, and has an open roof and an air space of 36ft. Its dimensions are 79ft. long and 37ft. broad, and its seating accommodation is for 600. There are also two shops on the ground floor, which are occupied. Mr. T. Briggs was the clerk of works.

**BENHILL-ON-SEA.**—Beulah Baptist Chapel, erected as a memorial of the late Rev. C. H. Spurgeon at a cost of £4,000, was formally opened on Wednesday in last week. It adjoins the school-chapel, which was opened in December, 1896, and comprises a hall 40ft. by 26ft. 6in., with two vestries about 18ft. by 9ft. 6in., which open into it by revolving shutters. The new chapel is in similar style to the school—viz., 14th-century Gothic. The inside dimensions are 60ft. by 36ft. 6in., with double transepts, 20ft. by 7ft., opening to the main building through arches. At the northern end is a gallery, approached by a stone staircase in the dwarf tower at the north-east angle. A feature in the building is a church parlour, measuring 18ft. by 14ft., the minister's vestry being rather less than 3ft. smaller, with lavatory conveniences attached. In the space between the school and the chapel are an infants' room and an additional classroom. To obviate the necessity of steps, a sloping floor has been constructed to the baptistery with direct access from the vestries, this being lined with white tiles. The chapel floor has an incline towards the rostrum. At the rear of the rostrum is a recess 6ft. by 15ft., and a screen with a large arch above supported by Mansfield stone columns. The roof is open-timbered and boarded, and the principals supported by stone corbels. At the northern end of the structure is a two-light cathedral window, all the windows being glazed with tinted glass in leaded lights. The roof is covered with Broseley tiles, while that of the tower has a covering of oak shingles. The whole of the building is heated by hot air from a heating chamber beneath the church parlour. An organ-loft, provided in the original plans, has been omitted for the present. The builder is Mr. Chas. Thomas, the architect being Mr. Resta W. Moore, of Brighton.

**BIRKDALE.**—The new Roman Catholic church in Everton-road, Birkdale, dedicated to St. Teresa, was opened last week. The new church, which is the gift of Mr. Charles J. Weld-Blundell, lord of the manor, takes the place of a temporary structure. It is built in the Early English style, and consists of a nave 100ft. by 24ft., with north and south aisles, each 12ft. wide, divided from the nave by columns, with transepts 14ft. deep. The whole forms a cruciform plan, widened out at the intersection of the arms. The ceiling is a pointed arch, and the windows are plain lancet throughout, except at the west end, which has a circular tracery window. The seating accommodation is over 500. The furniture and the priests' residence have been provided by the congregation, and the high altar, which is of Seaton stone, marble, and alabaster, is the gift of the late Mr. Derbyshire. The organ is from St. Marie's, Southport, where a new instrument is being erected. The church has been built to the design of Messrs. Sinnott, Sinnott, and Powell, of Liverpool, by Messrs. Fairbridge and Hatch, contractors, Birkdale.

**ECCLES.**—The new Roman Catholic Church of St. Mary, Eccles, was opened last week by the Bishop of Salford. The building, which is now complete, save for the spire, has been erected within the past twelve months, the foundation-stone having been laid on August 28, 1897. It has cost £9,000, of which £4,000 has been already subscribed. The church is of brick with red stone dressings, in the 13th century style. It is 125ft. long by 65ft. wide, exclusive of the sacristies, the nave being 30ft. wide and the aisles 11ft. 6in. The height of the nave is 34ft. to the wall plate, with lofty arches of 20ft. span, but

there is no clerestory, the light being obtained from high windows of coloured glass in the aisles. Side chapels of Our Lady and St. Joseph extend on each side of the sanctuary, and the choir gallery is at the west end. The church has a five-light east window of stained glass, the gift of Miss Annette de Trafford, and the sanctuary contains a marble and stone altar, given by Lady Annette de Trafford. The side chapels and porches also contain stained windows given by the De Trafford family, some of which have been transferred from the chapel in Trafford Hall. The church will be illuminated by the electric light. The architect was Mr. W. H. Rawle, Princess-street, Manchester, and Messrs. Southern and Sons, of Salford, were the contractors.

**HANLEY.**—The new Grand Theatre, erected at the corner of Trinity-street and Foundry-street was opened on Monday. It has been built from plans by Mr. Frank Matcham, of London, and is in the Renaissance style, a dome surmounting the entrance facade, and a verandah being provided. Seating accommodation is provided for nearly 3,000 persons. Externally the building is of red brick with stone dressings, and has frontages of 30ft. and 128ft. The auditorium is 75ft. wide, and 78ft. deep, the dimensions of the stage being 63ft. wide, and 44ft. deep, with a scene dock and property-room 40ft. by 16ft. The width of the proscenium can be increased to 41ft. The inner hall has marble columns, the floors are laid with encaustic tiles, the ceiling decorated in colours and gold. The staircase is of stone, the walls being tiled shoulder high. This leads to the foyer and crush-room. The dress-circle has four rows of gilded chairs, upholstered in Utrecht velvet of old gold colour. Over the corridor surrounding the grand circle is the upper circle, which has seven rows of seats and a roomy promenade at the back, and above this is the gallery, which will seat nearly 900 persons. The pit finds seating accommodation for 750, besides which there are orchestra and pit stalls, which provide 340 seats. At the sides of the circle there are private boxes. The prevailing tone of the decorations is cream and gold. Connection between the different parts of the house can be cut off by the closing of iron doors. The whole of the staircases are of fireproof construction, the joists are of steel, and the floors are formed of cement. The electric light has been installed, the heating is on the hot-water system, and the building is provided with a sliding roof. The contractor was Mr. T. Goodwin, of Hanley. The site cost £5,000, and the estimated cost of the building, including furnishing, is £20,000. The architect has supervised the erection, with the assistance of Mr. J. F. Revill, as clerk of the works. The fibrous plaster decorations are by the Plastic Decoration Company, London, the ordinary decorations and upholstering by Messrs. J. H. Morton and Sons, Liverpool, the iron construction by Messrs. Whitford and Co., London, the sanitary fittings by Messrs. Howson Brothers, Hanley; the gas arrangements by Messrs. Jenkins, of Leeds; and the electric light fittings by Messrs. Lung, Wharton, and Co., London. The seating is by Mr. T. Cavanagh; Messrs. Dowson, Taylor, and Co., of Manchester, supplying the fire-extinguishing apparatus, and Messrs. Holroyd, of Leeds, the heating apparatus.

**LEEDS.**—An appeal has been issued for funds for the restoration of St. George's Church, built just sixty years ago. It is stated that the roof of the church is in bad condition, and it is absolutely necessary that serious structural repairs be undertaken at an early date. Besides this, the interior is very dark and dirty, and badly ventilated; the pews are high and straight-backed, and to many uncomfortable; there is no light whatever at the east end of the choir, and there is an absence of proper vestry accommodation for the clergy and choir. The church has for some time caused much concern to its friends, and it is now a matter of urgency that a decided effort be made to strengthen the structure, and at the same time to re-pew and renovate the interior. Mr. Henry Walker, architect, Leeds, has examined the building, and made a report upon the matters which, in his opinion, require attention. His report and the plans prepared by him have been submitted to a meeting of parishioners and pew-renters, at which resolutions were passed that steps should be taken to raise the funds necessary for carrying out the architect's recommendations. The restoration scheme comprises:—(1) The thorough cleaning, painting, and deco-

ration of the interior of the church; (2) a new roof; (3) new pews for the body of the church; (4) electric lighting; (5) the construction of an apse at the east end (in which the beautiful painting by the late W. C. Cope, R.A., will retain its place over the holy table); (6) more commodious vestry accommodation; and (7) the rearrangement of the heating apparatus. To carry out the whole scheme, for which the requisite faculty has been obtained, will involve an estimated outlay of £5,000, and towards that sum promises have already been received amounting to £2,280.

**LOUGHBOROUGH.**—The new public baths in Island House Park, presented to the ratepayers by Mr. Joseph Griggs, were formally opened by the Marquis of Granby on the 10th inst. The baths are faced externally with local red pressed bricks, from the William-street yard of Messrs. G. Tucker and Son, with terracotta dressings from Ruabon, and are covered with small grey slates. The principal entrance is situated near the centre of the front elevation, through a vestibule, from which access is obtained to the large swimming-bath and corridors leading to the private slipper-baths, the office being placed on the left-hand side of the entrance. The private slipper-baths, nine in number—four first-class and five second-class—are arranged to the front of the building, the roof being a lean-to abutting upon the swimming-bath outer wall, and these baths are divided by pitch-pine partitions, each having a separate window and ventilating tube. The baths are of cast-iron white-glazed enamel, and are fitted with hot and cold water valves. At the end of the first-class baths the laundry and ironing-rooms are arranged, and at the end of the second-class baths are an emergency exit and a staircase leading to the spectators' gallery of the large bath. The swimming-bath has a water area of 80ft. by 30ft., with depth varying from 6ft. to 3½ft., and is surrounded by a cement concrete path, having coloured concrete kerb, and with 30 pitch-pine dressing boxes ranging along the entire length of one side and end, the dimensions of this hall being 94ft. by 42ft. The walls are lined with glazed bricks to form a dado, and coloured with Duresco above, and the roof is an open one of pitch-pine supported by light iron principals, surmounted by a lantern light the full length of the building, with windows on either side opened or closed by a revolving apparatus fixed on the wall. The bath itself is lined throughout with white-glazed bricks, having at intervals lines of blue-glazed bricks. A diving stage has been erected at the deep end, and at the opposite end, over the dressing boxes, is a pitch-pine gallery holding 150 people. At the east end of the swimming bath are the soap and spray baths, boys' dressing-room, and lavatories, all being lined with glazed bricks and having concrete floors. At the rear of these is the boiler-house, with octagonal chimney-stack 60ft. high, and store-yard. The woodwork throughout is of selected varnished pitch-pine, the walls being finished in Duresco. The whole building is lighted with gas brackets and star pendants. The steam for the heating is generated by a 20H.P. Cornish boiler, and passed direct to the circulating main, which is taken from a low level at the deep end of the bath. The temperature of the water is raised from 52° to 72°, and delivered direct into the bath at a higher level. The contract for heating was intrusted to Messrs. Messenger and Co., Limited. The general contract for the baths has been executed by Messrs. T. Barker and Son, and the whole of the works have been designed and carried out under the personal supervision of the architects, Messrs. Barrowcliffe and Allcock, all of Loughborough. The cost has been about £4,000.

A new board school at Westbury Park, Bristol, was opened on Monday. It consists of a central hall, two classrooms, and babies' room, and accommodates 150 children. The exterior is of red bricks, with white sashes and tiled roofs. Messrs. La Trobe and Weston, of Bristol, were the architects.

France is to have a new Parliament House, to be built from designs by M. Buquet. He will require the whole courtyard on the Rue de l'Université side of the Palais Bourbon. The Legislative Hall will have an area of 850 metres and a height of 18 metres. It will contain 14,000 cubic metres of air. Daylight will come in both from the sides and from a vaulted cupola. At night sittings there will be electric light. The Press is promised a large gallery in the best part of the House.



## Engineering Notes.

**THE IMPROVEMENT OF THE MERSEY.**—The annual report of the engineer, Mr. A. G. Lyster, was presented to the Mersey Docks and Harbour Board on Friday, and deals with the general state and progress of the dock works at Liverpool and Birkenhead for the year ending July 1. Mr. Lyster points out that the widening of the passage from 50ft. to 90ft. of the Hornby Dock was completed in October last, in which month the swing-bridge was also brought into use. It was decided on June 16, 1897, to extend the shed on the north quay westward for a distance of 500ft., and the work of raising to 27ft. above Old Dock Sill the remainder of the low quay and extending the shed was commenced in July of last year. The raising of the quay and the paving of the shed floor and the adjacent roadway is completed. The brick-work of the shed extension, also the whole of the ironwork, excepting the doors, are finished, and one-half of the slating of the roof and about one-sixth of the glazing of the skylights are done. Improvements have been made at various docks and timber yards. Alterations have also been carried out to the lines of railway at the west end of the south side of the Huskisson branch No. 2. The following are the principal quantities of work done during the year:—Canada Graving Dock, 227,554 cubic yards of excavations and 57,353 cubic yards of masonry and concrete; Huskisson branch dock No. 2, north wall 3,257 yards excavations, and 1,832 yards masonry and concrete; Huskisson Dock, west wall 7,679 yards excavations, and 1,467 yards masonry and concrete; Huskisson, south entrance, 43,006 yards excavations, and 10,009 yards masonry and concrete; New Half-tide Dock, including entrances and passages, 129,173 yards excavations, and 31,148 yards masonry and concrete. In connection with the new tobacco warehouses, the new wall at the Stanley Dock is practically completed; that the shed on the east quay of the Victoria Dock is being widened; and extensive alterations are being made to the yard and premises at Coburg Dock. The Birkenhead docks have also received special attention. Amongst many improvements made on that part of the estate may be mentioned the erection of a new shed 480ft. long by 100ft. wide, with railway lines at the East Float; additions and alterations at the Woodside and Wallasey lairages; considerable repairs and underpinning have been done to the wall, and the whole length from Mersey-view, Seacombe, to Sandon Parade, Egremont, has been put into a good state of repair. The quantity of sand removed from the bar and shoals in the Queen's Channel during the year is 2,910,900 tons from the bar and 4,652,700 from the buoys. The quantity of sand removed from the bar since the commencement of operations there in September, 1890, is 20,578,240 tons. In the centre of the dredging there is a depth of 26ft. at low water of spring tides, while eight years ago at a similar state of the tide the depth was only 11ft.

The council of the Society of Architects have under consideration a scheme for testing on behalf of architects and manufacturers the various materials used in building. It is proposed to publish the result of such tests monthly for the information of members, and to issue them in pamphlet form at the end of each year.

An inquest was held on Monday night at Stinchley, by Mr. Hebbert, deputy-coroner for North Worcestershire, touching the death of a Mrs. Sarah Starkey, who fell downstairs on Friday night, sustaining scalp wounds, which proved fatal. The coroner, in summing up, alluded to the fact that so many houses were being built without handrails to the stairs, as was the case at the house where deceased fell. On one occasion he had asked the jury to pass a resolution calling the attention of the surveyor of the district council to the fact that hundreds of houses were being so built, and he sent it to the district council, but they had not even condescended to acknowledge the receipt of it. The matter was nothing short of a public scandal. A verdict of accidental death was returned.

At a vestry meeting held at Holy Trinity Church, Guildford, on Thursday evening in last week, to consider the improvement and redecoration of the church, strong opposition was raised to a proposal to paper the internal walls, made by the artist whom the architect (Mr. A. H. Powell, of Guildford) had consulted. An installation of the electric light was sanctioned; but a resolution was passed disapproving of papering, and requesting the architect to repaint the walls.

## COMPETITIONS.

**NEW YORK.**—A series of Shattuck premiums has been offered to United States architects for designs for artisans' homes. The fifteen competitors invited to take part in the limited competition have been selected from the architects of Boston, New York, Baltimore, Chicago, Detroit, Toronto, Providence, Cincinnati, and some other towns, and these fifteen invited competitors have just elected, through the agency of a letter-ballot, the jury which is to award the prizes, not only in the limited competition, but in the open one. The jurors thus elected are Professor F. W. Chandler, of the Massachusetts Institute of Technology; Professor H. L. Warren, of the Lawrence Scientific School, Harvard University; and Mr. J. M. Carrère, of New York.

**WIDNES.**—The first premium of thirty-five guineas, in the public competition for the best design for laying out the Appleton House Estate, Widnes, as a public park, has been awarded to Messrs. William Barron and Son, Elvaston Nurseries, Borrowash, Derby. The area of the park is about 36 acres, and in addition to the plan of the park, which contains a lake, cricket and recreation grounds, lawn-tennis ground, bowling green, gymnasium, &c., they also furnish three alternative plans for dealing with Appleton House and premises, also designs for entrance-gates, band-stands, shelters, fountains, &c.

## CHIPS.

Alterations and additions are being carried out at the board schools at Moulton, Northamptonshire. Messrs. Dorman and Sons, of Northampton, are the architects, and Mr. Webster, of Buxworth, is the contractor.

The Queen has been pleased to appoint Mr. Arundel Tagg Arundel, M.S.A., of the Civil Service of India in the Madras Presidency, to be a Member of the Council of the Governor of Fort St. George, in succession to Mr. James Grose, C.I.E., deceased.

The Glasgow Corporation have under consideration a proposal to restrict the height of new buildings, as in Manchester since the passing of the London Building Act of 1894, to 85ft.

The urban district council of Barry have just adopted fair trade clauses for insertion in their contracts after having heard arguments for and against advanced by delegates from the local Trades Council and Master Builders' Association.

A lake dwelling or crannog has been discovered on the banks of the Clyde between Dumbarton Rock and Dunglass. The evidences of human habitation coincides with the same period as the occupation of the neighbouring hill fort of Dunbuie, discovered a couple of years ago. The officials of the Helensburgh Antiquarian Society, who carried through the Dunbuie excavations, will make a thorough examination of the crannog next week. The discovery of the crannog is mainly due to Mr. Donnelly, artist, Bowling.

Extensive works of redrainage have just been commenced at Chartham Lunatic Asylum, East Kent. The contractors are Messrs. Saunders and Co., of Southampton, whose tender has been accepted at £17,300. At Barming Asylum, in the same county, the heating apparatus is being reconstructed, also under the direction of the county surveyor. For this work the tender of Messrs. Simpson and Co., of Grosvenor-road, Pimlico, S.W., has been accepted at £1,223, exclusive of the builders' work, which will be carried out by the asylum staff.

At the Royal Botanic Society's Gardens, Regent's Park, a new public café has been erected, together with a private dining-hall (45ft. long by 30ft. wide), reading and reception-rooms, and ladies' and gentlemen's cloak-rooms. There is a spacious hall-lounge, entered from the main conservatory. With the exception of the café, the building is intended for the exclusive use of the Fellows of the society and their friends. The foundations and superstructure were carried out by Messrs. Huntley Bros., of Croydon; the decorations and furnishing by Messrs. Maple and Co., Ltd.; and the heating by the Thames Bank Iron Co. The architect is Mr. H. W. Hetherington Palmer, of the Outer Temple, W.C.

The sculpture galleries of the Louvre have just acquired some interesting French and Italian work belonging to various epochs. These additions include a series of original plaster casts and terracotta sketch models by Carpeaux, a bust of a young girl by Houdon, and a collection of early sixteenth-century statues, which come from the chateau of Chantelle, in the department of Allier. Gothic art is represented by a twelfth-century Christ on the Cross carved in wood, and by a fifteenth-century head of Christ sculptured in stone and painted.

## PROFESSIONAL AND TRADE SOCIETIES.

**NORTHERN ARCHITECTURAL ASSOCIATION.**—The members of this association visited the Dunston Flour Mills on Saturday, twenty-four members being present. Mr. Irving (one of the members of the board of the Co-operative Wholesale Society, Limited) and Mr. Farniloe (the works manager) met and conducted the party over the buildings, and explained the machinery and processes of manufacture.

**SCOTTISH NATIONAL OPERATIVE PLASTERERS' FEDERAL UNION.**—The fourteenth conference of the delegates of the Scottish National Operative Plasterers' Federal Union was held in the Waverley Hotel, Perth, on Saturday. There was a large attendance of delegates. Mr. Gilhooly, Perth, was formally elected chairman of the conference, and on behalf of the Perth and Crieff districts welcomed the delegates to Perth. The annual report was submitted by Mr. Guthrie, Dundee, secretary, from which it appeared that the association had had a most successful and memorable year. The proportion of members' contributions paid to central fund for management amounted to £361 0s. 5d. for the week ending July 30. The cost of management amounted to £134 17s. 2½d., equal to 1s. 6½d. per member, as compared with 1s. 9½d. last year, and 2s. 2d. in 1896. For funeral grants £98 had been paid at a cost equal to 1s. 1½d. per member, as compared with 1s. 5½d. the previous year. The total paid out of the central fund had been £232 17s. 2½d., or 2s. 8½d. per member, and a surplus on the year's transactions of £128 3s. 2½d. The financial position of all the branches was satisfactory. A resolution by Glasgow that the same system of voting be adopted as at the Trade Union Congress, was defeated by 29 votes to 11. Considerable discussion took place over another resolution by Glasgow: "That no district of the Federal Union shall allow their members, when sent by their local employers to work in another district, to violate or work antagonistic to the by-laws or conditions existing in the district to which they are sent." The meeting agreed to the principle of the motion, but it was further agreed to remit the resolution to the executive council to frame properly. It was agreed, on the motion of Mr. R. Moncrieff, of Glasgow, seconded by Mr. White, Alloa, that members working in the country where there is no district of the Federal Union, and when they have to lodge, be allowed to work ten hours per day for the first five days, and six hours on Saturday. It was decided that the grant on a member's death should be increased from £3 to £6, and on the death of a member's wife from £3 to £5, but that the grant to unmarried members for their parents should remain as at present (£3). A suggestion from Aberdeen that the conference should approve of a sick branch of the Federal Union was rejected. The following members were elected on the Executive Council:—Messrs. A. Dudgeon and R. Moncrieff, Glasgow; George King and W. Ross, Edinburgh; C. M'Tavish, Aberdeen; W. Hindshaw, Hamilton. Mr. H. Guthrie was unanimously re-elected secretary. Kirkcaldy was fixed as the next place of meeting. A long discussion was opened by Mr. Low, Aberdeen, on the question of apprentices. Ultimately, it was agreed that the secretary should get a census of the apprentices and journeymen in the various districts connected with the Federation, along with the grievances on the subject, and suggestions for remedying such.

The Tavistock Urban District Council have appointed Mr. Richard Lindon, of Plymouth, to the joint position of sanitary inspector and highway surveyor at a salary of £100 a year.

In our notice last week, p. 268, of the two stained-glass windows just placed in the Free Library at High Wycombe, we should have said that the artists were Messrs. Swaine, Bourne, and Son, of King Edward's-road, Birmingham. The subjects are Poetry and Literature.

The death is announced in Madrid of Don Federico Madrazo, the historical painter and director of the Academy of Fine Arts in that city. The son of the celebrated artist, Don José Madrazo, Federico Madrazo was born at Rome in 1815. He received his earliest lessons in painting from his father, and afterwards studied under Winterhalter at Paris. On returning to Madrid, he became Court painter, as his father had been before him, and earned great repute as a portrait painter. His son Raymond de Madrazo continues the artistic traditions of the family.



# Intercommunication.

## QUESTIONS.

[12015.]-**Strong-Rooms.**—I have to construct a strong-room in which the precautions to be taken are to be against fire rather than thieves. It will be on the ground floor, wholly above ground. Will brickwork be suitable for walls, or is concrete best? Any hints as to thickness of walls, &c., will be welcome. It adjoins a woodshed, so that a considerable heat will be present if a fire occurs.—**LOKI.**

[12016.]-**Reservoir.**—Will some reader be good enough to give a formula, other than by trigonometry, for determining the thickness of brick walls to water reservoirs sunk in ground, say, 20ft. square and 8ft. deep inside, the brickwork being built in cement mortar?—**J. B. M.**

[12017.]-**Dadoes.**—Will a practical reader tell me how dado framing can be fixed to a plastered wall? Would a few battens fixed to wall be a secure fixing for the panelling? A dado rail must be fixed also, and a skirting. Any information will be gratefully received by—**CONSTANT READER.**

[12018.]-**Rain-Water Collecting.**—I believe there is an apparatus which separates the best part of the rainfall for use, while allowing the dirty water to enter the drain. Will any reader give me the address of the maker?—**IZOD.**

[12019.]-**Staircases.**—Is there any elementary work on this branch suitable for an apprentice to a joiner?—**YOUNG JOINER.**

[12020.]-**Teak Floors.**—Which is the approved way of laying a teak floor, and how should the joints be made? Are iron tongues required?—**T. SPIRE.**

[12021.]-**Water-Bars.**—Are there any good water-bars that can be fixed to ordinary casements (open outwards), or can be screwed to sill of frame, so as to prevent a driving rain forcing its way over the rebate?—**BUILDER.**

[12022.]-**Dilapidations.**—What are the duties of a surveyor in surveying dilapidations? Are there any books published giving the information, and the mode of assessing them? Any instructions will be thankfully received by—**B.**

[12023.]-**Iron Ties to Roof.**—How is the diameter of a wrought-iron tie-rod found for any given pull?—**PERIL.**

## REPLIES.

[12002.]-**Window Fastenings.**—There are innumerable different patterns of window fastenings, which can be obtained of any large wholesale ironmongers.—**L. E.**

[12004.]-**Glazing.**—Muranese glass has a pretty effect, and is suitable for screens, while Hartley's rolled plate is better for skylights on account of its superior strength. Rendle's system of glazing is a very good one.—**LOUIS ERWOLD.**

[12005.]-**Concrete Floors.**—A bar placed in the concrete slab does increase the tensile strength.—**L. E.**

[12005.]-**Concrete Floors.**—Write for information to the Expanded Metal Co. Ltd., 30, Upper Thames-street. The increase of strength by using the tension bond for concrete is stated to be from 6 to 11 times. The 1in. mesh lathing placed at the bottom will increase the tensile strength of the concrete.—**G. H. G.**

[12006.]-**Exhaust Ventilators.**—Plans to fix can be only suggested on knowing what roof you have to fix to, and also pattern of ventilator.—**L. E.**

[12006.]-**Exhaust Ventilators.**—These can be safely carried on the ordinary rafters if two trimmer rafters are put in, the other rafters between being trimmed. But if there are principals with collars, I should recommend the ventilator to be carried between two of these by framing a piece of timber between them, the rafters being fixed to it in either side of ridge.—**ARCHITECT.**

[12007.]-**Casements.**—Any casement can be made watertight if it have a properly sectioned stile and sill. If the casement opens outwards, put a grooved fillet at the opening stiles, and also one on the outside to project over sill. The metal casements made by Henry Hope, Lionel-street, Birmingham, or Burt and Potts, Westminster, are watertight. I believe either firm can supply a water-bar that will exclude the wet.—**G.**

[12007.]-**Casements.**—French casements can be made watertight by aid of water-bars.—**L. E.**

[12008.]-**Ventilation of Top Rooms.**—A zinc pipe of 1in. diameter is not sufficient to properly ventilate a room of any size at all. You could have an outlet near ceiling, say, about 1 superficial foot in area, and corresponding amount of inlet near the floor. Either Tobin's tubes or Hinckes Bird's patent may be used for inlets.—**L. E.**

[12008.]-**Ventilation of Top Rooms.**—If there is a chimney shaft near, I should recommend "A. G." to make an opening into one of the flues by taking out a brick or two near the ceiling of room and putting in a Sherringham ventilator, or one of Hayward Brothers and Eckstein's outlet ventilators. If the room is large I should recommend one of Boyle's 12in. galvanised iron "air pump" ventilators. The cost would not be much. Send for particulars to firm, Robert Boyle and Son, Ltd., Holborn Viaduct.—**G. H. G.**

[12010.]-**Marble Pilasters.**—The marble can be fixed round stanchions by aid of cramps, and can be jointed with lime-putty, mixed sometimes with marble dust.—**L. E.**

[12011.]-**Photographic Apparatus for Tourist.**—One of the best portable cameras suitable for the above is Lancaster's "plate Instantograph." This camera folds into a very small compass, and the weight, including the lens, is only a few pounds. It contains all the latest improvements, and will stand a great deal of rough usage. The lens supplied with the camera is

hardly good enough for architectural work. I have found an "Optimus" Rapid Rectilinear lens (supplied by Perken, Son, and Rayment), a good all-round one. It must be a rectilinear lens for buildings, &c., as otherwise all upright and other lines would be distorted. A hand-camera is not of much use for the object named. The camera must be on a tripod or stand, so that one can carefully focus the work. Be sure the camera is level and upright, as otherwise the picture will be spoiled. If getting a new outfit, add a pneumatic shutter to the list of necessities. This allows one to open or close the shutter in an instant, and saves a great deal of risk. The Thornton Pickard Co. supply an excellent shutter. As to the cost, one can get an Instantograph, an Optimus lens, and a first-class pneumatic shutter all for a £5 note, and will then have a thoroughly good outfit, which will stand the wear and tear of many a tour.—**HARRY TURNER HEMS, Exeter.**

[12011.]-**Photographic Apparatus for Tourists.**—Any large manufacturer of cameras will supply your needs.—**L. E.**

[12011.]-**Photographic Apparatus for Tourists.**—"Intending Tourist" can obtain portable apparatus suitable for his purpose, and I should recommend him to procure a little book entitled "Architectural Photography," by G. A. T. Midleton, A.R.I.B.A., in the "Amateur Photographer Library," published by Hazell, Watson, and Viney, Ltd., Old Creed-lane. It was recently noticed in the BUILDING NEWS.—**G.**

[12012.]-**Silicate Cotton Layer to Roof.**—"Practical Man" should apply to Frederick Jones and Co., Kentish Town, for particulars. I should lay the cotton on rough boards fixed to fillets between rafters.—**G. H. G.**

[12012.]-**Silicate Cotton Layer to Roof.**—About 1in. layer of this material will be amply sufficient, and it can either be laid on boards fixed between rafters or below them. Felt would not be necessary where silicate of cotton was used.—**LOUIS ERWOLD.**

[12012.]-**Silicate Cotton Layer to Roof.**—Either of the methods of "Practical Man" would prove effective; but the better of the two is to apply the material 1in. thick in sheets underneath rafters, and thus secure complete insulation. Jones's patent combined Silicate Cotton and Plaster Slabs would probably be the simplest mode, as they form a ceiling, and obviate the trouble of lath and plaster.—**S. BIRCHMORE.**

[12014.]-**Estates Clerk of Works' Society.**—In answer to "X," the address of the Secretary of the Estates Clerks of Works Society is Mr. Thomas Potter, 95, Brigstock-road, Thornton Heath, Surrey.—**E. C. W.**

## CHIPS.

A New York Municipal Commission, specially charged to investigate the system of Lord Rowton's lodging-houses, is now in London, staying in one of them.

The city council of Leeds have received a report from the Baths Sub-Committee recommending that various alterations and improvements be carried out at the Cookbridge-street baths, at an estimated outlay of £5,000.

The Bill to enable a Birmingham syndicate to lay tramways in the city of Carlisle and its suburbs has now become law. The syndicate have decided to employ electricity as the motive power.

Townley's Hospital, Bolton, is being warmed and ventilated by means of Shorland's patent double-fronted Manchester stoves with descending smoke-flues, patent Manchester grates, and extract ventilators, the same being supplied by Messrs. E. H. Shorland and Brother, of Manchester.

The practical completion of the first instalment of the extensive additions made to the Northern Counties Institute, Inverness, took place on Saturday, when the new male hospital ward, which cost over £12,600, was inspected under the guidance of Mr. Alexander Ross, LL.D., of Messrs. Ross and MacBeth, of Inverness, the architects. Other improvements proceeding at the asylum is the addition of a female hospital. The cost of the female hospital and nurses' rooms and kitchen improvements is estimated at £15,941, and the new boiler-house and boilers at £2,500, making a total of £30,571. The furnishings of the two hospitals alone are to cost about £5,000.

A Local Government Board inquiry was held at Cobham on Tuesday week respecting the application of the Epsom Rural District Council to borrow £22,000 for the drainage scheme. There was strenuous opposition, and the proceedings were of a protracted nature.

In the reference between the Corporation of Edinburgh and Messrs. A. L. Reis and Co., 44, North Bridge, the arbitrator has issued proposed findings whereby he proposes to allow as compensation the sum of £1,113 8s. The claim made by Messrs. Reis amounted to £2,800. The arbitrator in the reference is Mr. William Ormiston, surveyor, Edinburgh, and Mr. Peter Morison, jun., S.S.C., Edinburgh, is clerk and legal assessor.

The Golden Cross Hotel, Charing Cross, so closely associated with the name of Dickens, was reopened on Monday. This well-known old hostelry, opposite Charing Cross Station, has been almost entirely remodelled, and an old-fashioned dingy house has been changed to an up-to-date hotel. The whole of the new work has been carried out by Messrs. Waring, from the plans of Messrs. Treadwell and Martin, architects.

## LEGAL INTELLIGENCE.

**EMPLOYERS' LIABILITY.**—In the City of London Court on August 18th, before Mr. Commissioner Kerr and a jury, the case of "Mabey v. Colls" came on for hearing. It was an action brought under the Employers' Liability Act by Thomas Mabey, a carpenter and joiner, against his former employers, Messrs. B. Colls and Sons, builders, of Coleman-street, E.C., to recover £350 damages for personal injuries sustained in consequence of the defendants' alleged negligence. It appeared that the plaintiff was one of a number of workmen employed by the defendants, on March 8th last, to effect certain alterations at a house known as 10, Brook-street, Grosvenor-square. His case was that, while he was cutting away a joist in a room on the ground-floor in accordance with instructions received from the acting foreman, a plank of wood fell upon him from a scaffold above and caused injuries which, according to the medical evidence, were likely to be of a permanent character, and to prevent him following his occupation in the future. The negligence complained of was that the scaffolding was improperly constructed, and expert evidence was called to show that it was impossible for a board to fall, as this one had done, from a properly-constructed scaffold. The defendants denied all knowledge of the accident, and said that the only scaffold of the height described by the plaintiff was in the hall, and that was properly constructed and close-boarded. The jury, however, found for the plaintiff, and awarded him £50 damages. Judgment was entered accordingly, with costs.

## WATER SUPPLY AND SANITARY MATTERS.

**THE EAST-END WATER SUPPLY.**—It has been semi-officially intimated to the local authorities in East London that, unless there is shortly a plentiful fall of rain, the East London Water Company will be compelled to cut off the supply of water to the public baths and washhouses, and to the owners of large factories supplied by meter from the fire-mains. At present the company are said to have stored in their reservoirs sufficient water to last about 100 days on the shortened supply.

**WELLINGTON, SALOP.**—The new sewage works, for which a loan of £10,408 was granted by the Local Government Board, were put into operation on Friday by the chairman of the urban district council. The scheme has done away with numerous serious defects in the drainage of the town and the pollution of a brook, which involved the council in litigation with Mr. T. S. Slaney-Eyton. An enormous quantity of reservoir water will be saved by the new method of collecting (for watering the streets) the water from the Ercall Hill, which formerly increased the bulk of sewage. Passing to Admaston, the sewage undergoes a system of precipitation and purification, and the water flowing on to a large area of land will be further purified by percolation, and will irrigate the ground, upon which produce is to be grown for commercial purposes.

**ABERDEEN.**—The sewerage committee of Aberdeen Town Council met, on Monday, to meet Mr. Mansergh, London, consulting engineer, on a proposed extensive sewerage scheme for the city. It is proposed to promote a bill to enable the council to carry the large sewer to Girdleness for discharge into the sea, in order to obviate difficulties that have arisen with regard to the pollution of the Dee, and also to meet the growing necessities of the city.

An inquiry was held at Bournemouth on Tuesday by Mr. A. E. Sandford Fawcett, Local Government Board inspector, respecting an application of the town council to borrow £1,000 to transform the course of the stream in the Lower Pleasure Gardens into an ornamental watercourse, with islet, grottoes, fountains, weirs, and a rustic bridge. The proposal is looked upon with great disfavour by many ratepayers, who offered it a strenuous opposition.

Arundel, with its ancient castle, which has for some years been undergoing restoration, has this year been chosen by the Society of Estates Clerks of Works for their annual meeting. On Tuesday the privilege of exploring the castle was taken advantage of, great interest being taken in the ancient and modern parts of the structure, the work of restoring which will probably be finished in two years. At the invitation of the Duke of Norfolk, lunch was partaken of in the Castle. Chichester Cathedral was visited on Wednesday.

An excellent recipe for the composition of a fire-extinguishing liquid is given by M. Raymond—viz., water, 1,000 parts; borax, 40 to 60 parts; soda (anhydrous), 80 to 120 parts; sodium hydrate, 150 to 200 parts; ammonium carbonate, 75 to 100 parts; ammonium chloride, 200 to 250 parts.

On Monday week a new Roman Catholic church, dedicated to St. Joseph, situate at Hill Top, Hednesford, was opened.



## Our Office Table.

THE annual report on the British Museum states that among the more important acquisitions of the year is of a further series of Egyptian sculptures of great antiquity, supplementing those which were purchased in 1896. The most valuable addition of literary interest is a papyrus, unfortunately much mutilated, of the first century before Christ, containing poems of the Greek poet, Bacchylides, the contemporary of Pindar. The number of remarkable books acquired during 1897 has been less considerable than usual; but several of the acquisitions have been of the highest importance. The purchase of a fine vellum copy of the Decretals of Boniface VIII., Petrus Schoeffer, Mentz, 1476, is of value as completing the museum set of the four Mentz editions of the Decretals. Three of these are upon vellum. Another acquisition is a dingy little tract, "Michael Howe, the last and worst of the Bush-rangers," Hobart Town (1817), which, gazetted and fly-sheets apart, is the first book printed in Australasia. In the department of manuscripts allusion is made to the poems of Bacchylides, on papyrus, being the only known manuscript of this poet, whose works have been lost for over a thousand years. It is written in a fine uncial hand, and contains twenty poems, six belonging to a class of Greek poetry of which no complete specimen has hitherto been extant. A large amount of work is reported in the department of prints and drawings, as also in respect to Egyptian and Assyrian antiquities. The acquisitions by purchase in the latter department are numerous, some of the objects dating about 3,700 B.C. Several presents are also recorded, including portions of sculptured slabs from the palaces at Nineveh of Sennacherib and Assur-bani-pal. In respect to Greek and Roman antiquities, some good results have accrued from the continued excavations in Cyprus. Sir A. W. Franks, keeper of the department of British antiquities, who died in May, 1897, bequeathed to the British Museum a large number of objects, including a collection of finger-rings of all ages and countries, numbering about 3,300.

In an article on the Cripplegate fire contributed to an insurance journal, Mr. Charles H. Noverre, the London manager of the Norwich Union Fire Office, expresses regret that the City Corporation and the Goldsmiths' Company were unable to overcome the difficulties in the way of widening the streets in the devastated area, which has suffered three disastrous fires within fifteen years. If, through lack of thought or effort, the public is content to leave the question of narrow thoroughfares, height, glass, frontage, and construction to solve itself as best it may, the insurance offices must not pursue a like haphazard course, but must, in self-defence, be ruled by business principles, and see that the just penalty is enforced in the shape of graduated increase in ratio such as the conditions of risk according to their judgment and experience justify. Mr. Noverre urges that, with a view to preventing the spread of fires, there are features of construction and separation which it seems criminal to neglect. In this connection, he emphasises the value of hand-made stock bricks as fire-resisting materials, while the twisting of iron girders and the cracking of stone framings furnish significant lessons for those engaged in construction.

THE prospectus and prize scheme for the forthcoming session of the Glasgow School of Art have just been published. The head-master of the school is Mr. Francis H. Newbery, and the director of the architectural department is Mr. William J. Anderson, A.R.I.B.A., who is assisted by Messrs. W. R. Watson, I. J. F. X. King, Emmet Brady, and Alexander McGibbon. A noteworthy feature of this section is a course of lectures on the "Architecture of the Renaissance in France," by the director, who, by the desire of the governors, has visited France for the purpose. Another important department, with a still higher staff of masters, is that of Decorative Art, of which Sir John Guthrie is the director. A large number of prizes are offered to students, including two of three guineas and two guineas respectively, given by the Glasgow Institute of Architects. This year the Glasgow School of Art has, it will be remembered, headed the list of schools in the National Competition, having taken two gold, nine silver, and twenty bronze medals, in all thirty-one, as against one gold, ten

silver, and twelve bronze medals taken by all the other schools and classes in Scotland. In this competition New Cross, London, came second, with 26 medals, Birmingham third with 25, and Leicester a poor fourth with 18, no other school of art taking more than a dozen medals. The memorial stone of the new school of art buildings for Glasgow now in course of erection was laid on May 25th, and it is expected that the premises will be ready for occupation before the close of the next session.

THE seventeenth annual gathering of the English Arboricultural Society was held last week in the Lake District. The proceedings began on Wednesday night, the 17th inst., with the annual business meeting at Penrith, the headquarters for the week; and on the following day the gardens of Sir R. G. Musgrave, Bart., Eden Hall; Mrs. Wedgwood, Hallsteads, Ullswater; and Mr. W. J. Marshall, Patterdale Hall, were visited, the annual dinner being held in the evening. On Friday the visitors went to the Keswick and Bassenthwaite districts and inspected the gardens at Castle Rigg Manor, Armathwaite Hall, Underscarr, and Mirehouse. Members were present from Huddersfield, York, Harrogate, Haydon Bridge, Carlisle, Hexham, Barnard Castle, Fryston, Naworth, West Hartlepool, Workop, Gateshead, Darlington, Durham, &c. The retiring president, Mr. F. W. Beadon, Longley Hall, Huddersfield, was unable to attend in consequence of the tragically sudden death of his father-in-law, Mr. Scarth, at Raby Castle the previous week, and Mr. J. Watt, Carlisle, presided at the outset. A very satisfactory report, showing a membership of nearly 500, and a balance to the good of £158, was read. Mr. John Graham, Durham, was elected president. A silver medal was awarded to Mr. Tom Bright, of Mount-street, Grosvenor-square, W., for an essay on "The different methods adopted in the measurement of stacked and felled timber," and a bronze medal to Mr. A. J. Ross, Skipton Castle, for an essay on "The felling and barking of oak or larch timber, and the best modes of drying, housing, and stacking and preparing the bark for delivery to the tanneries."

THE urban district council of Erith, who are carrying out a sewage scheme at a cost of £100,000, recently advertised for an inspector to superintend the laying of private drains and connections to the sewers, to inspect the construction of new buildings, and to assist the surveyor. A salary of £140 was offered, the advertisement showing that a qualified surveyor was required, it being stipulated that the inspector must have a practical knowledge of drainage, the construction of works, the preparation of plans, and be fully competent to keep all books and accounts connected with the office of inspector. Some 150 applicants responded to the invitation, and from these six were selected to interview the council. Of these, two failed to keep the appointment, the remaining four being the past surveyor to the Carshalton Urban District Council, a carpenter in Erith (formerly a member of the urban council, but now unfortunately out of work), a bricklayer's foreman, and a bricklayer. After examining the testimonials and putting test questions to the four candidates, the council decided, by the chairman's casting vote, in favour of the local carpenter, the voting being equal for him and for the surveyor from Carshalton, Mr. A. H. Jennings, who pertinently asks why the Erith authority should have advertised the appointment if they intended to appoint a local candidate against all comers.

A SINGULAR deadlock occurred last week at the election of a county surveyor for East Sussex by the Roads and Bridges Committee of the county council. The four selected candidates were: A. Dryland, A.M.I.C.E., assistant surveyor, county of Kent; C. Law Green, surveyor, Croydon Rural District Council; F. S. Morris, assistant surveyor, county of Stafford; and F. J. Wood, A.M.I.C.E., assistant surveyor, county of Lancaster, there having been originally 81 candidates. The four selected candidates were interviewed in the order given, and upon the names being put to the vote, Mr. Dryland obtained 10 and Mr. Wood 10, there being 20 members of the committee present. The chairman declined to decide the matter by giving a casting vote, but stated he had voted for Mr. Dryland, and if he did exercise his right would have to do so in his favour. He remained firm in his refusal to give a second vote, and after considerable discussion upon the merits of the respective candidates, and

upon the position caused by the equality of votes, it was resolved to try the effect of taking another vote, when Mr. Wood obtained 11 to Mr. Dryland's 9, and was therefore declared elected.

A PECULIAR monument, resembling a miniature lighthouse, has been erected in the cemetery at Ulverston as a memorial of the late Thomas Watkins Wilson, M.D., who died in London 18 months ago. The structure, which is 23ft. in height, with a spreading base 25ft. in circumference and 8ft. in diameter, is constructed of white Carrara marble, is surmounted with a small dome and ball, supported on four columns, and between these is a chamber, ornamented with a moulded cornice and containing the radiating lantern. The light is forty candle-power, and the lamp has a burning capacity of about 13ft. of gas per hour. On the die block immediately beneath the entrance door is cut in bold relief a large anchor. The chain finishes with a broken link, the other end being buried in the rock. The whole of the base of the lighthouse is carved to represent waves breaking against the rocks, and a coping covered with sea sand is going to be erected around this, in order to give the whole a realistic appearance.

To determine whether a trunk was hewn in winter or in summer is (says a German contemporary) of great importance to buyers of building timber, since timber cut down in summer represents a lower value than that felled in winter. Timber hewn during the resting period—i.e., between October and April, contains in its cells numerous starch particles which cannot be found in wood cut down in summer. Owing to this presence of starch the wood is coarse and impenetrable, since the starch closes the pores. For this reason, winter-hewn timber is exclusively employed for staves because, with staves from summer-hewn wood, the contents of the barrels are subject to evaporation through the pores. The starch contained in the winter wood is given a violet colour by iodine. Hence, if the timber to be examined is coated with an iodine solution and the surface of the felling side appears yellow, it may be assumed with certainty that the respective tree was cut down in summer. The light yellow lines are the moisture rays, while cells, tissue, and wood fibres simply take on a yellow colouring. In the case of winter-hewn timber the amylaceous rays form much darker, ink-coloured, black stripes on the yellow ground.

THE Chemical Laboratory of the University of Virginia has published a simple method of distinguishing stucco work made in Keene's cement from that made in ordinary plaster of Paris. As is well known, Keene's cement is characterised by the presence of a small amount of alum. It is ascertained that the alumina, which is present to the extent of less than one per cent., is to be detected by a dilute infusion of logwood, which need merely be applied by a feather or camel's-hair pencil to the surface of the stucco, when almost immediately the blue-violet colour of the spot will indicate Keene's cement; while ordinary plaster of Paris is merely stained a reddish brown under this treatment. In the supervision of certain work this test applied in an inconspicuous place will solve what might otherwise prove a troublesome problem for an analytical chemist.

THE building trades are still active at Coventry, although a slight falling off was perceptible. The land lying between the Radford and Foleshill-roads has been let by the Freeman's trustees on a 99 years' lease for development as a building estate. The scheme now in hand includes the erection of some 200 houses of the superior artisan class, of about £22 rental, and with two sitting, three bed and bath-rooms. Something like a dozen of these are nearing completion, and workmen are busily engaged in cutting out and metalting Widdrington-road. The main entrance to the new district will be on the Foleshill-road, near the corporation stoneyard, where a bridge is about to be thrown over the canal. This work is in the hands of Messrs. McCarthy and Co., who are building the houses for sale. On land adjacent, Messrs. Mason, of Leicester, have also commenced the work of laying out three new streets, but up to the present no building has been started.

THE peer who has undertaken to provide a set of Communion plate for St. Paul's Cathedral, to replace that given by Mr. Hooley, is understood to be the Duke of Newcastle.



# THE BUILDING NEWS

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FRIDAY, SEPTEMBER 2, 1898.

### AUTUMN EXHIBITION, WALKER ART GALLERY, LIVERPOOL.

**B**ORDEAUX, they say, is a "little Paris," and the Walker Art Gallery is becoming more and more a little Burlington House. It is not only that many of the most noticeable pictures from this year's Academy are to be seen here; but the general appearance of the galleries is pretty much the same, and the works placed best by the Hanging Committee are of the kind that find most favour in the eyes of Academicians. In other years, in one room at least, there was a difference. In the room which the late Mr. Philip Rathbone always called the "Whistler" room, and which he took under his especial care, a small number of works were brought together, different in feeling from the majority of those in the other galleries, and were hung differently, each picture having its space round it. But this little quiet oasis has now disappeared; the distinctive character of the room is gone. It is true that it contains some of the best pictures in the exhibition; but these are so crowded by inferior work that much of the pleasure of seeing them is lost. Facing one another are Burne-Jones's "Chant d'Amour," lent by Mr. Ismay (perhaps the finest picture the painter ever produced), and Mr. J. M. Strudwick's "Evensong," lent by Mr. Imrie, which is as near perfection as a picture can be. One can well understand how Mr. Ismay and Mr. Imrie, who, by the way, are partners, must squabble as to which possesses the greater masterpieces. If the Burne-Jones has not the brilliancy and jewel-like quality of the Strudwick, it has softness and beauty which enable it to hold its own, perhaps even to do more. Looking at these two pictures, it is difficult to say which is by the greater artist; and yet, for one person who knows and admires Mr. Strudwick's art, a thousand could be found enthusiastic about that of the late Sir E. Burne-Jones. It is the fortune of art, we suppose, but, without undervaluing the high quality of the latter's work, or considering any of the praise bestowed upon it exaggerated, we are sorry that the appreciation of the former's work by the few is not shared by the many. In the same gallery is Mr. Waterhouse's fine "La Belle Dame Sans Merci"; a portrait of Sir E. Burne-Jones, by himself; "The Importunate Neighbour," by Mr. Holman Hunt; a small, but interesting pre-Raphaelite picture, by Mr. Arthur J. Gaskin; "The Annunciation," "A Daughter of Firenze," by Miss MacNicol; "A French Diver," by Mr. D. Y. Cameron; and "An Autumn Evensong," by Mr. Bertram Priestman—two very pleasant and low-toned pictures, a few other good ones, and a fair number of indifferent.

There is no doubt that the exhibition as a whole is above the average of previous years; in one respect it is very far superior. For the first time the committee has devoted an entire gallery to Sculpture. A room has been allotted to it on the ground floor which hitherto has not formed part of the Autumn Exhibition. It is true that the lighting is not good—it is side-light—but by the use of muslin curtains the light has been diffused as much as possible, and is better than might have been expected. Of the large works here, Mr. George Simond's "Hervor Alvit," a marble group representing the swan-girl and her companions; Mr. Lucchesi's "Crash of Doom"; "St. George and the Rescued Maiden," by Mr. H. C. Fehr; and Mr. Pomeroy's very fine figure of Perseus have been exhibited before; but Mr. Charles J.

Allen's plaster group, entitled "Rescued," is now shown for the first time. It is a fine work, well conceived and admirably modelled. It represents a man carrying a child with one arm and half-supporting a female figure, whilst with his other hand he carries a dead eagle, which hangs down almost to the ground. The sentiment is as old as the hills, and there is nothing very original in the treatment; but the grouping is fine, and the work looks well from every point of view. The figures, which are nude, are somewhat over life-size. Smaller works are shown by Mr. Thornycroft, whose bronze statuette of "The Bathing" is somewhat disappointing, and Mr. Lanteri, who has a nice little bronze group representing "The Fisherman and the Mermaid." There is a most delightful marble bust entitled "Ailsa," by Mr. A. J. McLean, and next to it is another female bust by Mr. Harry Bates, called "A Study in Marble," which is thoroughly Greek in feeling. Some of the most interesting of the small exhibits are of animals. Mr. J. H. M. Furse has a bronze group representing a noble Cock and Snake, the former being particularly fine. Another snake study is Mr. O. Waldmann's Tigress and Serpent, the tigress, with one paw on the snake's body, bending her head on one side and snarling, evidently afraid the reptile is going to strike. Mr. Cecil Brown and Mr. Teiscera de Maltos each have two small animal groups, the former's "The Fight" being the most successful of the four.

On the staircase one looks for the architectural drawings—it is where they are to be found generally in the Walker Art Gallery—but looks in vain. They are conspicuous by their absence. This is, perhaps, hardly a true statement, as architectural drawings are never conspicuous, whether absent or present. The architects have shown their wisdom in not sending to what has been, until this year, a purely picture show. Perhaps the authorities next year may see their way to hang architectural drawings on the walls of the Sculpture Gallery: the two arts go well together. In justice to the committee, and as an additional reason for the absence of architectural exhibits this year, it should be remembered that a fine exhibition of architecture and applied art was held in the galleries this spring. Before definitely passing away from the Sculpture Gallery, mention ought to be made of Mr. Havard Thomas's very fine low relief in marble of "A Draught Ox." Architects might do more to encourage this kind of work, which, undoubtedly, would form a fine jewel in an architectural setting. Mr. Goscombe John's "Drinking Horn," with stand in silver-gilt, ought not to be passed over. It has a fine barbaric splendour about it, and is "big," a quality somewhat rare in modern work, and one to be thankful for when discovered.

Coming back to the pictures, and looking round for works of a decorative character, it cannot be said that there is very much to be seen. There are several pictures which are decorative—all good pictures must be—inside their frames, and yet few, if any, which would bear transplanting. Decorative painting is not followed in England as it is in France. Painters complain that it is the fault of the architects; we don't think so. If there is not the demand, it is because architects fear for the quality and cost of the supply. Painters, if they want to do mural work, must be content with smaller sums than they ask for easel pictures. Of the painters exhibiting in this exhibition, Mr. Moira seems to have, best of all, the instinctive feeling for decoration. It is true that his picture here—"Love's Orisons"—is small, but it nevertheless possesses all those qualities which are so telling in mural decoration; rich, but subdued colouring, balance, simple but effective massing, broad treatment, and non-assertiveness. He is not a Puvis de Chevannes, he is not even his

prophet; but he can do decorative work, and that is a great thing. He is much more fitted for this work, we think, than Mr. Byam Shaw. Mr. Shaw's pictures are most decorative (inside their frames); but we do not think they would work in as part of a general scheme so well as Mr. Moira's. No doubt, however, he is clever enough to adapt himself to his surroundings, if required to do so. In his "Queen of Spades," exhibited in this exhibition—to explain more fully what we feel—the figure in the foreground would, if the picture were to be framed in on a wall, upset the balance, and be aggressive. Mr. Shaw also shows his fine allegory "Truth," and his picture of Miss Pyke Nott. "Picture" is here a better word than "portrait," because it is something more than a portrait. Mrs. Marianne Stokes is another artist who can do fine decorative work. Her "Aucassin and Nicolette" is a charming thing, and none the less charming because it is somewhat different in feeling from much of the work she has hitherto done. We cannot say we like Mr. T. C. Gotch's "The Awakening"—it looks thin and poor, and archaic without the charm of archaicism;—it is not worthy of the author of "The Child Enthroned." Mr. Solomon's "On the Threshold of the City" is hardly decorative, although it is subdued in colour, and would not "shout," and Mr. Herkomer's "The Guards' Cheer" is not decorative, not subdued, and does "shout." Why did he introduce that little girl with the conventional bunch of flowers in the foreground? Notwithstanding its faults, however, it is a bold bit of painting, and if the artist wished to crush most of the pictures round his own he has certainly succeeded. Two panels of flowers are exhibited by Mrs. Gray-Hill. This lady has a power of arranging flowers on the flat and producing a fine decorative effect which is quite marvellous. Her colour also is excellent. Mr. Draper's picture, bought by the "Chantry," does not appeal to us. It is well painted, well drawn, and the colour is good, and yet, in our opinion, it is absolutely unattractive. Little space is left to speak of the portraits and landscapes. Of the former, Mr. D. T. Cameron's little girl in red on a low toned background, Miss Dorothy Maude Kay, although by no means the biggest picture here, is one of the most pleasing. Mr. Harrington Mann's portrait of his wife and Mr. Jack's portrait of a lady are both very effective, especially the latter, and it is a great pity that they are not hung lower. The most telling of all the portraits is Mr. Harris Brown's Lord Bishop of Emmaus, and hung, as it is, at the end of a suite of rooms, the prelate seems to be conferring a benediction on the exhibition. Mr. Morrison has three portraits which are not very interesting, and one really fine one. His Mr. Cotterill is not only an excellent likeness, but a fine work of art. Of other pictures Mr. La Thangue has two very fine ones. One, "Down a Country Lane," children dancing with primroses in their hands, the gorse in the hedges being out in blossom, is perhaps the strongest bit of painting in the whole exhibition. Another strong picture is Mr. Bramley's "A Dalesman's Clipping." Mr. Austen Brown's "La Benediction de la Mer à Etaples" is a fresh piece of work, fresh in colour and pleasing, although a trifle weak in effect. Mr. Charles's "A Refreshing Drink" is a fine landscape, somewhat of the Constable school, and a nice bit of colour is a small picture by Mr. H. Royle, "Glen Lednock, Perthshire." Mr. Alfred East's important picture, "Opulent Autumn" occupies, as it deserves, a good place. There are a number of quiet tone pictures which are refreshing to come across. Mr. Priestman has two landscapes, "Christchurch Marshes" and "An Autumn Evening" mentioned before, both charming in their subdued colouring. The same may be said of Mr. Lanery's "The Night After



the Battle of Langside." His "Lady in Brown" we do not like so well; but then it is skied in a corner, and is difficult to see. Altogether the hangers, although they have done their work well, if judged conventionally, have hardly been fair to pictures of the Glasgow School.

#### STREETS AND PROMENADES.

COMPARED with many European cities, our streets and promenades are exceedingly dull and uninteresting. We have few streets, save, perhaps, our great River Embankment, that can compare with those boulevards, promenades, and quays which are features of many Belgian cities. The Digue of Ostend, stretching a distance of two miles or more bordering the sea; the ring of noble boulevards as those of the Midi or of Waterloo, which encircle the city of Brussels; the Avenue des Arts, Antwerp; the Voorhout of the Hague, to say nothing of the Ringstrasse, Vienna, and the splendid boulevards of the French capital, are instances where art has been linked with natural resources. The semicircle of boulevards, and the magnificent quays and open squares of some of the cities we have named, often lined with trees and bordered with grand hotels, contrast in a remarkable manner with the dull lines of houses and shops of London. One writer, in speaking of recent architecture in Germany, has attributed much of its success to the elaborate academical training of Continental schools. The non-academical office-pupilage of the English architect's education is unfavourably contrasted with the Continental, and the object of the writer has been to show that the office-pupilage system has not been fortunate in the results. We cannot agree in this conclusion. It is quite true that the German buildings exhibit the academical training more conspicuously than our English buildings do; but the question is whether the architecture so produced is better or worse. It is certainly open to doubt whether the academical training has been an advantage: elegant uniformity and artificial graces fostered by the schools are very well in certain circumstances. In Paris, for example, which has been largely remodelled under State control, the wide streets have produced a dignified setting for buildings conceived in the Roman or Italian style, and the Louvre and adjacent boulevards make one grand whole; but in other cities—as in London—the irregular planning of our streets and admixture of the older architecture renders it impossible to impart Classic elegance to our thoroughfares with any great success. In the Belgian and in most French cities the Mediæval and Renaissance features predominate; in London the modern dull 18th-century style prevails.

With such a heterogeneous mixture of styles, "academicism"—if by that term we mean to convey the purity and elegance of the Classical styles—has little chance of thriving. Coming to the practical question of making our streets and promenades dignified and inviting to strangers and enjoyable to the citizen, it appears to us that the competent English architect, trained under the pupilage system and allowed a free choice in his selection of styles, may do as well or better than one turned out from a State French School, who has spent all his time in making careful drawings of Classic examples. Both may be cribs up to a certain point; but the one who has been allowed a freer range in his selection of types and has picked up a general knowledge of building may, after all, and in spite of his unsystematic training, be able to realise the requirements of city life. His style shows often more vigour and individuality, if less refined in its character and details.

We have, indeed, a few examples left of what a Classic taste did for our streets and

squares. Regent's Park, the squares of Bloomsbury, Eaton-square, and many surrounding streets, and Regent-street retain still the traces of Classic design and regularity of feature. These sombre brick and stucco lines of houses, with their plain window openings and portico entrances and flat roofs, may have satisfied a past generation: they were at least sombre and quiet, if not elegant; but their respectable mediocrity has long since ceased to give pleasure to the denizens of our huge Metropolis. An elegant uniformity prevail in many of the terraces of Regent's Park and Pimlico, but they soon tire. A more robust taste, often, it may be, distinguished by individual eccentricities, has supplanted the older régime. There has been a development of individuality and picturesque feeling in all our main streets, owing, no doubt, to the English mode of learning design, of picking up promiscuously from different sources all kinds of features—French, Belgian, quaint English ideas of the 16th and 17th centuries—but no doubt as much owing to the reaction from the dull Classicism of the 18th and early 19th centuries. The development has been a natural and vigorous assertion of individuality and native elements. Looking at any of our great modern thoroughfares, say Fleet-street or Oxford-street, we cannot fail to notice the effect of this change, the admixture of the new vigour with the old commonplace style of building—such as gabled houses, turrets, varieties of brick and terracotta treatment, and more ornamental but often pretentious shop-fronts. No doubt the change is for the better, on the whole; we lose the monotony and dullness of the old street as it appeared fifty years ago, but there are exceptions to be taken. The modern style is often mere facework, and the ornament and detail is irritating and showy. There is a want of restfulness in it all, such as we see in the quaint old streets of the semi-Mediæval city. Nature has not been studied: the lines of our new streets are straight, the projections of features which give a charm to any of our old cities like Chester or York, or any of the old French and Belgian cities, have been pruned off by building regulations. There are no trees to shade the sides of the footways, no quays, no market squares; the pavements are often narrow and unadorned, there is no grass margin with seats and shelters, and the crowded and congested condition of the traffic makes a hot day in the Metropolis unbearable, despite our sanitary arrangements and the superior paving of our roads and footways.

The Victoria Embankment is still in a chaotic state. Beginning with the Cecil and Savoy Hotels at the western end and passing Somerset House, the new Gothic offices and hotels between it and the Temple, the flat and overwrought Renaissance façade of the School Board Offices, and a few recent buildings, we have the welcome gardens of the Temple on which the eye can gratefully rest. Beyond come a variety of new buildings, Late Gothic, as the Thames Conservancy Offices and Sion College, and then the dignified City of London School and the big corner hotel. We have in this row of new edifices almost every modern development of style. Chaotic though it is, the Embankment is a natural outcome of our architecture. The buildings lack rhythm and agreeable skyline, and near the eastern end the commercial buildings of newspaper companies which crowd the space between Fleet-street and the Embankment spoil the few architectural buildings which face the river. In these building arrangements we lack the control of a committee of experts. Lofty office blocks have been passed that ought not to have been possible. The beautiful line of leafy trees which overshadows the footways of this river promenade redeems much that one might condemn. If

we cast a glance on the other side of the river we see a motley row of wharves, black and dingy, without a single effort to utilise the bank for recreation. Our wharfage architecture is indeed a negative quantity, for we see nothing to beautify the river bank but the picturesque irregularity of old sheds and wharves. We have not yet learned how to make our wharves and quays pleasing, or to convert them into "things of beauty," like the quays and canals of Holland or Belgium.

#### MODEL SPECIFICATIONS.—XXVIII.

JOINERY: PANNELLING, DOORS, RIBBED CEILINGS.

WE now describe and illustrate further details of joiner's work. Sketches 1 and 2 show a framed panelled wall lining with large-scale section of wood cornice, put together or rebated in two or three pieces; sections of frieze and dado rails; also a four-panel door showing the fixing of jamb linings to framed grounds and details of mouldings 3 and 4. We also give sections of panelled wood ceilings, showing how the boarding and ribs are fixed, and the panels formed. In one case the ribs are secured to the joists and cross-pieces, and inserted between, scribed and dowelled to them to form the panels. Section 5 has the moulding worked solid on the joists in one direction, and the panels are framed and moulded, fixed to fillets, or the panels can be plastered (7). These ceilings are effective, and are suitable for offices, reception-rooms, restaurants, &c.

We give clauses for several special kinds of wall linings and partitions; also for special kinds of doors, &c. Next week we shall give clauses for sashes and casements, which form a very important branch of joinery, and comprise many kinds. In this kind of work the rails are tenoned into stiles, and the ends of sash-bars may be also tenoned to rails or stiles. The intersecting bars are generally scribed and dowelled together, the vertical bars being made continuous.

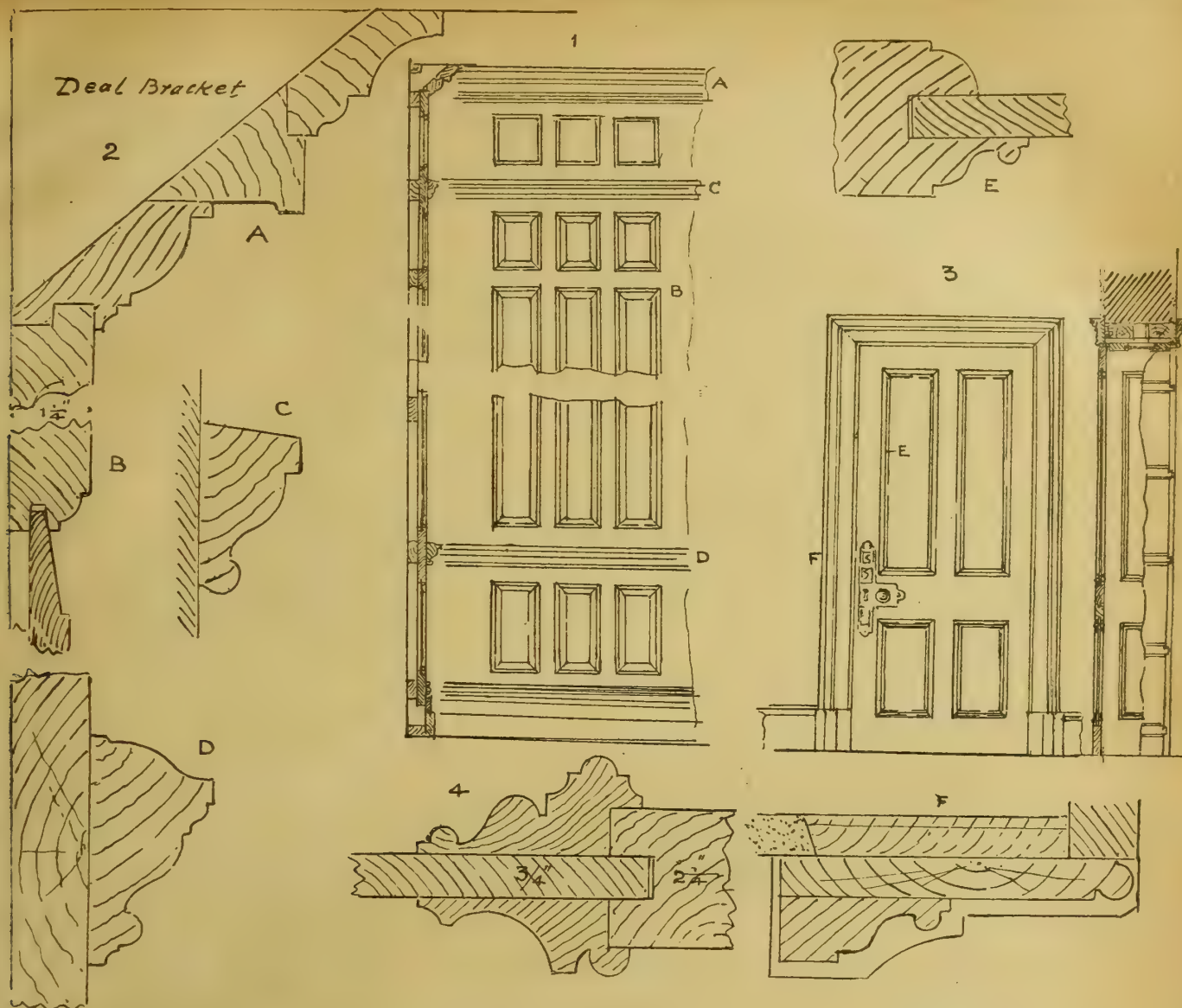
72. *Framed Partitions*.—The following are other kinds of deal partitions:—1½ in. deal, wrought both sides and ploughed, or tongued and beaded; 1½ in. or 1½ in. square framed; 1½ in. bead butt, moulded square; bead flush and square, or moulded both sides. (For panelled wall linings see clause 67.)

73. *Panelled Framing*.—The vestibule partition across hall to be constructed with 4 in. by 4 in. (or 4 in. by 3 in.), beaded at each angle (or four times moulded), and twice rebated deal (or mahogany) posts and transoms grooved on two sides for linings. The posts to be filled with 2 in. moulded both sides (or belection moulded) panelled framing, with diminished rails and stiles and upper panels prepared for glass with loose beads. Put moulding (as per detail) 2 in. by 1½ in. to transom tongued on, also moulded architraves 3 in. by 2 in. The glazed doors to correspond with framing with rebated and beaded meeting stiles in 5 in. brass butts, and provide mortise lock and furniture, p.c. 12s., to be selected from Jas. Hill and Co., or Boobyer and Sons' stock, by architect. Glaze the panels with glass approved.

74. *Vestibule Framing*.—The lobby to have wrought and polished Honduras mahogany framing 2 in. (or 2½ in.) moulded both sides, two (or three) panels high, rebated and grooved at angles with wall edges let into plaster, staff-beaded angles with a moulded capping 3 in. by 3 in.; hang 2 in. (or 2½ in.) three (or two) panel doors moulded both sides, with diminished stiles and rail; upper panels prepared for glass with loose beads, brass cups and screws, glazed with ¼ in. best British polished plate in washleather and putty (or with John M. Newton's bevelled glass). The doors to revolve in hollows in the stiles, and to be hung with patent brass-cased steel springs, or on James Hill and Co.'s (or Archibald Smith and Steven's) swing-door springs.

75. *Spandrel Framing*.—The staircase to be inclosed with 1½ in. (or 2 in.) moulded and square framing (three panels high), let into soffit of stairs on top, with diminished stiles and rail. Hang on framing a four-panel moulded and square door, with 4 in. wrought-iron butts, and provide a 6 in. brass mortise lock, &c., complete. The upper panels to be rebated for 24 oz. fluted sheet-glass.





76. *Dwarf Shop Framing.*—For office dwarf framing similar descriptions may be used, inserting oak, walnut, Honduras mahogany, or other hard wood, as required; the thickness may be 1½ in. or 2 in., moulded both sides, one or two panels high, with moulded capping, say 3 in. by 3 in., ploughed (or tongued). Specify if door to be made in framing; if wrought-iron angle-brackets are necessary to hold panelling, if the panels are bolection-moulded or are to be raised, &c. All angles of such framing to be grooved and rebated, and to have an angle-bead.

77. *Wall Panelling of Shop.*—The walls of main office or shop to be of 1½ in. wrought deal framing, in four (or five) panels high, with solid moulded ovolo, or quarter-round and square framed, with raised splayed panels (or square framed one side, and bolection moulded the other), grooved and rebated together at angles, and screwed to 2 in. by ½ in. horizontal fir battens every 2 ft. 6 in., plugged to walls (see sketch 1, A, B, C, D, &c.). The dado to be 1½ in., one panel high, square framed and solid moulded as above, and the frieze to correspond (see drawing) with moulded necking, 2 in. by 1½ in., and cornice, 6 in. by 2 in., in two pieces, rebated, fixed on brackets secured to joists with all mitres, stopped ends, &c. (For skirting, see clauses 62 and 63.)

(If there are pilasters at intervals, specify) the pilasters to be framed with 1½ in. rebated or grooved and tongued sides, and one panel in front, solid moulded with raised splayed panels, blocked together, and rebated and grooved to panelling. The capitals and entablature pedestals and bases to be moulded according to detail, and to be carefully tongued and mitred at angles.

78. *Panelled Plaster Ceiling.*—The ceilings of principal rooms (plastered) are to be divided into squares 2 ft. 6 in. (or 3 ft.) panels by moulded ribs, 3 in. by 1 in. (or 3 in. by 1½ in.), neatly scribed (or mitred) at intersections, and screwed to joists; or nail along squares set out on plaster ceiling, hollowed fillets 2½ in. by 1½ in., neatly scribed at intersections

with staff heads 1½ in. diameter, nailed along centre of hollow, mitred at intersections, and returned round walls of room. [Note.—It is, of course, necessary that all ribs on ceilings in section should correspond with the upper member of cornice, so that they may be mitred thereto. When other shaped ribs are fixed, as in beaded ribs, they may mitre to a margin bead of same section outside cornice.]

79. *Ceiling Panelling.*—The ceiling joists of reception-room (or dining-room) to be firred to a level surface. Line with 1½ in. V-jointed and rebated deal boards of 4 in. width screwed to the joists. The panels to be formed by moulded ribs (see section), 4 in. by 3 in., screwed to joists, and transverse ribs mitred at intersections; or the boards to be 1½ in. grooved and tongued, and V-jointed, laid diagonally, and screwed to joists. Moulded ribs, 3 in. by 3 in., to be screwed to every second or third joist, and the cross ribs to be scribed to them to form panels; or the ceiling may be lined with moulded and square panelling, screwed to joists (state if any circular or octagonal panels are introduced). Or—

The joists of dining-room to be moulded in the solid (sketch 5); scribe into the same, at regular intervals of a square, cross pieces dowelled to joists to form panels, and fill in the panels with 1½ in. wood panelling (or lath-and-plaster, on fillets—see sketch 7). Fix ornamental studs or bosses at the intersection of ribs by screws.

80. *Margin Panel Doors.*—The doors of reception-rooms to have 1½ in. panels, having sunk margins (or centre) in 2 in. stiles and rails, with double central stile beaded up the centre, and with ogee (or ovolo) and bead, both sides, hung with the best 4 in. lifting brass butts to 1½ in. double rebated jambs, and having 7 in. moulded architrave on framed and splayed ground. Put a 7 in. best mortise lock with furniture approved.

One or two special kinds of doors may be described before leaving the subject—viz., the ordinary sash or glazed doors, folding and sliding

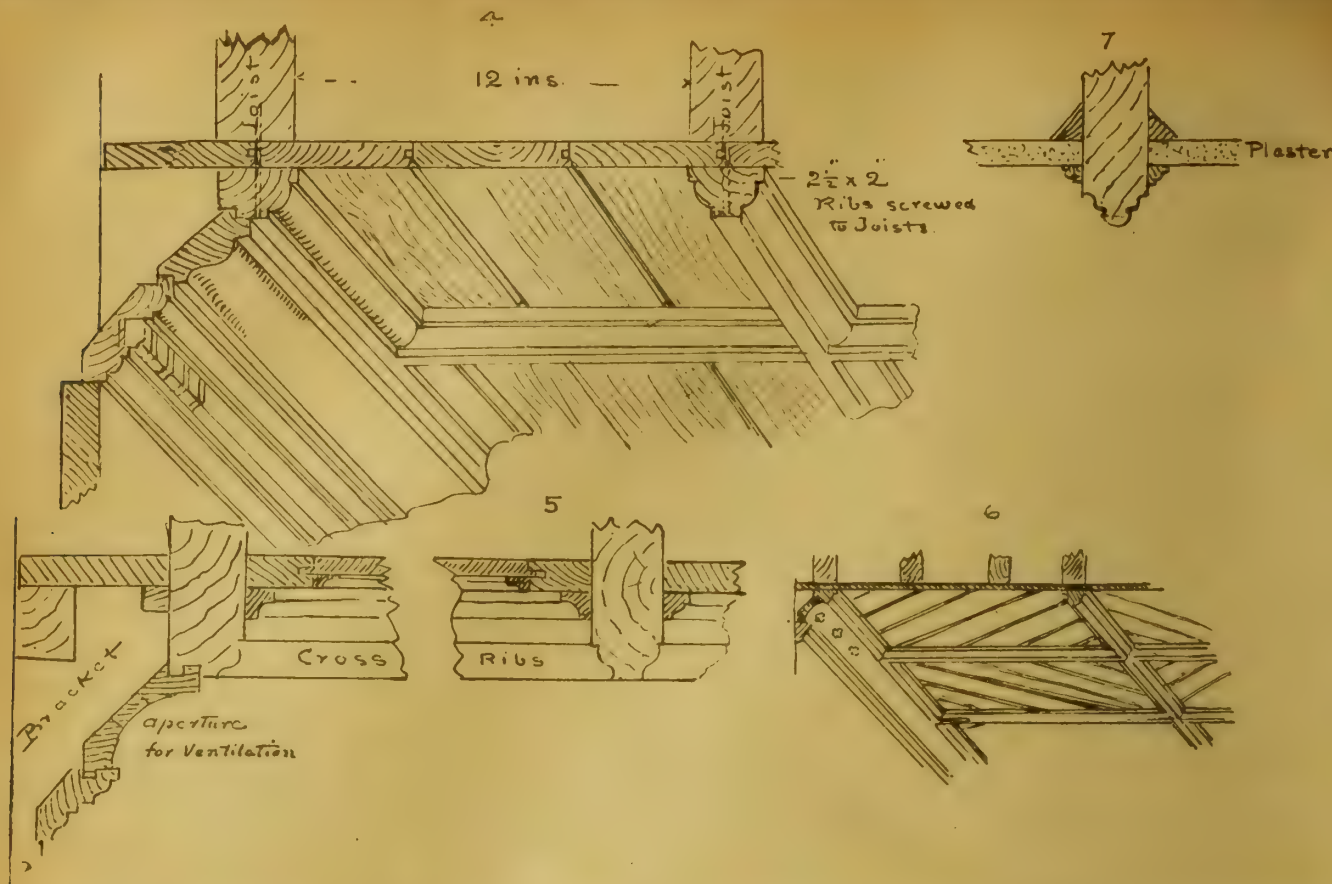
81. *Glazed Doors.*—The doors of servants' corridor or back lobby to be 2 in. (or 2½ in.) in wrought deal, square frame and moulded, three panel, with diminished stiles and rail, and filled with loose inner beads fixed with brass screws. The top panel to be glazed with ½ in. polished plate of best quality in washleather and putty. Provide a 1½ in. (or 1½ in.) bead butt (or flush), two panel square-framed movable shutter, with brass stud-plates and thumb-screw fastening; or (if glazed with leaded lights) fill in the top panel with moulded sash 2 in., or with loose beads, rebated to stiles and rails, and glaze the panel with 16 oz. muffled sheet-glass in three or more tints to design, to proper lead comes, bedded in putty, secured to framing by iron saddle bars 18 in. apart. (Various sections and sizes of lead comes for the glass are made for the different thickness of glass.)

82. *Folding Doors.*—After describing the framing of door, its thickness (2 in. or 2½ in.), if four or six panels, how many panels high, if moulded on one or both sides or bolection moulded, jamb linings, &c., as in previous clauses: continue—The doors to be hung, folding with rebated and beaded meeting stiles provided with 12 in. (or 18 in.) brass barrel (or flush) bolts (or name kind of bolt or manufacturer's name). (If there are more than two leaves, state whether 3 or 4, and the bolts and back flap hinges to the middle leaves.)

83. *Sliding Door.*—The opening between drawing-room and dining-room to have sliding doors of 2 in. deal, moulded both sides, of three panels in height to correspond with others, hung by metal suspenders to the axles of brass rollers fitted to traverse an iron rail, as shown by detail. Or—

The door between reception-rooms to be 2 in. (or 2½ in.) wrought deal, four (or six) panel, moulded both sides, sliding doors. Oak spurs, 2 ft. by 4 in., to be screwed to the outer stiles at bottom, and made to run between fillets 2 in. deep, in the wall space, as guides, and the upper stiles of door to have wrought-iron straps screwed





to them by bolts, and suspended over 4in. iron (or gunmetal) bushed wheels, two to each door. The wheels to run on a hanging-bar 3in. by 1/2in. of wrought iron rounded on top edge for wheels, and supported by three iron hangers screwed to lintel. The meeting stiles to be hollowed out (or to have a metal rebated and tongued joint screwed on). Put four brass flush handles, p.c. 3s. 6d. per pair. Or—

(Instead of suspending the doors, they may be made to run on metal runners screwed to floor, and forming a groove with wheels sunk in stiles of door, or fixed by iron straps to the door; in this case the top of door has to run in a metal groove.)

84. *Swing Shop-Doors.*—The entrance shop-door to swing both ways, and to be 2 1/2in. (or 2 1/4in.) wrought deal (or oak, or mahogany), square-framed, two (or three) panel, moulded both sides, with rounded stiles, hung folding in two halves; the lower panel bolection moulded both sides, the upper panels rebated for glass, with diminished stiles and top rails, removable moulded beads, brass cups and screws. The upper panels to be glazed with 1/2in. best British polished plated glass in putty and washleather. Each door to swing on James Hill and Co.'s (or Arch. Smith and Steven's) patent brass-cased steel spring hinges, p.c. 3s. each, and brass handles, &c., complete, to be approved. The frames to be deal or mahogany, 5in. by 4in., hollowed for doors, with cast-iron shoes, rebated for doors, and twice beaded (or moulded) and grooved for linings, with rebated, throated, and moulded on all sides transom, with moulding as per detail tongued on outside.

85. *Staircase.*—The staircase to be fitted with 1 1/2in. deal steps, with moulded nosings along front and returns; inch deal risers, and casing of steps cut as pattern, and fascia-moulded as drawing; handsome curtail step; wainscot (or mahogany) handrail moulded to detail, and turned balusters out of 2in. square, two to each step. The face of landing to have nosing and fascia to correspond with those of stairs. The soffit of stairs to be panelled with 1 1/2in. moulded framing, see detail. Or—

The staircase as above, with moulded nosings framed in to skirting and outer string, the latter wrought, moulded, and capped (see sketch) with 1 1/2in. balusters, and wainscot handrail and newels cut and moulded as shown.

86. *Principal Staircase.*—The principal staircase to have 1 1/2in. pitch pine (or wrought deal) treads, with rounded nosing and hollow moulding under same; inch risers, glued and blocked to fir carriages; the ends of steps to be housed into 1 1/2in. wall strings, and 2in. outer string-boards sunk and staff-headed, and finished at the top with a moulded

capping framed at the bottom and corners into 6in. square newels with moulded finials, bases, and pendants, as per detail to be supplied. The handrail to be moulded of mahogany, 4in. by 4in., fitted together with screws, ramped and kneed, and housed into newels, with 1 1/2in. square balusters turned according to detail.

#### THE FORTHCOMING SANITARY CONGRESS AT BIRMINGHAM.

THE seventeenth annual congress of the Sanitary Institute will be held this year in Birmingham, commencing on Tuesday, the 27th inst., and terminating on the following Saturday, October 1st. The general reception-room will be in the town-hall, and the conferences and sections will be held in the Mason University College, and the lecture to congress and the closing general meeting will also take place within the same building. The president's inaugural address and the popular lecture will be delivered in the large lecture theatre of the Birmingham and Midland Institute, and the council chamber will be used for the reception of members of the congress. The formal reception by the Lord Mayor of the members will be made at half-past twelve o'clock on the Tuesday, and in the afternoon the president (Sir Joseph Fayrer, Bart.) will deliver his inaugural address. In the evening the Lord Mayor will open the Health Exhibition at Bingley Hall. On the following day the members will devote six hours to conference work. One section, over which the Lady Mayoress will preside, will deal with "Domestic Hygiene." In the evening the Lord Mayor will give a conversazione and reception in the Council House. The sectional meetings, three in number, commence in Mason College on the Thursday. The first will be devoted to the study of "Sanitary Science and Preventive Medicine," and will be presided over by Dr. Alfred Hill (city medical officer). "Engineering and Architecture" is the title of the subject in Section II., at which Mr. W. Henman, F.R.I.B.A., of Birmingham, will preside; and in the third section discussions will take place having relation to "Physics, Chemistry, and Biology." This meeting will be held in the Biology Theatre, and the chair occupied by Dr. G. Sims Woodhead. In the afternoon the whole of the members will reassemble, and attend, at the invitation of the chairman (Alderman Cook) and members of the Health Committee of the City Corporation, a garden-party at the Botanical Gardens, Edgbaston. The same night Dr.

Christopher Childs (Lecturer on Bacteriology in Relation to Hygiene at University College, London) will deliver a lecture to the congress. On Friday, which concludes the practical part of the congress, the papers and discussions opened in the sections on the previous day will be continued. In the afternoon excursions will be made to Dudley Castle and the Wren's Nest, the Whitacre pumping-station and filter-beds, and Shustoke reservoirs and the Saltley sewage farm. The closing general meeting of the congress is arranged for five o'clock, and at half-past eight Dr. Alec. Hill (master of Downing College and Vice-Chancellor of Cambridge University) will deliver a popular lecture. The chair is to be taken by the Lord Mayor. On Saturday excursions have been arranged for Stratford-on-Avon and Warwick, Malvern, and the Croft Granite, Brick, and Concrete Co.'s Works, Leicester. At Stratford-on-Avon various places of public interest will be visited, including Shakespeare's birthplace and the Shakespeare Memorial Buildings. The journey will then be continued to Warwick Castle. The visitors to Malvern will inspect the Abbey, British Camp, sewage farms, and waterworks.

The local general committee have made arrangements that members may visit the public institutions of the city and a number of manufacturing.

#### THREE-HINGED MASONRY ARCHES; LONG SPANS ESPECIALLY CONSIDERED.\*

By DAVID A. MOLITOR, M.Am.Soc.C.E.

(Continued from p. 282.)

THE final computation is carried out in complete detail in the following tables, and all the steps in the solution of the formulas used are readily traced without any further description. The weights  $q$  are based on an assumed weight of the concrete of 2300kl. per cubic metre.

Table No. 2 gives the general data relative to dead loads, and the computation of the line of thrust for a live load of 200kl. per square metre over the entire span. This case of loading should give a line of thrust corresponding with the centre line of the arch ring.

Table No. 3 gives the computation for the values of maximum  $y$ , being the result of loading which produces the maximum compression in the intrados, and the minimum stress in the extrados.

\* Read before the American Society of Civil Engineers.



TABLE NO. 1.—PRELIMINARY INVESTIGATION. LIVE LOAD OF 400 KLS. PER METRE, AND CONCENTRATED LOAD OF 10 000 KLS.

Point.	$q$		$qr$	$\Sigma q$		$\Sigma qr$	$\frac{\Sigma qr}{\Sigma q} = b$	$c$	$a$	$\beta$	From Eqs. (32).			$S$	$N$	From Eqs. (34).			$D$	$W$	$Y$
	kls.	m.		kls.	kl. m.						H	V	$q_{max}$			H	V	$y_{min}$			
1	8 060	1 35	10 890	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2	9 120	4 2	38 304	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3	10 840	7 2	78 048	27 960	127 152	4 55	4 2	8 7	5° 40'	—	312 198	7 670	0 621	37 313	314 320	302 652	6 600	0 207	28 160	303 424	143 6
4	12 400	10 2	126 480	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5	13 700	13 2	180 840	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6	14 600	16 2	236 520	68 630	670 932	9 77	8 3	17 7	15° 10'	—	314 637	6 933	2 266	78 495	314 112	295 713	4 673	1 621	67 747	303 045	166 0
7	15 910	19 2	3 547 2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
8	17 220	22 2	3 82 254	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
9	18 120	25 2	456 624	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
10	19 080	28 2	538 056	133 990	2 353 428	16 93	13 0	29 7	26° 30'	—	317 020	6 330	6 590	150 526	350 553	287 330	2 344	6 150	143 326	321 796	150 0
11	20 320	31 2	633 984	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
12	22 810	34 2	781 128	182 150	3 768 540	20 639	—	33 0	33° 30'	—	—	—	—	—	—	—	—	—	—	—	—

$$\Sigma_0^2 q = 182 150.$$

$$S = 15 311.$$

$$\text{Constants: } \frac{S}{f} \Sigma_0^2 q = 278 890.$$

$$\frac{p l^2}{8} = 259 200.$$

$$W \left( \frac{l}{2} - 1 \right) = 350 000.$$

Case of maximum loading. Entire span covered with 400kls. per metre and 10 000kls. at the crown.

$$\text{Equation (26)— } H_{max} = \frac{S}{f} \Sigma_0^2 q + \frac{p l^2}{8} + \frac{W l}{4 f} = 322 810 \text{ kls., and } D_0 \text{ at crown} = \frac{H_{max}}{k} = \frac{3,228 \cdot 1}{40} = 80 \cdot 7 \text{ cm.} + 10 \text{ per cent.} = 88 \text{ cm.}$$

$$\text{Equation (27)— } S_{max} = \Sigma_0^2 q + \frac{p l}{2} + \frac{W}{2} = 201 550 \text{ kls.}$$

$$\text{Equation (36)— } N_{max} = H_{max} \cos. \beta_{12} + S_{max} \sin. \beta_{12} = 394 760 \text{ kls., and } D_{12} \text{ at springing} = \frac{N_{max}}{k} = \frac{3,947 \cdot 6}{40} = 98 \cdot 7 \text{ cm., or say } 106 \text{ cm.}$$

TABLE NO. 2.—GENERAL DATA RELATIVE TO DEAD LOADS AND COMPUTATION OF LINE OF THRUST FOR LIVE LOAD OF 200 KLS. PER SQUARE METRE OVER BRIDGE.

Point.	$q$	$r$	$qr$	$\Sigma q$	$\Sigma qr$	$\frac{\Sigma qr}{\Sigma q} = b$	$a$	$e$	$\beta$	$\sin. \beta$	$\cos. \beta$	$a - b$	$(a - b) \Sigma_0^2 q$	$\frac{a^2 p}{2}$	$y$
	kls.	m.	kl. m.	kls.	kl. m.	m.	m.	m.				m.	kl. m.	kl. m.	m.
1	8 800	1 35	11 880	8 800	11 880	1 35	2 7	1 4	1° 00'	0 017	0 9993	1 35	11 880	729	0 042
2	9 710	4 2	40 782	18 510	52 662	2 86	2 7	2 8	2° 50'	0 050	0 999	2 84	52 568	3 240	0 165
3	11 440	7 2	82 368	29 950	135 030	4 51	8 7	4 2	5° 10'	0 090	0 996	4 19	125 490	7 569	0 442
4	12 860	10 2	131 172	42 810	266 202	6 22	11 7	5 6	8° 10'	0 142	0 990	5 48	231 599	13 689	0 724
5	13 630	13 2	179 916	55 440	446 118	7 90	14 7	6 9	11° 10'	0 194	0 981	6 80	333 792	21 609	1 346
6	14 840	16 2	242 028	71 380	688 146	9 65	17 7	8 1	14° 00'	0 242	0 970	8 05	574 609	31 329	2 012
7	15 990	19 2	306 816	87 360	994 962	11 39	20 7	9 3	16° 50'	0 290	0 957	9 31	813 322	42 849	2 842
8	17 260	22 2	383 172	104 620	1 378 134	13 17	23 7	10 5	20° 10'	0 345	0 949	10 53	1 101 649	56 167	3 844
9	18 460	25 2	465 192	123 080	1 843 326	14 96	26 7	11 6	23° 20'	0 393	0 918	11 72	1 442 498	71 289	5 026
10	19 700	28 2	555 540	142 780	2 393 866	16 80	29 7	12 7	26° 30'	0 446	0 895	12 90	1 811 862	88 269	6 408
11	20 960	31 2	653 952	163 740	3 052 818	18 64	32 7	13 8	29° 5'	0 497	0 867	14 06	2 302 184	106 929	7 998
12	22 520	34 2	770 184	186 260	3 823 002	20 525	36 0	14 8	33° 30'	0 552	0 834	15 475	2 882 374	129 600	10 000

$$s = \frac{l}{2} - b_{12} = 15 \cdot 475.$$

Case of maximum loading, for live load,  $p = 400$  kls. per square metre over entire span, and  $W = 10 000$  kls. at crown.

$$\text{Constants— } \frac{S}{f} \Sigma_0^2 q = 288 237. \quad \frac{p l^2}{8} = 259 200. \quad W \left( \frac{l}{2} - 1 \right) = 350 000.$$

$$\text{From Equation (26)— } H_{max} = \frac{S}{f} \Sigma_0^2 q + \frac{p l^2}{8} + \frac{W l}{4 f} = 332 157 \text{ kls., from which } D_0 = \frac{3,321 \cdot 57}{40} = 83 \text{ cm. } 88 \text{ cm. was taken.}$$

$$\text{From equation (27)— } S_{max} = \Sigma_0^2 q + \frac{p l}{2} + \frac{W}{2} = 205 660 \text{ kls.}$$

$$\text{From equation (36)— } N_{max} = H_{max} \cos. \beta_{12} + S_{max} \sin. \beta_{12} = 390 543 \text{ kls., from which } D_{12} = \frac{3,905 \cdot 4}{40} = 97 \cdot 6 \text{ cm. } 106 \text{ cm. was taken.}$$

$$\text{From Equation (37)— } T = S \cos. \beta - H \sin. \beta = -11 860 \text{ kls.}$$

TABLE NO. 3.—VALUES OF  $y_{max}$ ,  $N$ , AND  $T$ .

Point.	$\frac{p e}{2 l} (l - e)$	$\frac{p e}{4 f} (l - e)$	$\frac{p l}{2} \left( \frac{l}{2} + e \right)$	$p e \left( a - \frac{e}{2} \right)$	$a V$	$(a - b) \Sigma_0^2 q$ from Table No. 2	H	$y_{max}$	$\Sigma_0^2 q$ from Table No. 2.	S	H cos. $\beta$	S sin. $\beta$	N.	T.
					kl. m.	kl. m.	kls.	m.	kls.	kls.	kls.	kls.	kls.	kls.
1	271 0	996	3 884	2 160	22 105	11 890	319 683	0 113	8 800	17 545	319 621	298	319 919	12 106
2	534 3	1 939	4 181	4 816	45 169	52 568	320 635	0 320	18 510	27 552	320 815	1 377	321 692	11 494
3	791 0	2 847	4 483	11 098	66 729	125 490	321 544	0 632	29 950	39 299	320 258	3 537	323 785	10 203
4	1 032 9	3 718	4 806	19 933	86 909	234 599	322 415	1 059	42 810	52 477	319 191	7 451	326 643	6 169
5	1 247 8	4 492	5 111	30 050	108 034	383 792	323 189	1 609	56 440	66 412	317 048	12 884	329 932	2 452
6	1 437 8	5 176	5 401	44 226	124 311	574 609	323 873	2 294	71 380	81 642	314 157	19 757	333 914	810
7	1 619 8	5 831	5 699	59 706	141 613	813 322	324 528	3 127	87 360	97 920	310 573	28 397	338 970	—
8	1 793 8	6 458	6 004	73 290	158 013	1 101 649	325 155	4 099	104 620	115 485	305 320	36 842	345 162	—
9	1 943 3	7 006	6 292	93 976	173 942	1 442 498	325 703	5 261	123 080	131 233	298 005	45 156	352 151	—
10	2 092 0	7 531	6 544	118 618	189 159	1 841 862	326 228	6 590	142 780	154 227	291 974	63 785	360 759	—
11	2 231 0	8 032	6 887	142 416	203 721	2 334 184	326 729	8 106	163 740	175 438	283 274	87 217	370 491	—
12	2 351 6	8 466	7 166	169 312	219 938	2 882 374	327 163	10 000	186 260	193 287	272 654	109 454	382 308	—

EQUATIONS USED.

$$V = \frac{1}{l} \left[ \frac{p l^2}{8} + W \left( \frac{l}{2} - 1 \right) - \frac{p e}{2} (l - e) \right] = 8 461 - \frac{p e}{2 l} (l - e)$$

$$\text{Equations (32)— } H = \frac{S}{f} \Sigma_0^2 q + \frac{1}{2 f} \left[ \frac{p l^2}{8} + W \left( \frac{l}{2} - 1 \right) + \frac{p e}{2} (l - e) \right] = 318 697 + \frac{p e}{4 f} (l - e)$$

DATA.

Values of  $a$ ,  $e$ ,  $\sin. \beta$  and  $\cos. \beta$  from Table No. 2.  
 $\frac{l}{2} = 36 \text{ m. and } f = 10 \cdot 0 \text{ m.}$

$$\text{Equation (33)— } S = \frac{p}{2 l} \left( \frac{l}{2} + e \right)^2 + \frac{W}{l} \left( \frac{l}{2} - 1 \right) + \Sigma_0^2 q.$$

$$\text{Equation (36)— } N = H \cos. \beta + S \sin. \beta.$$

$$\text{Equation (37)— } T = S \cos. \beta - H \sin. \beta.$$

$p = 400 \text{ kl. per square metre and } W = 10 000 \text{ kls.}$

$$\frac{S}{f} \Sigma_0^2 q = 288 237, \text{ and } W \left( \frac{l}{2} - 1 \right) = 4 861.$$



TABLE NO. 4.—VALUES OF  $y_{min}$ ,  $N_c$ , AND  $T_c$ .

Point.	$\frac{p}{2} \left( \frac{l}{2} - e \right)^2$	$W \left( \frac{l}{2} - a \right)$	V	H	$p(a-e)$	$\frac{p}{2} (a-e)^2$	$(a-b) \sum_0^a q$ from Table No. 2	$aV$	$y_{min}$	$\sum_0^a q$ from Table No. 2	S	H cos. $\beta$	S sin. $\beta$	$N_c$	$T_c$
			cls.	cls.			kl. m.	kl. m.	m.	cls.	cls.	cls.	cls.	cls.	cls.
1	239 432	333 000	7 950	316 839	520	338	11 880	21 465	-0.029	8 800	1 370	316 797	23	316 820	-4 016
2	220 448	303 000	7 270	314 409	1 160	1 682	52 563	41 439	+0.047	18 510	12 400	314 085	620	314 715	-3 332
3	202 248	273 000	6 690	311 999	1 800	3 872	125 490	57 420	0.231	29 950	25 150	310 751	2 263	313 014	-3 030
4	184 832	243 000	5 913	309 629	2 440	7 442	234 599	69 538	0.557	42 810	39 307	306 533	5 592	312 115	-5 053
5	169 362	213 000	5 810	307 355	3 120	12 168	333 792	78 057	1.034	56 440	54 230	301 515	10 524	312 039	6 408
6	155 682	183 000	4 704	305 171	3 840	18 432	574 609	83 261	1.670	71 380	70 518	296 016	17 085	313 081	-5 450
7	142 578	153 000	4 105	303 116	4 560	25 992	813 322	84 973	2.484	87 360	87 815	289 936	25 466	315 452	-3 885
8	130 050	123 000	3 515	300 889	5 280	34 848	1 101 649	83 305	3.500	104 620	106 385	292 535	36 703	319 238	-8 911
9	119 072	93 000	2 915	298 840	6 040	45 692	1 412 498	78 681	4.713	123 080	126 175	274 385	49 965	324 300	-2 512
10	108 578	63 000	2 343	296 816	6 800	57 800	1 841 862	70 775	6.462	142 780	147 197	265 650	65 650	331 300	-1 219
11	93 569	33 000	1 827	294 815	7 560	71 442	2 302 184	69 748	7.848	163 740	169 473	255 658	84 228	339 833	+ 410
12	89 888	030	1 218	292 731	8 480	89 888	2 882 374	44 924	10.000	186 260	193 492	244 138	106 807	350 945	- 215

EQUATIONS USED.

$$\begin{aligned} V &= \frac{1}{l} \left[ \frac{p}{2} \left( \frac{l}{2} - e \right)^2 + W \left( \frac{l}{2} - a \right) \right] \\ H &= \frac{s}{f} \sum_0^l q + \frac{1}{2f} \left[ \frac{p}{2} \left( \frac{l}{2} - e \right)^2 + W \left( \frac{l}{2} - a \right) \right] \\ y_{min} &= \frac{(a-b) \sum_0^a q - aV + \frac{p}{2} (a-e)^2}{H} \end{aligned}$$

Equation (35)—  $S = \sum_0^a q + p(a-e) - V.$

Equation (36)—  $N_c = H \cos. \beta + S \sin. \beta.$

Equation (37)—  $T_c = S \cos. \beta - H \sin. \beta.$

DATA.

Values of  $a$ ,  $e$ ,  $\sin. \beta$  and  $\cos. \beta$  are taken from Table No. 2. $\frac{l}{2} = 36$  m., and  $f = 10$  0 m. $p = 400$  cls. per square metre, and  $W = 10$  000 cls. $\frac{s}{f} \sum_0^l q = 288$  237.TABLE NO. 5.—VALUES OF  $D$ ,  $y_c$ , AND STRESS  $k$  IN THE ARCH RING.

Point.	$\Delta y$	cos. $\beta$ Table No. 2.	$e$	$N_c$ Table No. 3.	$N_c$ Table No. 4.	$N_c \left( \frac{N_c}{1 + \frac{N_c}{N_c}} \right)$	$N_c \left( \frac{N_c}{1 + \frac{N_c}{N_c}} \right)$	$N_c \left( \frac{N_c}{1 + \frac{N_c}{N_c}} \right)$	$D$	$\frac{kD}{N_c} - 1$	$w$	$y_{min}$ Table No. 4.	$y_c$	$w^1$	Unit Stresses Caused by $N_c$ .	Unit Stresses Caused by $N_i$ .
	cm.		cm.	cls.	cls.				cm.		cm.	m.	cm.	cm.	atm.	atm.
1	14.2	0.999	14.2	3 200	3 163	39.8	1 534.0	3 390.9	110.4	0.33	7.2	-0.029	0.043	7.0	+39.9	+17.50
2	27.3	0.999	27.3	3 217	3 147	39.8	1 534.0	9 519.2	129.8	0.65	14.1	+0.047	0.188	13.2	+8.45	+9.67
3	40.1	0.996	40.1	3 238	3 130	39.8	1 584.0	9 575.8	145.4	0.86	20.8	0.231	0.440	19.3	+3.00	+2.21
4	50.2	0.990	50.1	3 266	3 121	39.9	1 592.0	11 993.9	156.4	1.00	26.1	0.557	0.820	24.0	+0.06	+1.67
5	57.5	0.981	56.4	3 299	3 123	40.1	1 605.1	13 569.8	163.3	1.10	29.9	1.034	1.339	26.5	-1.89	+0.53
6	62.4	0.970	60.5	3 339	3 131	40.4	1 632.2	14 665.2	167.7	1.15	32.5	1.670	2.002	28.3	-2.80	-0.20
7	63.8	0.957	61.1	3 330	3 154	40.8	1 664.6	14 957.3	169.7	1.15	32.5	2.484	2.828	28.6	-2.80	-0.20
8	59.9	0.939	56.2	3 452	3 192	41.4	1 714.0	13 950.1	166.6	1.09	30.3	3.500	3.833	25.9	-1.72	+1.44
9	54.8	0.918	50.3	3 522	3 243	42.2	1 780.8	12 735.9	162.7	1.01	27.3	4.713	5.010	23.0	-0.14	+3.24
10	42.8	0.895	38.3	3 698	3 313	43.2	1 866.2	9 927.4	151.8	0.83	21.0	6.162	6.397	17.3	+3.61	+7.60
11	25.8	0.867	23.4	3 705	3 393	44.3	1 962.5	5 953.9	133.3	0.57	12.7	7.848	7.994	9.8	+10.97	+15.57
12	00.	0.834	00	3 823	3 509	—	—	—	—	—	0.0	0.000	10.000	0.0	—	—

EQUATIONS USED.

$$\Delta = y_{max} - y_{min} \quad e = \Delta y \cos. \beta.$$

Equation (40)—  $D = \sqrt[6]{\frac{N_c}{k \left( 1 + \frac{N_c}{N_c} \right)}} + \left[ \frac{N_c}{k \left( 1 + \frac{N_c}{N_c} \right)} \right] + \frac{N_c}{k \left( 1 + \frac{N_c}{N_c} \right)}$

Equation (41)—  $w = \frac{D}{6} \left( \frac{kD}{N_c} - 1 \right)$

Equation (42)—  $y_c = y_{min} + \frac{w}{\cos. \beta}$

Equation (39)—  $k_1 = \frac{N}{D} \left( 1 - \frac{6w}{D} \right)$  and  $k_2 = \frac{N}{D} \left( 1 + \frac{6w}{D} \right)$

The values of  $N_i$  and  $N_c$  in the above table are given for an arch 1 cm. wide, thus giving unit stresses in atmospheres of 1 kl. per cm.<sup>2</sup> to  $k_i$  and  $k_c$ . $w$  = distance from the point of application of  $N_c$  to the arch centre line. $w^1 = e - w$  = distance from the point of application  $N_i$  to the arch centre line. $y_c$  = ordinate of the arch centre line. $k$  = allowable unit stress on the extreme fibre.

40 = atm. in compression; 2 atm. in tension

(See also Fig. 16.)

The pressure on the abutment foundation is given on Plate XLVI.

TABLE NO. 6.—CHANGE IN LENGTH OF THE ARCH RING.

Point.	$\sum_0^a q$ from Table No. 2.	$ap$	S	H cos. $\beta$	S sin. $\beta$	N	F	L	$\frac{N}{F}$	$\frac{NL}{F}$	$\frac{NL}{F} \left( \frac{1}{E} + \frac{1}{E'} \right)$	L ( $\epsilon + \alpha t$ )	$\Delta L$
	cls.	kl. m.	cls.	cls.	cls.	cls.	cm. <sup>2</sup>	cm.	atm.		cm.	cm.	cm.
0	000	0	0	301 197	000	301 197	9 360	135	32.2	4 347	-0.0162	-0.1499	-0.1661
1	8 800	540	9 340	301 137	159	301 296	11 040	285	27.3	7 780	-0.0290	-0.3163	-0.3453
2	18 510	1 140	19 650	301 983	983	301 879	12 950	300	23.3	6 990	-0.0265	-0.3330	-0.3590
3	29 950	1 740	31 690	299 993	2 852	302 845	14 580	301	20.8	6 261	-0.0233	-0.3341	-0.3574
4	42 810	2 340	45 150	293 185	6 411	304 596	15 640	304	19.5	5 928	-0.0221	-0.3374	-0.3595
5	56 440	2 940	59 380	295 474	11 520	306 994	16 330	306	18.8	5 733	-0.0214	-0.3397	-0.3611
6	71 380	3 540	74 920	292 161	18 131	310 292	16 800	309	18.5	5 717	-0.0213	-0.3430	-0.3643
7	87 360	4 140	91 500	283 246	26 535	314 781	16 970	314	18.5	5 869	-0.0216	-0.3485	-0.3701
8	104 620	4 740	109 360	272 824	37 729	320 553	16 660	319	19.2	6 125	-0.0228	-0.3511	-0.3769
9	123 080	5 340	128 420	276 499	50 854	327 353	16 270	325	20.1	6 532	-0.0243	-0.3537	-0.3850
10	142 780	5 940	148 720	269 571	66 329	333 900	15 180	333	22.1	7 359	-0.0274	-0.3696	-0.3970
11	163 740	6 540	170 280	261 188	84 629	345 767	13 330	342	26.9	9 270	-0.0342	-0.3796	-0.4138
12	186 260	7 200	193 460	251 198	106 790	357 953	11 280	216	31.7	6 817	-0.0255	-0.2393	-0.2653

Average = 23 0.

Equation (26)—  $H = \frac{s}{f} \sum_0^l q + \frac{p}{8f} = 301$  197 cls.

Equation (27)—  $S = \sum_0^a q + ap.$

EQUATIONS USED.

Equation (36)—  $N = H \cos. \beta + S \sin. \beta.$

Equation (46)—  $\Delta L = - \frac{NL}{F} \left( \frac{1}{E} + \frac{1}{E'} \right) - L (\epsilon + \alpha t)$

Total  $\delta = 4$  5203.



Table No. 4 gives the computation for the values of minimum  $y$ , being the result of loading which produces the maximum compression in the extrados and the minimum stress in the intrados.

Table No. 5 gives the computation of the thickness of the arch rings at the several points selected, also of the ordinates of the centre line, and the unit stresses in the extreme fibres of the arch ring. See Plate XLVI. for graphical representation.

(To be concluded.)

## SUBSTITUTES USED IN THE PAINT TRADE.

CHEMISTRY has many sins—commercial—to answer for, not least of which are the numerous “make-believes” or substitutes for the old-fashioned genuine article. Thus we have not only the genuine turps, but also turpentine substitutes, which the manufacturers unblushingly claim to be “just as good.” Also we have rosin oils pushed forward instead of “honest linseed”; we have varnishes made of colophony (a residuum left after distilling turpentine), and many other substitutes offered in place of the genuine article. The chief claim they possess on attention is their low price compared with the article they are asserted to replace; but although “cheap in price,” they are “dear in quality,” for, notwithstanding the bold claims of their purveyors, all such substitutes are not only *not* “just as good,” but fifty times inferior to the genuine article. It is not the writer's intention in the present paper to go into details concerning all the articles that are put forward in the paint trade as “substitutes,” but simply to confine himself, in the present paper at least, to giving instructions for preparing a useful

### DRIER OR SICCATIVE FOR OIL AND PAINT.

The old form of patent drier consisted of compounds of lead and linseed-oil, which were prepared by heating the ingredients together for seven hours. Thus litharge, or oxide of lead, was heated with burned oil until the mixture was of a thick, varnish-like consistency or paste form. Modern-day chemistry, however, shows us a much better way of producing a more efficient form of “drier” for paints and oils. The compound above referred to is essentially a *linoleate of lead*, or lead “soap”; but we now know that linoleates of other metals, such as of manganese, also act the part of a “drier” to oil and paint. We also know that resinsates likewise tend to dry paint and oil very rapidly.

To the uninitiated it is as well to say that a “linoleate” is a combination of the linoleic acid of the oil with a metal, while a “resinate” is a compound of rosin or resin which has been liquefied by boiling with an alkali, and then reprecipitating from the alkaline solution with a metallic salt, whereas the resin and metal combine to form a “resinate.”

Many painters do not understand the true action of a “drier.” They know their function is to cause the paint to dry at a quicker rate than it would otherwise do; but the actual chemical and physical changes are brought about by the mixture of a drier with a paint. These changes are as follows:—“Driers” are compounds rich in oxygen, and their chief function appears to be a catalytic one, whereby they impart oxygen to the fatty acids of the oil vehicle in a paint so as to convert such oil into a tough, hard skin (oxidised linseed-oil) which envelops the particles of pigment and so incloses them in an impenetrable coat or pellicle of the oil vehicle, the pigment and oil forming a “coat” of paint. By catalytic action is meant a parting with oxygen out of its own body and a reabsorption of oxygen from the air. Drying-oils become dry (*i.e.*, hardened) by absorbing oxygen from the air when exposed thereto; but the rate of absorption is so slow that it would take many paints several weeks to dry and become hard if it were not for the “driers” that has been added to them. Litharge, oxide of zinc, sulphate of manganese, and borate of manganese are all bodies which exhibit this catalytic action when they are mixed up with a drying oil, and consequently these bodies have been used as components of “driers”; but this general method of incorporation with an oil to give a drying compound was to boil or heat the metallic salt with linseed-oil until a thick viscid mass was produced.

By the following method, however, much

better drying compounds can be produced than what can be obtained by the more antiquated methods, as the production of drying components for paint are very simple and easy. Every painter should be able to make his own, and thus not only save his pocket and be independent of the paint manufacturers, but also he would know exactly the nature of the composition of the compound he is using.

**Linoleate Driers.**—Make linseed-oil into a soap by boiling 100 parts, fluid measure, of linseed-oil with 84 parts of a soda lye of 30° Bé. (a weaker solution of the soda lye may be used, but the quantity required would be greater—viz., 110 parts of a lye 25° Bé., 143 parts of a lye 20°, and 287 parts of a lye of 10° Bé.) To the liquid soap thus made (linseed-oil will not make a hard, solid soap) add a saturated solution of sugar of lead or chloride of manganese, collect the precipitated linoleate by filtering the mixture through flannel filtering bags. Wash once or twice with water, and dry the linoleate in hot air, or the linoleate may be melted by heat.

Lead linoleate contains from 20 to 22 per cent. of lead oxide, while manganese linoleate contains only 9 to 11 per cent. When properly made, these linoleates should be soluble in chloroform. To use these linoleates, heat linseed-oil to 300° Fahr., and for every gallon of oil add 5lb of the linoleate drier, and stir until dissolved. The solution thus made is added to the bulk of oil used, heating the latter from 230° to 250° Fahr., the quantity used being proportionate to the drying qualities required in the paint.

Drying oil prepared as above is much better for paint-mixing than “boiled” oil. Much of the cheaper qualities of “boiled oil,” so-called, is simply bung oil—that is, it has not been boiled at all, but simply put into a barrel, in the bung-hole of which is suspended a bag containing resin, which dissolves in the oil and renders it somewhat of a drying nature, and thicker in consistency. It is needless to say that “bung oils” are poor substitutes for the properly prepared drying oil.

Resinsates as driers for paints are made by one or other of the following methods:—

First method:—Melt common rosin or colophony at a gentle heat, or else make a mixture of common rosin and kauri gum and melt them together by heat, and while this is kept at a melting heat, stir in 10 per cent. of litharge (percentage by weight) or 5 per cent. of oxide of manganese, and continue the beating until all the metallic salts have become dissolved. If these amounts of oxide be exceeded the salt will not dissolve to unite with the rosin, but remain mixed therewith in the free state, and consequently be at liberty to injuriously affect any pigment mixed with the drier; moreover, any excess of the metallic oxide will remain insoluble in the paint, varnish, or oil with which such resinate drier is mixed; but against these facts should be set that the larger the amount of lead oxide present in the resinate the quicker will it act as a drier, and less will therefore be required to be mixed with a paint or varnish. Sometimes the amount present of the oxide is 10 per cent. of manganese oxide and 20 to 25 per cent. of lead oxide.

Second method of making resinsates:—Make a solution of caustic soda in water, and while boiling hot put in as much rosin as will dissolve in the caustic liquid; then add to the hot compound a hot saturated solution of lead acetate for a resinate of lead, or else a hot saturated solution of chloride or sulphate of manganese for producing a resinate of manganese. On mixing in these metallic solutions, the resinsates will be thrown up to the top of the compound as curdy masses. Skim off these, or filter the solution and wash with water and dry. To use the powders thus obtained, they are dissolved in the oil by heat, their solubility in oil being greater in proportion to their freedom from water; 15 to 20 per cent. of lead oxide and 10 per cent. of manganese oxide is usually present in these resinsates.

A third kind of resinate is obtained by mixing solutions of the metallic salts (lead and manganese), and then adding the mixture to the alkaline solution of rosin. By this means a mixed resinate containing 7 to 9 per cent. of lead and from 1½ to 2 per cent. of manganese oxides are obtained.

When either resinsates or linoleates have been used as driers of oils, varnishes or paints, the operator will not care to go back to the use of the cumbersome “patent driers” compound, or anything of that sort.

H. C. STANDAGE.

## THE RESTORATION OF SELBY ABBEY.

ALTHOUGH the question of cost has given a pause to the movement for completing the restoration of Selby Abbey, “the most perfectly preserved specimen of a monastic church in Yorkshire,” a good deal of interest continues to be taken in the famous edifice by the general public. With reference to a new edition of “The Story of Selby Abbey,” now in preparation, the author has received from Mr. J. Oldrid Scott, F.S.A., the architect for the restoration, the following letter:—

“It is very hard to know what to write about Selby, as your book is so complete, and the quotations from my father seem everything that is required. I feel strongly that the restoration of the central tower and south transept are urgently needed, as they are at present a serious disfigurement to the exterior. The poor design of the tower is quite out of harmony with the beautiful building, and it is in such a dilapidated condition that some steps are necessary even for security. The tower has from the first suffered from the subsidence caused by the subsoil and foundations being unequal to the weight placed on them, and the arches abutting on the tower began to settle at a very early date. They are very much out of shape from the unequal settlement, and unhappily the evil is not now at an end. In designing the upper part of the tower care was taken to make the walls hollow, and as far as possible, to lighten the whole structure; but it would be a wise course to remedy once for all the cause of the mischief by putting in a new foundation below the four great piers which carry the tower. This would be a difficult and costly work; but it is quite practicable, and the cost should not be grudged where one of the very finest of the Yorkshire abbeys is in peril. The design of the upper part was founded on an old engraving made before the fall of the tower. The absence of the south transept is a great blot on the beauty of the exterior, and there cannot be any doubt that the building would gain largely in appearance if it were added.”

The fine Norman nave of Selby Abbey was restored in 1871 under the direction of Sir Gilbert Scott, and Mr. Oldrid Scott superintended the restoration of the choir about eight years ago. The nave was declared by the late Lord Leighton to be the most exquisite specimen of Norman architecture that he knew; and Sir Gilbert Scott wrote of the choir that it would be difficult to find an example of the Decorated style more perfect than at Selby. The cost of the further work is estimated at £10,000.

## ACCIDENTS WITH GAS.\*

THE records of the coroners' offices in every large city show each year a list of fatalities due to the use of illuminating or fuel gas in buildings. The thirteenth annual report of the Board of Gas and Electric Light Commissioners of the Commonwealth of Massachusetts, published in January, 1898, enumerates one hundred and five instances of gas-escapes which happened during the year 1897, and which caused the death of 60 persons and injury to 74 others. A few of these cases were due to intended suicide, but the larger number were clearly accidents. The casualties occurring in other States are undoubtedly equally large in proportion, and perhaps even exceed the above figures in the case of seaboard cities, where a vast number of immigrants land every year, many of whom are not familiar with the management of gas.

As is well known, many gas companies now manufacture water-gas, which they enrich with naphtha. This gas contains a much larger percentage of carbonic oxide than coal-gas, and since carbonic oxide forms the principal poisonous constituent of illuminating gas, a greater number of fatalities result in those cities where water-gas is used. The percentage of carbonic oxide in gas varies from 6 per cent. in coal-gas to as much as 25 per cent. in water-gas. Carbonic oxide is strictly odourless, and therefore pure water-gas would be a very dangerous gas to use. Fortunately, it cannot, *per se*, be used for lighting purposes, and must be mixed, or “enriched” with coal-gas or naphtha to make it suitable for illumination. This admixture imparts to the gas the peculiar, strong and pungent odour, by means of which it is readily detected, when it escapes unburned in even small quantities. Notwithstanding this fact, the many accidents point to the necessity of diligent care in the use of gas-fittings and fittings, emphasise the need of popular instruction in the management of gas, and tend to show that an official supervision of gas-piping and gas-fittings in all classes of buildings would be as desirable as the official regulation of plumbing and drainage now enforced in a large number of cities.

Illuminating gas (both coal and water-gas)

\* By WILLIAM PAUL GERHARD, C.E., of New York, in the *American Architect*.



possesses another quality, making it dangerous under certain conditions—i.e., when mixed in certain proportion with atmospheric air (from 13 to 20 per cent.) it becomes a highly explosive compound. Ignorance of this fact is a prolific source of accidents and explosions. When gas escapes, it is imperative that one should not search for the leak with an open light. Yet, even the employés of gas companies frequently come to grief by a disregard of this simple rule.

Similar severe accidents happen when an escape of gas occurs in the cellar of a building, or when a gas-meter springs a leak. In all such cases the safe rule to follow is never to search for the leak with an open flame or lantern, or to strike a match near the gas-meter, or even to handle any tool or instrument which may cause a flying spark.

Many a case of gas asphyxiation arises from the ignorance of persons who have never used gas before. Immigrants and travellers from remote country towns are victims in a large percentage of these cases. Persons who have never lighted a gas-flame before in their lives are apt, upon retiring at night, to blow out the flame in the same way that they would a candle or oil-lamp, and the next morning they are found asphyxiated in their beds. Intoxicated persons sometimes commit the same fatal mistake.

The Massachusetts Board of Gas and Electric Light Commissioners considered several expedients to guard against this accident. They suggested that a legislative Act might be passed requiring in the sleeping-rooms of cheap hotels and lodging-houses the use of some kind of gas-burner from which gas cannot escape except when lighted. At last year's Gas Exhibition in New York several inventions tending to accomplish this object were shown, and types of gas-burners are now manufactured which automatically shut off the supply of gas if the burner is blown out, either by design or by accident, as, for instance, from a draught of air passing over a flame while it has been turned down low. The danger in relying upon such safety-burners arises from the fact that these appliances may not always prove to be reliable and durable, and may refuse to work at the proper moment. It is not denied, however, that it is within the range of mechanical possibility to construct a device of this kind which would be simple, safe, durable, and at all times efficient, and encouragement should be offered to inventors of this line of appliances.

Another frequent source of accident by asphyxiation is found in gas-keys which are worn out and have become so loose that they turn easily. It frequently happens with such fittings that, upon retiring for the night, persons turn out the gas, and accidentally or carelessly reopen the burner partly, though enough to cause a dangerous escape of gas. Many cases of fatalities recorded in statistics are due to this cause. The remedy is too obvious to require any further description.

Other accidents arise from fixtures defective by reason of the stop-pin being either absent (so-called "all-round keys," which persons unconsciously may turn too far), or because of its having fallen out. Such old-fashioned fixtures are, unfortunately, often to be found in hotels and lodging-houses. Years ago, the author suggested that the use of such dangerous fixtures should be prohibited by legislative act. The law should also provide for an efficient inspection of the gas-fixtures in hotels, lodging-houses, and similar buildings. The above-named commission proposed, as a further safeguard, a law prohibiting the use of gas in sleeping-rooms containing less than a definite number of cubic feet.

Fatal accidents occur through the stupid custom, still existing in some hotels, of turning off the gas at night from the bedrooms. Occupants often leave their gas-flame turned down low on retiring, and, by reason of the practice mentioned, the flame becomes extinguished without the burner-cock being turned off. When the gas is again turned on, early in the morning, it escapes through the partly-open burner and asphyxiates the occupants before they awaken. This bad practice is not confined to hotels and lodging-houses only, but also occurs in boarding-schools, and in apartment and dwelling-houses. Equally bad is the practice of turning off the gas at the main service during the day, as it leads to similar dangers, by reason of people leaving gas-cocks open when they attempt to light the gas early in the evening, before it has been turned on at the meter.

Gas explosions may also occur when the meter

is frozen and attempts are made to thaw the same out with a heat of flame.

A much more serious matter is the frequent escape of gas into houses from breaks or leaks in the street mains. These escapes may occur into houses which are not provided with a gas service. As long as the pungent odour of the gas warns the occupants of the leak danger of accident may be averted. Unfortunately, the gas, after filtering through the soil, sometimes loses its peculiar odour, and cases of whole families being asphyxiated from the escape of gas are by no means uncommon. Very often escapes of gas merely cause sickness or headache and, the true cause not being at once apparent, the gas company is not notified and the leaks are not immediately repaired. Such escapes are particularly dangerous in winter time when, by reason of being heated, the houses act like huge chimneys in drawing up the gas-polluted air. Where the street surface is paved with impermeable pavements, like asphalt, and in winter, when street surfaces are frozen hard, the escape into the interior of houses is much more likely to occur than where the pavement is an old-fashioned, loosely-jointed, cobblestone pavement. The report referred to states that from 1889-1896 13 cases occurred of this kind, in which 75 persons were rendered unconscious.

Finally, the air of houses may be continuously contaminated by slight escapes due to leaky house gas-pipes, or to defective fixtures, loose bracket-joints, or worn-out gas-keys. The leaks may be so slight as to be hardly noticeable. In many cases of headaches, languor, nausea, drowsiness, prostration, or loss of consciousness the cause is to be sought in a slight escape of gas. The public are generally inclined to attribute such illness to "sewer gas" entering the house through defective plumbing, and the true cause is seldom thought of. A writer in a recent issue of the *New York Evening Post* speaks about the danger as follows:—

"A frequent cause of neuralgia and headaches is the poison of illuminating gas. When the house is supplied with what is known as 'water-gas' a recurrence of such maladies should prompt a very careful investigation of the fixtures. Water-gas contains a poison of admitted virulence, and the fact that it is colourless, tasteless, and odourless makes its power for evil the greater. Absolutely tight fixtures are the only protection. . . . Periodical examination is essential, for what seems secure to-day may be insecure to-morrow. Old fixtures are likely to be loose in screws and joints, the thread of the thumb-screw may be worn out and turn at a touch to let the poison escape, with no one the wiser; or in moving furniture the arm of a chandelier or side bracket may be wrenched enough to permit its escape. A safe plan is to have each fixture put through what is called the pressure test. This properly done by a good plumber will show quickly any defects or chances for leakage."

Not long ago the writer had in his own house a case in point. When the gas-lights were lit in the evening a peculiar odour arose, which caused severe headache, but for which the reason could not be immediately ascertained, as the odour ceased completely in daytime, when the gas-fixtures were turned off. The house gas-pipes were tested and found in a tight condition. The gas-fixtures also showed no leaks. The gas company was sent for to clean out the main service, it having occurred to the writer that an accumulation of naphthalene in the meter or the house pipes or the service might cause the gas when burning to smell as it did. The service was thoroughly cleaned out, the meter was removed, emptied, and cleaned, the house pipes were blown out by means of a pressure-pump, but all to no avail; the odour returned in the evening when the lights were burning. After much searching, the cause was at last found in slight leaks at the burner joints, which permitted an escape of unburned gas whenever the keys were open and the flames lit. These joints were made tight with white lead, and the odour immediately ceased.

In the statistics of gas accidents other less frequent causes appear, among which I mention the following:—

(a) Fixtures of gas and electric lights so constructed that the gas-key might be accidentally turned in the dark instead of the electric key.

(b) Gas escapes from the gas cooking-stove by means of the water boiling over and extinguishing the gas-flame.

(c) The breeze from an open window blowing out a gas-flame which has been turned down low,

the gas then escaping unburned and causing an accident.

(d) A flame turned down low for the night being extinguished by a sudden reduction in the gas pressure.

(e) The connecting rubber hose of a gas heating stove becoming either loose in the joint or completely detached and causing an escape of unburned gas.

(f) Two gas-keys, one for light, the other for a gas stove, being placed so near together that one might be mistaken for the other and turned unintentionally.

(g) The tubing of a gas chandelier or other fixture becoming split and permitting escapes of gas.

(h) Disarranged electric gas-lighting fittings intended by the pulling of a chain to open a valve, letting out the gas, and at the same time light it by a spark.

(i) Finally, gas leaks may cause headaches and loss of consciousness where gas escapes from the rubber-hose connection to a table gas-lamp.

The majority of cases quoted are clearly due to lack of reasonable and ordinary care on the part of the consumers of gas. What is needed are plain instructions to users, and emphasis should be laid on the fact that, unless burned, illuminating gas is a highly dangerous substance, and that due care is required in its use. The danger of asphyxiation is somewhat greater where water-gas is manufactured and distributed, for reasons explained above.

It is not the intention of the writer to create a prejudice by these notes against the use of lighting gas or gaseous fuel, for, as long as it is confined in tight pipes, gas is perfectly harmless, and if burned properly or used with reasonable care, there is not the slightest danger connected with its use. Even the fire risk is comparatively small. Statistics gathered by German fire insurance companies show that in the five years from 1881-1885 only 14.7 per cent. of the fires caused by lighting were due to gas, whereas 85.3 per cent. were due to the use of kerosene and oil lamps. In 1892, 1,089 fires arose from kerosene and oil, and only 80 fires from gas.

#### FIREPROOF CONSTRUCTION.

HOW to render buildings proof against the destructive agency of fire is a rather hackneyed subject. Much has been written on the question and many theories broached; but the suggestions have in many cases proved impracticable or too expensive for ordinary buildings and dwellings. How few of our houses are fire-resisting! Certain regulations as to party-walls, parapets, thickness of flues, the distance of flues from woodwork, and the like have minimised the risk of a serious fire in our streets; but they have done nothing to make each building, as far as possible, indestructible by fire. A writer in the *Engineering Magazine*, Mr. Francis C. Moore, lately referred to some very necessary precautions, such as the construction of chimneys, fireplaces, hearths, and the like. Our American friends are remiss in these matters. Dwelling-houses of wood are the rule, and in many cases the fireplaces and chimneys, though built of brick or masonry, are not constructed with sufficient care. The writer affirms that 80 per cent. of the fires in dwellings throughout the United States are unsafe, being only 4½ in. or a half-brick thick, and he suggests that where the walls round the smoke-flue are less than 8 in. thick, they should be lined with burned-clay flue lining. The ordinary well-burned drain-pipe makes a good flue lining. All flues not so lined ought to have struck joints, no pargetting being allowed. Another precaution which we in England have long considered essential is a safe distance of all timbers and woodwork from any smoke or heat-flue; that no timbers, &c., should come within 9 in., or a brick, of any flue. According to statistics of fires in the United States, more than 20 per cent. of the fires occurring are due to defective flues. The rules as to chimneys in the London Building Act are numerous and precise. They are to be built of brick, stone, or other incombustible materials, the bend of any flue is not to be at a less angle than 45° to the horizontal; it is not to be used in connection with a steam-boiler or hot-air engine, unless the flue is at least 20 ft. in height from level of floor on which engine is placed; the inside of every flue is to be rendered, pargetted or lined with piping; the jambs are to be at least 8½ in. wide on each side



of opening, the backs are to be the same thickness, the shaft is to be carried up at least 3ft. above the roof or gutter. As to timber or wood-work, the rules require that those materials are not to be placed in any wall or chimney-breast nearer than 12in. to the inside of any flue or chimney-opening within 10in. from the upper side of hearth of such opening, or within 2in. from the face of brickwork about any chimney or flue where its substance is less than 8in., unless the face of the brickwork is rendered; and wooden plugs are not to be driven nearer than 6in. to the inside of any flue or opening. Mr. Moore observes that no floor timbers or other woodwork should come within 8in. of the inside of any flue or within 2in. of the outside of such flue. This rule would prevent any wooden plug or wedge being driven into the joints of the brickwork. As to hearths, they should be supported on trimmer arches filled up with concrete as a bedding to the hearth. The back hearth of ground floor has an ash dump, which allows the ashes to be swept down an ash chute to a grated opening in basement for removal of the refuse. A section is given showing this construction; the contraction of throat of flue by a "sailing" over of the brickwork. Here a 9in. breast is shown and a 9in. back. Another point insisted on is that all chimneys should be built from the ground, and all floor timbers should be trimmed clear of the hearths and brickwork, so as not to be in contact with it at any point.

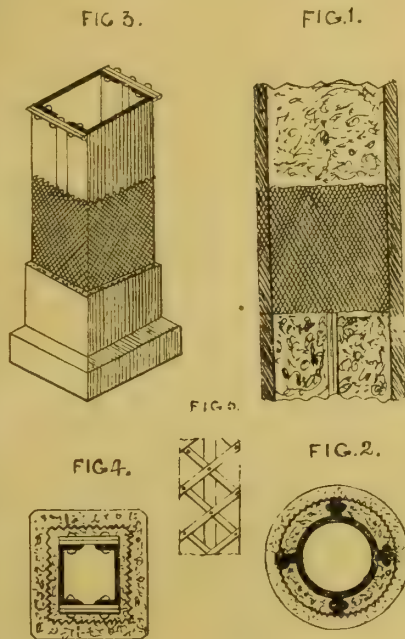
Another useful preventive against fire spreading from room to room, especially in frame buildings, where hollow partitions are adopted, is to fill in at each floor all spaces between the studs with incombustible material—the author says bricks and mortar to the height of about a foot; but we think slag-wool would be quite as effective. Another thing condemned is battening outer walls for plastering, which leaves an air-space through which flames may ascend to the upper stories; but the New York Building Law provides that in all fired walls above and below each tier of floor-beams a course of bricks is to project to cut off the communication.

In a specification of chimney construction, the author says all flues are to have a capacity of 8in. by 12in. All hearths are to have trimmer arches extending 20in. from chimney-breast. No doubt if these precautions were observed, a large percentage of fires would be prevented; and if we were to construct our floors and staircases of concrete and iron or steel, a still greater immunity would be the result.

#### FIREPROOF CASINGS FOR COLUMNS AND GIRDERS.

ALTHOUGH the employment of iron and steel columns, girders, and joists has completely ousted the old style of timber construction, now restricted to ordinary dwelling-houses and small inferior buildings, yet the new-comers cannot claim to be altogether free from some of the disadvantages which attended their prototypes. Similarly to them, they are exposed, although not to the same extent, to the risks and dangers of fire, and numerous have been the protective processes and the ingenious devices and methods brought forward from time to time to render them invulnerable to the action of the devouring element. While the people of all civilised countries have contributed their share towards the solution of this important problem, yet there is no doubt that the Americans have been foremost in pushing the matter to a really practical issue. The erection of their mammoth buildings or "sky-scrapers," in which timber is almost wholly and totally superseded by iron and steel, rendered it imperative that the metal columns, joists, girders, and the floors and ceilings should be made fireproof. In other words, the conductivity of the constructive parts of these gigantic structures, with their almost endless tiers of stories, was to be either annihilated or nullified, which was best accomplished by encasing them in isolating and incombustible envelopes. For this purpose, among other materials, expanded metal, termed by the French engineers *metal déployé*, has been found to afford excellent results. It is used in connection with concrete, cement, and various descriptions of stucco plaster and other wall facings, according to the particular requirements of each special case. We shall now proceed to give an example or two of the method by which it is frequently applied at home, on the Continent, and in America.

In Figs. 1 and 2 are shown a plan and a sectional elevation of an ordinary Phoenix column rendered fireproof in the manner to be described. This particular pattern of column has not been selected on account of it possessing any especial superiority over other forms, but simply for the purpose of illustrating the use of the process. As a matter of fact, there are several objections raised against the Phoenix column. One is that it is a closed column, and that when once erected it is impossible to get at the interior, scrape away the rust, and repaint it, or recast it with some protective solution. The same well-known objection has been made against box girders, but practically it is, in both instances, of very little importance, and far more specious than real. In common, however, with all columns of a cylindrical section, it is not an easy matter to make



connections and attachments to it, nor to rivet or bolt up horizontal and diagonal bracing between a pair of columns. It is no doubt principally for this reason that square, rectangular, and polygonal columns have been of late years so largely adopted. Nevertheless, the Phoenix form is employed, especially in America, to a very great extent in bridges, for the support of roofs, and for iron piers and viaducts. The process of encasement commences by encircling with a covering of expanded metal the exterior surface of the column outside the flanges, as shown in Fig. 2, and filling the annular spaces with some description of concrete grouting, which need not be of a superior character. Upon the exposed surface of the expanded metal is spread a fairly thick coating or layer of some one or other incombustible mixture, in which asbestos frequently plays a prominent part, and upon which ordinary mouldings, arrises, and panels can be worked.

Another example of the same fireproof casing is represented in elevation, cross-section and plan in Figs. 3—5, in which the column is rectangular in form, and built up of a pair of channel steels, braced together by diagonal bars on two of its sides. The bars should be placed sufficiently closely together as to act as lathing for the concrete layer placed between the expanded metal and the column itself. In any case, even if some of the grouting did drop into the interior of the column, it would be of no consequence.

In instances in which joists and girders are rendered fireproof there is frequently, for the purpose of ventilation, a clear space left between them and the expanded metal, and the latter is attached to small cramps, knees, brackets, and other pieces of iron fastened to the parts to be protected. The facility with which expanded metal can be applied to almost every form and section of iron and steel, whether rolled or built up, endows it with some advantages not possessed by other systems of fireproof casings. Whether the *metal déployé* will become a prominent feature in the construction of large concrete arches designed upon the Monier principle, it would be somewhat premature just at present to venture to

predict. It has, however, been successfully adopted in concrete arches of comparatively small spans, and is unquestionably well adapted for the purpose we have described and illustrated. It may be mentioned that recently a manufactory has been established at Saint-Denis for the sole production of expanded metal. T. C.

#### HARDWOOD FLOORS.\*

THE selection of flooring requires intimate knowledge of the fibres, grains, and colours of the various woods; even the different characteristics assumed at the various times and conditions of growth; the colours, as new lumber, sun and kiln dried, and in wearing old age; the usage to which it is to be put must be a prime factor; its price and the ease of obtaining it must not be ignored.

About a dozen families of trees give nearly all the flooring. The two hard pines (*Pinus rigida* and *Pinus resinosa*) known in lumber-yards as Georgia, Carolina, or Southern are more trod upon in America than any other wood. From them come the oil of turpentine and rosin of commerce, by "boxing" the trees, blazing with a cup-shaped hollow at the bottom of the blaze in which the crude resin accumulates. From this the oil is distilled, and the residue refined into the clear amber rosin. Contrary to general belief, boxing adds to rather than detracts from the value of the wood. By extracting the sap year after year the growth is retarded, and the grain made more compact, finer, and harder. Consumptives seek the piney woods to gain the delicious aroma arising partly from the increased ozone, as well as delight in the dry pine straw upon which to ramble and to loiter—the laziest, most delightful of occupations.

Boards for flooring should be selected entirely from the hearts of old trees. This will cost when laid about five cents to the square foot; it is of a light straw-colour and takes on an excellent polish, is hard but elastic, and makes a good floor for dancing; its unfortunate feature is its proneness to sliver; this can largely be obviated by the way in which it is laid.

White-wood or bass (*Tilia glabra* of Europe and *Tilia Americana* of this country) and ash (*Fraxinus excelsior* of Europe and *Fraxinus Americana*) cost about the same as the above, but neither is worth considering. The wood is soft, is not pretty, slivers readily, and does not keep its shape under atmospheric changes.

Oak (*Quercus alba*, *Q. rubra* and *Q. virens*) markets at about the same figure, and either one of the three mentioned varieties makes an excellent floor. The red oaks, unfortunately, are the ones generally selected. The wood from them makes the homeliest and roughest of the oak floors; the grain is the coarsest, and they stand moisture least well. However, remember that we are comparing oak with oak, and no oak floor is to be lightly condemned. The so-called Spanish oak is the best of the red oaks. It grows in all the lower Allegheny regions. The live-oaks and post-oaks make light-coloured, hard, easily-polished timber. But the white oak stands head and shoulders above all the others. It is the lightest in colour, hardest, grained closest, and is susceptible of the highest polish; from this comes the finest of the old English black-oak furniture: it withstands alike all climates.

Birch (*Betula alba* and *B. papyracea*) makes an entirely satisfactory floor for dancing, as well as for kindred uses. It is easily brought to a smooth surface and a fine polish, is of a rich amber colour of an even shade, and, in addition, has that rare elasticity and resiliency that make it alike delightful for walking and dancing. It costs about ten cents laid, and is in no way a disappointment to those using it.

What is said of birch applies equally well to hard maple (*Acer rubrum* and *A. dasycarpum*), both the white and red varieties, the white being that chosen for floors, it being the lightest coloured of the wood so used. It is very hard, takes readily a fine polish; the boards are not liable to warp, but, unfortunately, require the very closest care in the drying to prevent shrinkage when laid. It is lasting, and is but little affected by water. Only beech, hickory, and white oak approach it in lightness of colour. Hickory (*Carya alba* and *C. glabra* and *C. amara*) has too sterling qualities, generally appreciated, to need detailed discussion of its intrinsic worth, yet it is

\* Contributed to the *American Architect* by EDGAR J. SPRAYLING, B.Sc., M.D.



sadly neglected when the question of flooring is under consideration; perhaps that is due to the difficulty with which it is laid. It is an open-grain wood, but takes polish with ease. From the various trees of the *Carya alba* is obtained the hickory nuts of commerce; while the *Carya glabra* yields the so-called pig-nuts, and the *Carya amara* gives only a small bitter nut that is all but worthless.

Beech (*Fagus sylvatica* of Europe and *F. ferruginea* of America) makes almost an ideal floor, light-coloured and hard, and has the rare quality of wearing smoother with age; at times it is found beautifully bird's-eyed. In the Southern States it grows in the greatest profusion in the swamps and lower woods, but is unappreciated, only enough being preserved for use in making plane-stocks and other tools requiring a hard, durable wood that does not shrink, warp, or split. It could be laid for ten cents. And along with it goes apple (*Pyrus malus*), which polishes to a rich, delicate amber colour; the cost is about the same as beech, but the apple-wood has the tremendous disadvantage of not being obtainable in large boards.

The cherry-woods, especially the *Prunus Pennsylvanica* (red) and the *P. serotina* (black) are esteemed highly in cabinetmaking, and are equally beautiful and desirable for flooring. The garden cherry, *P. cerasus*, is often used as a cheaper substitute, but can be readily detected by the odour and taste, as well as by the general appearance. This is not an ideal wood for dancing floors, but for dining-rooms it cannot be excelled. Both the red and black varieties are beautifully grained, and often can be found curled, and even bird's-eyed; neither of these could be laid for less than 15 to 18 cents a foot. To properly select the boards, and lay the body of the straight-grained and the border of the curled, nothing could make a prettier floor.

The walnuts are about the same price and wearing value. The black walnuts (*Juglans nigra* of America and *J. regia* of Europe) are the ones best known to cabinet makers, they being also the hardest and most durable of them, as well as of the richest and darkest colours, that being too well known to require comment. The lighter walnuts, among them the butternuts, have many admirable qualities, and by some persons are chosen for that reason. But of course the general appearance and desirability of the real black walnut cannot be imitated, certainly not excelled, by any wood except mahogany (*Swietenia mahogani*), which, being about 100 ft. a foot, is excluded from the consideration of most persons, and so comment would be needless—except to say that it lacks that elasticity and resiliency so desirable in a floor for dancing.

The uses, the furnishing, and the window-space of a room should therefore determine the kind of wood to be used.

The laying requires not only a good carpenter, but an expert judge of woods, and of the individual boards, because only by carefully selecting and placing like planks can we get a permanently even surface. Suppose a plank of heart and one of sap should be placed side by side: no matter what the wood, when a rainy season may come the sap will swell more and rise above the heart. Even when they come from like relative positions in two like trees their texture may differ so widely as to make them undesirable companions. In spite of the nicest workmanship and the best judgment in selecting, some inequalities of surface will be present till removed by the most thorough sandpapering. This should be done with enough care to avoid scratching; then comes the polishing.

It must be remembered that not a drop of water has touched the wood since it left the saw-mill, and none must touch it until demanded by soiling incidentally to daily use; or, more strictly speaking, none should ever get nearer the wood than the polishing covering it. After the floor is perfectly smooth and free from all stains or dust spots the following mixture should be applied hot:—4oz. of English rosin, 12oz. paraffin, 1 gallon turpentine. This mixture will make a solution only under heat, and should be applied to the floor as hot as possible with a cloth or brush, or, better still, a felt applicator. After standing a few hours, it should be briskly rubbed with a felt or woollen rubber, and is then ready for use. This protects the wood from water, or whatever else may fall upon it, and also fills-in the pores, thus preventing shrinking, which is a very important factor in keeping a smooth floor.

When the floor becomes soiled a warm soap-

suds should be the only agent used in cleansing it, then, after allowing it to air well, reapply the above polish. Ordinarily it should be cleaned of dust each day by dry soft cloths, and gone over with a rubber once a week.

No oil or other grease should, under any circumstances, be put on a floor, no matter what the wood, or what the conditions.

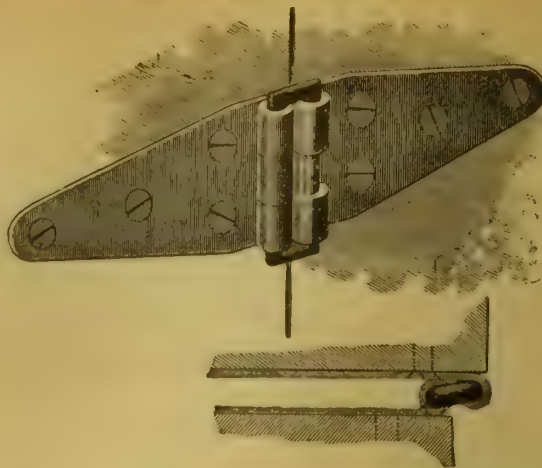
#### OBITUARY.

DR. JOHN HOPKINSON, F.R.S., D.Sc., the well-known electrical and mechanical engineer, who, together with his son and two daughters, was killed on Saturday by a fall down a precipice while ascending the Dent Veisivi in the Canton Valais, was the eldest son of Alderman Hopkinson, an ex-Mayor of Manchester, and was a brother of Professor Alfred Hopkinson, who lately resigned his seat in Parliament for the Cricklade Division of Wilts to become principal of Owens College. Dr. Hopkinson was educated at Lindow Grove School and Queenwood College, and in his sixteenth year went to Owens College. He afterwards went up to Trinity College, Cambridge, and was Senior Wrangler and first Smith's prizeman in 1871, being appointed fellow and tutor of his college. He paid special attention to lighthouse machinery, in which he introduced many improvements, particularly the group flashing apparatus. After residing in Birmingham for some years as engineer to Messrs. Chance and Co., he removed to London and practised as an electrical engineer. He introduced the method now in common use of depicting certain phenomena by means of characteristic curves. Dr. Hopkinson also presented valuable papers to the Royal Society on electrostatics and magnetism, and he also read papers on technical subjects before the Institutions of Civil Engineers and Electrical Engineers. In 1890 one of the Royal Society's medals was awarded to him, and he was also elected president of the Institution of Electrical Engineers. He was Professor of Electrical Engineering at King's College, London.

On Sunday two stained-glass windows, which have been placed in Sandal Church in memory of the late Captain Beverley, were formally dedicated. One of the windows represents the Good Shepherd, and the other the Woman at the Well of Samaria.

The renovation of Archbishop Chichele's tomb, on the north side of the choir of Canterbury Cathedral, which has been in the hands of Mr. C. E. Kempe for some months, is now complete. The tomb was erected by Archbishop Chichele during his own lifetime, and the statutes of All Souls' require that the monument shall be renovated every fifty years, at the expense of the warden and fellows. The figures of the Apostles, which for a long period stood in the angles of the monument, have been placed in the niches in the choir screen, which it is thought was their original position, and from which they were probably removed for safety at the time when the cathedral was damaged by the Puritans.

The Rev. B. Doyley Aplin, the rector of the parish, directs attention to the serious condition of the Norman tower of the church of Aston-le-Walls. Part of the south-west corner has already come down, and a further portion may be expected to fall during the winter if the weather should be severe. An estimated sum of £800 is required to prevent this valuable specimen of early architecture from falling into a ruinous state.



#### A PATENTED HINGE.

THE hinge shown in the illustrations has been patented in the United States by Mr. J. J. Farrars, of Rapid City, South Dakota. While preserving simplicity of construction, and therefore not increasing the cost of production, the patentee claims an advantage in the way of strength for both butt and strap hinges. It will be seen that a double line is employed. One strap is provided with three knuckles, the middle one extending beyond the other two. The companion strap has an upper and lower knuckle, which, when the parts of the hinge are assembled, receive between them and align with the central projecting knuckle of the other strap. The legs of a double or link-pintle pass through the registering knuckles of both straps or butts. With this construction each strap has virtually an independent pintle and a plurality of knuckles; yet both straps are so connected by the same pintle that they will work freely. By thus distributing the strain at the knuckles, it is claimed, greater strength will result without increasing the bulk or cost. The centre of the hinge shifts round when the door swings, and by making the knuckles perfectly round, the straps can fold back close together.

#### CHIPS.

A public hall is about to be built at Pitlochry, N.B., from plans by Mr. Alexander Ness, of Nethryle, Dundee, selected in competition. The estimate is about £2,500.

The Rev. Stuart Sim writes from Lower Brixham Vicarage, Devon, with reference to the plan for rebuilding Lower Brixham Church in memory of the Rev. Henry Francis Lyte, formerly vicar of the parish and author of the well-known hymn "Abide with Me," stating that £350 has now been received towards the £4,000 required, and that it has been decided to proceed with the new roof at once, hoping that before it becomes necessary to take away the scaffolding sufficient money will have come in to justify the committee in beginning to build the tower also.

The public electric light installation works for Peterborough have been started, so far as the foundations are concerned, on a site in the Albert-place Meadow, adjoining both the River Nene and the Great Northern Railway. At present, however, the full plans for the superstructure, by Mr. J. O. Gill, C.E., the borough electrical engineer, are not quite completed. The scheme, nevertheless, having been generally approved by the Local Government Board, it only remains for the engineer's plans to be passed by the corporation and the construction thrown open to competition by tender.

The Lords of the Committee of Council on Education have received a request, on behalf of the Hungarian Government, for a selection of works for which awards have been made in the National Competition of this year, to be sent on loan, at the expense of the Hungarian Government, for exhibition in the new Industrial Art Museum at Buda-Pest, and their lordships have promised to afford every facility. The Schools of Art are being asked to state in each case whether works may be sent.

At Grassendale on Friday an inquiry was held by Colonel W. R. Slacks, R.E., on behalf of the Local Government Board, into the application of the Garston Urban District Council for sanction to borrow £25,000 for the purpose of erecting a refuse destructor and electric lighting station on land adjoining the public offices at Grassendale. Mr. F. H. Medhurst, B.Sc., consulting engineer, London, who had prepared the designs for the proposed works, explained that the destructor would be of the most modern type, on the forced draught principle. Considerable opposition was raised to the proposal.



## Building Intelligence.

**ACTON, CHESTER.**—The parish church of Acton, near Nantwich, was reopened, after restoration, from plans by Messrs. Austin and Paley, of Lancaster, on Thursday in last week. The work has included the removal of the wall of the north aisle, which was in great danger of falling, the laying of new foundations, the erection of a heating chamber and apparatus, and the rebuilding of the wall exactly as it had been in former times. For the debased brick-lined clerestories of 1757 have been substituted new walls and windows. The plaster ceilings and worn-out lead have been removed, and the present fine oak and leaden roofs have been erected in their place. The entire site has been dug out to the depth of a foot, and the space filled with concrete cement and asphalt, in which the present paving and wooden blocks have been laid. The columns and walls have been restored, and the north-east pier of the tower, which was in danger, has been strengthened by pouring in gallons of liquid cement. The old square pews have disappeared, and their places are taken by oak seats. A new pulpit has also been provided, and other improvements included the erection of new porches and external doors, and the introduction of rug-seating and kneelers throughout the church. These works have been carried out at the cost of Mr. Sutton Timmis. Lord Tollemache, the lay rector, has defrayed the expense of restoring the chancel. An oak roof covered with stone flags has been put in, and the lath and plaster disfigurements on the walls have been removed, and the walls repaired and cleaned. The floor has been filled with cement and asphalt and relaid in the style of the floor in the nave, and the Jacobean woodwork, which was introduced in 1660, at the time of the restoration by the Wilbraham family, has been all cleaned and remade. The restoration of the chancel has cost about £1,500. A new organ chamber has been erected at a cost of £250, borne by Mr. H. J. Tollemache, M.P., and the organ has been replaced with a new one, at a cost of £519. Amongst a number of gifts which have been made to the church are an altar-cloth, an oak eagle lectern, an olive-wood alms-dish, the ancient font of the first church, probably of Saxon work, restored from Dorford, a Baskerville folio Bible, and a candelabrum.

**DEWSBURY.**—Joiners, bricklayers, slaters, and plumbers are better employed at Dewsbury than they have been for a few years past, chiefly because of the demand for new shops and offices, consequent on the carrying out of street improvements by the corporation, who have spent much money in widening thoroughfares and in providing a site for a market. The works in hand include new wings for the Dewsbury and District Technical School, and the Masonic Temple, Halifax-road; new shops and offices in Corporation-street, Northgate, and Union-street; new premises for the London and Yorkshire Banking Company, and additions to and alteration of the West Riding Union Bank at the east end of the Market-place. A covered arcade is also being provided, the building of villas is going forward on the Carrett estate, near the infirmary, and something is being done to improve old Westgate by the re-erection of a building there.

**LEITH.**—The ceremony of laying the last brick on the top of the new chimney in connection with the electric-lighting station, now in course of erection at Junction-street, Leith, was performed on Friday by Bailie Manclark, convener of the Electric Lighting Committee of the Leith Town Council. Among those present were Mr. W. Bryson, electrical engineer for the corporation, and Mr. H. Simpson, architect. Bailie Manclark was presented, on behalf of the builders, Messrs. Kinneir, Moodie, and Co., with a silver trowel. The chimney is 155ft. in height, 18ft. in diameter at the base, and 12ft. in diameter at the top, with an internal diameter of 8ft. 3in. at the bottom and 9ft. 3in. at the top. There is an internal shaft of firebrick to the height of 100ft., built entirely independent of the outer walls of the chimney, having a space of 10ft. all round.

**MANCHESTER.**—A conventual chapel, also for the use of an orphanage, the memorial-stone of which was laid by the Bishop of Salford last month, is approaching completion in the grounds of the orphanage conducted by the Sisters of Charity of the Order of St. Vincent de Paul, in Victoria Park, Manchester. It is 90ft. long by

30ft. wide, in one span. An arched ambulatory surrounds the sanctuary, thus throwing up into relief the altar. The work is 14th-Century French in style, with traceried windows. The east end is apsidal; the roof hammer-beam, with pierced panelling. Messrs. Wilson and Toft, of Manchester, are the contractors, and Mr. W. H. Rawle is the architect.

**NEWCASTLE - UNDER - LYME.**—The Ebenezer New Connexion Sunday-schools are being rebuilt at a cost of £2,000, and memorial-stones have just been laid. The schools were first erected in 1803, an enlargement being necessary ten years later. In 1822 the schools were rebuilt, and were again enlarged in 1850. The present scheme consists of a remodelling of the Marsh-street lecture-hall (formerly the chapel of the denomination) and the girls' schools. Externally, the old lecture hall is not much altered, but a new ceiling and roof have been provided. The old gallery and orchestra are removed and two stories formed, the assembly-room, which is 59ft. by 35ft., being on the upper floor, and the lower part is occupied by five class-rooms for boys, entered from a corridor 7ft. wide. Accommodation is here found for 190 scholars. The girls' school, with the exception of a portion of the front wall, has been pulled down and rebuilt. It has five classrooms on the ground floor, and two larger rooms separated by sliding doors upstairs, accommodation being supplied for 245 girls and infants. The school front will be finished in cement. Kitchen accommodation is arranged for, and the heating is by high-pressure hot-water pipes. Mr. J. Lewis, architect, Newcastle, has designed and is superintending the improvements, and the builder is Mr. J. Bagnall, of Fenton.

**RUSHTON, STAFFS.**—The opening services in connection with the internal restoration of the church of St. Lawrence, Rushton, took place on Sunday in last week. The high-backed pews and flagged floor have been taken out and the church refitted with Kauri-pine seats, while the flags have been replaced with a wood-block floor, which is laid upon a concrete and cement foundation. The pulpit has been removed from the south to the north side of the entrance to the chancel, and the organ has been taken from the chancel to the old site of the pulpit. A wooden lectern in harmony with the pulpit is another addition. The seating accommodation is for about 250. The bases of the old wooden pillars have been supported by stone facings, the chancel decorated with draperies, and new kneelers have been supplied all through the church. The path through the churchyard has been flagged with the stones taken from the inside of the church, and a gravestone, bearing date 1610, has been placed at the entrance to the church. Mr. J. W. Critchlow, of Leek, has been the architect, and Mr. Thos. Grace the contractor, Mr. E. Phillips, of Leek, carrying out the decoration.

**SOUTH SHIELDS.**—A Unionist club in Catherine-street was opened on Wednesday week by the Marquis of Londonderry. It is four stories in height, buff terracotta being used up to the first floor, with deep red bricks and terracotta windows above. The approach from the street is through a high vaulted lobby to the entrance-hall, and beyond a wide staircase leads to the floors above. On the right of the entrance-hall is the reading-room, and facing this is a smoke-room, with a buffet bar in dark mahogany with glazed screens; in the rear are the cloak-room and lavatories, with walls of glazed bricks. The first floor is utilised entirely as a billiard-room, and contains two of Burroughes and Watts' tables, and one of another make. Above this there is a smoking and assembly room covering the entire area of the second floor, but which can be divided into three smaller rooms by collapsible partitions. A lift runs from the buffet on the ground floor to the top of the building. The top floor is set apart for the caretaker's residence, while the basement is utilised as cellars. The building has been fitted throughout with gas and the electric light, and in addition to the steamcoils and radiators for heating there are fireplaces in all the rooms. The total cost of the building has been £5,000. Mr. J. H. Morton, of South Shields, is the architect.

**TYNEMOUTH LIGHTHOUSE.**—On Wednesday night, for the first time for about three centuries, no light was exhibited at Tynemouth Castle point; but in its stead a fresh flash-light was shown from a new tower just built on the islet of St. Mary, off Curry Point, 3½ miles to the northwards. The existing four-sided lighthouse tower, about to be demolished, was erected in 1777, and

is a familiar landmark at the mouth of the Tyne. The new tower on St. Mary's Isle is cylindrical in form, and 120ft. in height; it is surmounted by a dioptric illuminating apparatus, showing two powerful flashes in quick succession every 20 seconds, the intensity of each flash at full power being calculated as 121,500 candles. The illuminant is mineral oil, burning in a lamp with five concentric wicks. The system of group flashing is that invented by the late Dr. John Hopkinson, whose recent tragic death is referred to in another column. The huge structure of glass and gunmetal, weighing about 3½ tons, is caused to revolve in a circular trough of mercury, the mercury necessary for floating this great weight being only 7cwt. 2qr. 10lb. Friction is thus reduced to a minimum, and the apparatus can be rotated by a push of the finger, when its own momentum will carry it round two or three times. The light in clear weather should be visible 17 miles. The manufacturers of the optical apparatus are Messrs. Chance Brothers and Co., Ltd., of Birmingham. At the formal inauguration on Wednesday night the Elder Brethren of Trinity were accompanied by Lord Rayleigh, the scientific adviser to the Trinity House, and Mr. Thomas Matthews, the corporation's engineer-in-chief, under whose supervision the entire work has been carried out in accordance with his own designs.

**TRURO.**—The annual report of Truro Cathedral Union, which has just been issued, states that during the past year the south-east transept has been enriched by the gift of stained glass, filling the great four lancet windows and the rose window above them, presented by Dame Eliza Truscott, in memory of her husband, Sir F. Truscott, Knt., who, as Lord Mayor of London, was present at the laying of the foundation stones of the cathedral. The subjects of the window are "The Adoration of the Magi," and other scenes from the life of Our Lord. In the north choir-aisle two windows have been filled with stained glass in memory of his mother by Mr. Robert Harvey. The figures in the upper portion of the windows, illustrative of the history of the Church in the 3rd century and first years of the fourth, are those of SS. Cyprian, Perpetua, and Lawrence in one light, and SS. Alban, Catharine, and Pancras in the other. The scenes are the Martyrdom of St. Cyprian and of St. Alban. One more window only remains to be filled in the north choir aisle, and it is hoped that it may shortly be possible to do this in memory of the late Mrs. Benney. The parish church (St. Mary's Aisle) is about to be enriched with a stained window in memory of the late Mr. William Barret, and a wrought-iron screen, according to Mr. J. L. Pearson's original design, will be shortly placed along the arcade. Two brasses, one in memory of Mrs. John H. Vivian and the other in memory of brothers and sisters of Mr. Robert Harvey, have been placed in the cathedral. The memorial proposed to be erected to the late primate by the clergy ordained by him at Truro and Canterbury is still uncompleted. A "family brass," in which the armorial decorations are well executed, has been placed in the "Benson transept" by Mr. A. C. Benson, who has also intrusted to the keeping of the dean and chapter the finely-cut seals used by Dr. Benson as Bishop of Truro and as Archbishop of Canterbury, with other objects of interest belonging to him. From the late primate's papers Mr. Benson has also sent several documents of interest and value relating to the cathedral and diocese, which have been deposited among the chapter muniments. A carved faldstool, in memory of the late Rev. J. M. Humphrey, will shortly be placed in the north choir aisle.

The managers of the Central London District Schools have adopted plans by Messrs. J. T. Newman and Jacques, of Fen-court, E.C., for infants' school buildings, to be added to their existing schools at Hanwell.

The new organ which has been erected in the Jubilee Primitive Methodist Chapel, Tunstall, was opened on Thursday afternoon in last week. Many of the pipes of the old organ have been utilised in the present instrument, the cost of which has thereby been brought down to £600. The builders are Messrs. Laycock and Bannister, of Cross Hills, near Keighley. The case is of pitch-pine, stained and varnished, and is relieved by overhanging towers of pipes decorated in colours and gold, and supported by carved trusses. The organ contains three manuals and pedal board, with a total of 44 stops and 2,050 pipes.



## Engineering Notes.

**GRANGEMOUTH, N.B.** The directors of the Caledonian Railway Company are about to enlarge their docks at Grangemouth to three times their present dimensions. The contractors are Messrs. Charles Brand and Son, who also carried out the enlargement of the existing docks between 1877 and 1882. For the present extension the plans have been prepared by the company's consulting engineer, Sir John Wolfe Barry, K.C.B. The new dock will be situated between the old dock and the Forth, and will occupy the foreshore lying to the south of the river Carron. In the existing eastern channel there will be a large canting basin. Above the new dock a fresh western channel will be made, giving access from the new dock to the old docks. The first operation to be performed in the construction of the dock will be the excavation of the dry material lying to the west above high-water mark, and the driving of an embankment around the whole of the space to be reclaimed from the firth, and which will be occupied by the channels, canting basins, and sidings. When the tide has been thus excluded, and the impounded water pumped out, the building of the dock walls and the entrance channel will be commenced. On each side of the entrance to the Forth a series of concrete monoliths will be placed and sunk to a depth of from 40ft. to 50ft. These monoliths will be rectangular in shape, of varying lengths up to about 40ft. and about 20ft. in width. In constructing these monoliths a steel shoe with cutting edges is first placed on the surface, a piled platform having been previously erected. Two iron screw rods are then fastened to the shoe, and a brick curb having been built inside the shoe a little above the level of the steel sides, the screws are brought into use for the purpose of lowering the steel shoe into the layer of mud forming the upper surface of the bed of the Forth. The operation is continued by removing the earth inside, and as the steel shoe gradually sinks, concrete walls are built, the concrete being poured in a plastic state. This process goes on gradually, and the screw rods in the mean time maintain the connection between the steel shoe and the brick curb and the concrete of which the monoliths are composed, and also prevent them from going off the line either laterally or vertically. The entrance to the channel at the sea end will be trumpet-mouthed. The same method will be followed in the construction of the inverts of the locks. The quay walls will be composed either of concrete or rubble masonry, and the total quantity of concrete and rubble to be used, including the concrete in the monoliths, will amount to from 300,000 to 400,000 cubic yards. The material for the concrete will be procured from the slag heaps at Carron Ironworks. Similar slag was employed in the construction of the first dock formed by the Caledonian Company, and has proved satisfactory. After the dock walls are formed the interior excavations will be begun, the earthwork being removed partly by steam navvies and partly by dredging. The total quantity of earthwork to be thus disposed of will be from 3,000,000 to 4,000,000 cubic yards. The coping and ashlar for machinery beds, roller paths, ashlar pointings, square quoins, hollow quoins, sills, caisson sills, &c., will be of granite, of which material about 120,000 cubic feet will be employed. Altogether the dock will contain between 32 and 33 acres of water space. The whole of the earth to be excavated will be needed for raising the ground about the dock to the level of the coping of the dock walls. Around the reclaimed ground an embankment will be raised at the eastern end. The work of making the dock will be begun forthwith, and it is expected to be completed in about four years.

**THE SIMPLON TUNNEL.**—The third great tunnel through the Alps, that under the Simplon Pass, which has just been commenced, will form the most direct communication between Berne, Lausanne, and Geneva to Domo d'Assola, Milan, and the North of Italy, and it has the advantage of being on a low level. Whilst the altitude of the St. Gothard tunnel is 3,789ft. above the sea and that of the Mont Cenis is 4,247ft., the Simplon is only 2,312ft. The approach on the Swiss side will be on the present level of, and at a short distance from, the end of the existing sidings at Brieg Station in the Rhone Valley, the present terminus of the Jura-Simplon Railway. The Italian terminus will be at Iselle.

The maximum gradient will be 1 in 140, and the work will consist of two parallel tunnels—each for one pair of rails—at a distance apart of about 50ft. The length of the tunnel will be 12½ miles as against the 9½ miles of the St. Gothard and the nearly 8 miles of the Mont Cenis tunnel. The contract for the construction of the tunnel—exclusive of land—is about £2,800,000, and the time in which it has to be completed is five and a half years. The contractors are Messrs. Brandt, Brandau, and Co., of Hamburg, with whom is associated Colonel Locher, of Zurich.

### CHIPS.

The mountain railway extension from Zermatt to the Gorner Grät was formally opened last week.

The maximum economy of metal in a plate girder exists, says J. A. L. Waddell in *Indian Engineering*, when the weight of the flanges is equal to the weight of the web with its stiffening. As for the question of deflection, there is no need of figuring on it at all, because any depth of web that will involve the greatest economy of metal in the girder will provide ample stiffness.

Eighty-seven lots of building land at Clacton-on-Sea were offered for sale by auction last week, by instruction of the trustees of the will of the late Mr. C. G. Round. The estate is at the west end of Clacton close to the town and pier. Seventy-nine lots were sold and realised upwards of £15,000.

The parish schools at Bredgar, Kent, are about to be enlarged. Mr. W. L. Grant, M.S.A., of Sittingbourne, is the architect, and the contract has been taken by Mr. Bowles, of Malton-next-Sittingbourne.

The Local Government Board have sanctioned the proposal of the March Urban District Council to borrow £2,600, for providing additional market accommodation. The buildings will comprise a corn-exchange, offices, and a clock tower, and will be erected on the Market-place.

A new parish hall at Lumphanan, near Aberdeen, built at a cost of £700, and accommodating 50 persons, was opened on Friday. The hall has been built from designs by Mr. George Spark, Lumphanan, clerk to the parish council. The contractors were:—masons, Messrs. David Calder and Co., builders, Aboyne; carpenter, Mr. W. G. McRobbie, Lumphanan; slaters, Messrs. Robert Wright and Sons, Aboyne; plasterer, Mr. George Merson, Banchoy; plumber, Messrs. Thomas Davidson and Company, Banchoy.

On Wednesday week Dr. Wheaton, Local Government Board Inspector, held an inquiry at Oulton into the application of the rural district council for Mutford and Lthingland for a loan of £2,700 for an infectious hospital.

Mr. W. E. O. Meade-King, Local Government Board Inspector, held an inquiry at Ashford, East Kent, on Wednesday week, with regard to the application of the urban district council for permission to raise loans of £14,000 for alterations, extensions, and improvements at the gasworks, and of £2,785 for the purchase of the recreation ground.

Tron Parish Church, Glasgow, a plain structure, rebuilt in 1792 after destruction by fire, and which has been closed since the beginning of July for repairs and redecoration, was reopened on Sunday.

The memorial stones of a new Baptist chapel were laid in Manor Court-row, Nuneaton, yesterday (Tuesday). The building will be Gothic in type, and will accommodate 890 persons. Mr. John Wills, of Derby, is the architect, and the cost of chapel and site will be £5,000.

The Wesleyan Chapel at Friskney, Lincolnshire, was reopened last week after renovation. The work was carried out by Mr. J. Richardson, of Leake.

A three-light window in the north aisle of Uppingham Parish Church has just been filled with stained glass representing incidents in the life of Dorcas. The window was designed and executed by Mr. T. F. Curtis, of the firm of Messrs. Ward and Hughes, Frith-street, Soho-square, W.

Messrs. Morrison, Ingram, and Co., Ltd., have just completed additions which have been in hand for nearly 12 months at their Midway Pottery Works, Swadlincote, Derbyshire. These extensions, and the equipment of the works with up-to-date machinery, will enable the firm to double this branch of their business. The patterns have practically all been remodelled, and a number of new designs added.

The improvement committee of the Manchester Corporation have passed the plans for the new Midland Railway Hotel, which is to be erected on the Concert Hall site. The elevations to Windmill-street and Lower Mosley-street were not presented, but the committee had before them the other plans in detail, including that for the new concert-hall which forms part of the company's scheme.

## PROFESSIONAL AND TRADE SOCIETIES.

**LEEDS MASTER BUILDERS' ASSOCIATION.**—The annual meeting and excursion of the members of this association took place on August 26 at Studley Royal. The gathering was held in the picturesque ruins of Fountains Abbey. Mr. W. Nicholson, the retiring president, occupied the chair. The annual report, submitted by Mr. Ernest Schofield (hon. secretary), stated that the membership of the association had doubled since 1896. Notices for alteration of rules had been received from the masons and joiners, but amicable settlements had been arrived at in both instances by agreeing to have a standing committee. Notice, however, must be given in November, so that the arrangement might be properly entered in the rules. The statement of accounts showed a balance in hand of £31 2s. 7d. The chairman, in moving the adoption of the report, said that certain modifications had been made in the rules, one of which was the formation of a standing committee to settle all disputes: with a 49½ hours' working week. The joint standing committee were empowered to settle all threatened strikes or lockouts. The last year had been a rather eventful one for the building trade, as it had seen the passing of the Workmen's Compensation Act, a measure which pressed heavily upon them. To meet this Act the builders had an insurance society, which was steadily increasing in membership. The position taken up by the labour party had forced the employers to form a federation for their own protection and for the benefit of the trade, but not for the purpose of fighting the men. Mr. W. Irwin seconded the motion, which was adopted. Mr. Walker, of Armley, was elected president for the ensuing year, Mr. W. H. Daws vice-president, Mr. W. C. Eliason permanent secretary, and Messrs. Myers, Pickard, Irwin, Nicholson, Atkinson, Rhodes, Umpleby, and Schofield, the committee, with Messrs. Season and Umpleby as auditors.

**SANITARY ASSOCIATION OF SCOTLAND.**—The annual congress of the Sanitary Association of Scotland will be held next week in Rothessay. Opening on the evening of Wednesday next, the 7th inst., with the annual business meeting, the congress will extend over three days. On Thursday, after the presidential address has been delivered, a paper will be read, and a discussion will take place on the vaccination question, and in the evening the annual dinner of the association will take place. On Friday a paper will be read on "Women as Sanitary Workers," by Dr. Elsie Maud Inglis, Edinburgh, and a discussion will take place on the amendment of the Food and Drugs Act; and in the afternoon Mr. A. MacKay Trotter, Glasgow, will read a paper on the "Housing of Cattle." Thereafter there will be a sail round the Island of Bute, and next day the congress proceedings will be brought to a close by a garden-party at Mount Stuart House, on the invitation of Lord and Lady Bute.

**SOMERSETSHIRE ARCHÆOLOGICAL SOCIETY.**—The fiftieth annual meeting of this society is being held at Taunton this week, under the presidency of Mr. E. J. Stanley, and under the patronage of the Earl of Cork (lord-lieutenant of the county) and the Right Hon. Richard Paget (chairman of the county council). At noon on Tuesday the society was received at the Municipal Hall by the mayor of the borough (Alderman Potter), after which the annual general meeting was held, and the president delivered his address. The mayor invited the members to luncheon at the Castle Hall, and in the afternoon visits were paid to the castle, municipal buildings, St. Mary's Church, St. James's Church, Priory Barn, and other places of interest, these visits being followed by meetings for the reading and discussion of papers. As a memorial of the jubilee of the society it has been decided to raise a fund for the restoration of the hall of Taunton Castle, the home of the society's museum. Excursions to localities of interest took place on Wednesday and yesterday, and the proceedings will be concluded to-day (Friday).

The King's Head Inn, at Enfield, is about to be rebuilt from plans by Messrs. Shoebridge and Rising.

The foundation-stone of a new Presbyterian church and hall was laid at Haltwhistle on Wednesday week. The church, which will cost £2,000, is being built from plans by Mr. W. Lister Newcombe, F.R.I.B.A., of Newcastle-on-Tyne.



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## ILLUSTRATIONS.

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ELLINGHAM HALL, NORTHUMBERLAND.—LEWISHAM  
CENTRAL FREE LIBRARY.—NOTRE DAME DE LA COUTURE,  
BERNAY.

## Our Illustrations.

## BOOTLE TECHNICAL SCHOOLS.

THIS building is to be erected on a site adjoining the public baths. It is to be in red brick, with terracotta dressings, the roof covered with Westmoreland slates. The accommodation has been somewhat increased since the design was selected in competition, and our illustration shows the building in its revised form. The tower, also, was an addition desired by the committee. The building will be warmed by low-pressure radiators, and the exhaust ventilation will be induced by steam coils in special chambers on the trunks. The architects are Messrs. Best and Callon, of Westminster, S.W.

## HISTORIC ORNAMENT: NATIONAL SILVER MEDAL DRAWINGS.

THESE two exceedingly rich and elegant examples of 16th-century French Renaissance work are illustrated by pencil drawings by Mr. John J. Brownson, who won a Silver Medal for these admirably-executed studies, drawn in illustration of Historic Ornament. The carved wood doorway from Beauvais forms part of a fixed screen, and is chiefly remarkable for its mouldings, which are not only very characteristic of the period to which the work belongs, but it is exceptionally fine. Much ingenuity is shown in the arrangement and return of the mouldings of the capitals, and they contrast well with those of the base, which, though refined and delicate, are very broadly managed, the light and shade being most carefully considered. The stone rood-loft in Limoges Cathedral is an equally noticeable example of the more florid Renaissance, for which the French were so famous. The shaft or column is divided up in a particularly graceful manner, with a view to good proportion and telling contrast. This good result is obtained without any sacrifice of unity, and with surprisingly little loss of breadth of effect. The figured dimensions on this sheet of measured drawings add to its usefulness. The details were drawn from the casts in South Kensington Museum.

## NORTH DRIVE, TOOTING COMMON.—HOUSE AT HASLEMERE.

THE plans and views given herewith of these two country houses, designed by Mr. C. F. A. Voysey, are, to a large extent, self-explanatory. Both buildings illustrate that quaint sense of the picturesque which the architect of these residences has associated so tastefully with all his designs. The walls are finished in white rough cast, the roofs are covered with stone slab slates, with red ridge tiles and chimney-pots, while the wood-work is coloured a good strong green. Stables

are attached to the Tooting house; but at Haslemere, the larger of the two buildings, the stables are detached, and a feature is pleasingly made of the garden slopes and terrace steps.

## ORATORY, ELLINGHAM HALL.

THIS private chapel is attached to the residence of Sir John Haggerston, Bart., Ellingham Hall, Northumberland. A new mansion, to which this oratory is attached, will be commenced at once, as soon as the Catholics in the neighbourhood can be accommodated in the new chapel. The present oratory is in the centre of the old house, to which the Haggerstons have admitted the public for generations past. The architects, Messrs. Dunn, Hansom, and Fenwick, of Newcastle-on-Tyne, have adopted the Perpendicular style, which has been treated in a simple manner. Externally, the chief ornamental feature is the tracery of the windows. These have been executed by Mr. Bladwell, of Bath, in Bath stone (the lights being filled in with leaded glass, supplied by Messrs. Atkinson Brothers, of Newcastle). The Bath stone forms a pleasing contrast with the rest of the building, which is of local stone, of a pinkish tint. The use of red tiles for the roofs still further adds to this effect. In the interior there is no plaster; the walls are built in rubble, tuck-pointed, or, as it is locally termed, "snail" work. The roof is open, of unvarnished pitch-pine, panelled on the underside of the rafters, and with ornamental framed principals. At the back of the chapel, between the entrance door and the seats, is an oak tracery screen filled with glass, and above this is a gallery intended for the use of the family, connected with the hall by a private staircase. The altar (which is a present from Mr. Charlton Haggerston, brother of the owner) has been carried out in Caen stone, and, though plain, is effective. The building has been executed by Messrs. Elliott Brothers, contractors, of Chathill, Northumberland.

## LEWISHAM CENTRAL FREE LIBRARY.

THIS design was placed first in the recent competition by the assessor, Mr. Mountford, and has been adopted by the committee. The building is in red brick with stone dressings, and roofed with Westmoreland slates. The heating to be effected by low pressure hot water, and the ventilation by induced current. Messrs. Best and Callon are the architects.

## NOTRE DAME DE LA COUTURE, BERNAY, FRANCE.

THIS picturesque country church, chiefly in the French Flamboyant style, is a cruciform building with a picturesquely shingled belfry to the south-western tower, and having projecting oriel turrets, as well as the spirelets at the base of the broach, presents more than an ordinarily quaint appearance well befitting its amply-wooded surroundings, as seen in the picture. Mr. W. Campbell's clever pen drawing does justice to the subject, for which we are indebted to the *American Architect*.

The Kirkburton Urban District Council have resolved that the sewage-disposal scheme submitted by Mr. T. Aird Murray, C.E., of Sheffield, be accepted, and that he be appointed engineer to the council to carry out the scheme.

The town council of Sudbury have decided to increase the salary of the borough engineer, Mr. T. W. A. Hayward by £50 a year, mainly in consideration of the improvements made by him in macadamised roads.

The State of Pennsylvania is one of the few in America which has taken any practical steps towards forest preservation under a law which went into effect on January 1st of this year. The State forest commissioners are authorised to purchase, on behalf of the State, land suitable for forest culture, and so located as to protect watersheds. Under this law Commissioner Rothrock recently purchased 14,000 acres in Clinton County, at tax sale, at an average cost of 8½ cents an acre.

The South African Industrial and Arts Exhibition, which is to be opened at Grahamstown on Dec. 15, is making rapid progress. The main hall is 165ft. long and 148ft. deep, forming three courts, each 55ft. wide and 148ft. long. The grounds, which will cover a space of about eight acres, slope down to a lagoon, formed by throwing a dam across the river, and are being laid out in a picturesque manner. Space in the buildings, as well as in the grounds, is being reserved by exhibitors both in South Africa and abroad. A whole court has been taken by the Natal Government, and a similar one by Rhodesia. British manufacturers are showing considerable interest in the Exhibition.

## COMPETITIONS.

"OWEN JONES" PRIZE.—This competition was instituted, in 1878, by the Council of the Society of Arts, as trustees of the sum of £400, presented to them by the Owen Jones Memorial Committee, being the balance of subscriptions to that fund, upon condition of their expending the interest thereof in prizes to "Students of the School of Art who, in annual competition, produce the best designs for Household Furniture, Carpets, Wallpapers and Hangings, Damask, Chintzes, &c., regulated by the principles laid down by Owen Jones." The prizes are awarded on the results of the annual competition of the Science and Art Department. Six prizes were offered for competition in the present year, each prize consisting of a bound copy of Owen Jones's "Principles of Design," and a Bronze Medal. The following is a list of the successful candidates:—Emmet Brady, School of Art, Glasgow, design for wall-paper; William F. G. Brown, School of Art, Glasgow, design for printed velvet; James Grimstone, School of Art, Glasgow, designs for wall-paper; Ethel Hedgland, School of Art, Dover, designs for parasol cover and zouave jacket in cut linen; Florence S. K. Joyce, School of Art, Birmingham, modelled design for a finger-plate; Fred. Charles Kiefer, School of Art, Battersea, designs for printed muslin. The next award will be made in 1899, when six prizes will be offered for competition.

RUSHOLME, MANCHESTER.—The proprietors of Messrs. Hyde's brewery, Rusholme, near Manchester, recently decided to erect a new fifty-quarter plant brewery to consist of brew-house, copper-house, boiler-house, chimney shaft, fermenting house, cellars, bottling stores, cask-washing shed, dray-sheds, and stabling, &c., for 30 horses, and invited eight brewery architects to send in designs in competition for two premiums of £50 and £30. These designs have now been adjudged, and that of Mr. G. T. Harrap, A.M.I.C.E., and Mr. William H. Duffield, A.R.I.B.A., brewers' consulting engineers and architects, of 34, Queen-street, Cannon-street, London, E.C., has been selected, and this firm have been instructed to carry out the work without delay. The names of the other competitors have not been made known.

WREXHAM.—The school board invite sets of plans from architects residing or practising in the town for the new schools to accommodate 450 boys, 275 girls, and 275 infants, together with caretaker's house. The author of the successful set of plans will receive a premium of £30, and a second premium of £15 will be offered.

## CHIPS.

At the parish church of Bovey Tracey a new organ, built by Messrs. Hele & Co., of Exeter and Plymouth, was opened last week.

A technical school is to be erected in Cecil-road, Holdenhurst-road, Bournemouth, East, from plans by Messrs. Creeke, Gifford and Oakeley, architects, of Bournemouth.

Colonel Albert James Hepper, D.S.O., R.E., held an inquiry on Tuesday in Berwick Town-hall respecting an application of the town council to the Local Government Board for approval to borrow a sum of £8,000 for the erection of a police station and lock-up. Mr. R. Weddell, town clerk, and Mr. R. Burns Dick, Newcastle, the architect of the proposed buildings, gave evidence as to the proposals. No opposition was offered to the application.

One of the largest building ventures of the year at Chicago will be the large apartment hotel, on the north side, where Rush, Bellevue, and State-streets intersect, of which Mr. R. T. Newbury is the architect. It will have a ground area of 200ft. by 270ft., and will be twelve stories high, while the cost is estimated at about £300,000 sterling. It is hoped to make it a headquarters for bachelors and club men, and besides these suites of rooms a special feature will be a natatorium and a ball-room.

The urban district council of Birkdale have received sanction to the borrowing of £7,455 for the following works, the plans and estimates of which were prepared by Mr. F. C. Hodgkinson, engineer and surveyor to the authority—viz., street improvements, £4,250; sewer extension, £530; caretaker's lodge at the Victoria Park, £575; fire-brigade station, £500; and gas-mains extension, £1,500.

The committee of the proposed Victoria Church-house, at the corner of Lord-street and South John-street, Liverpool, have just approved plans prepared by Mr. Bradbury, the diocesan surveyor, and building will shortly be started.



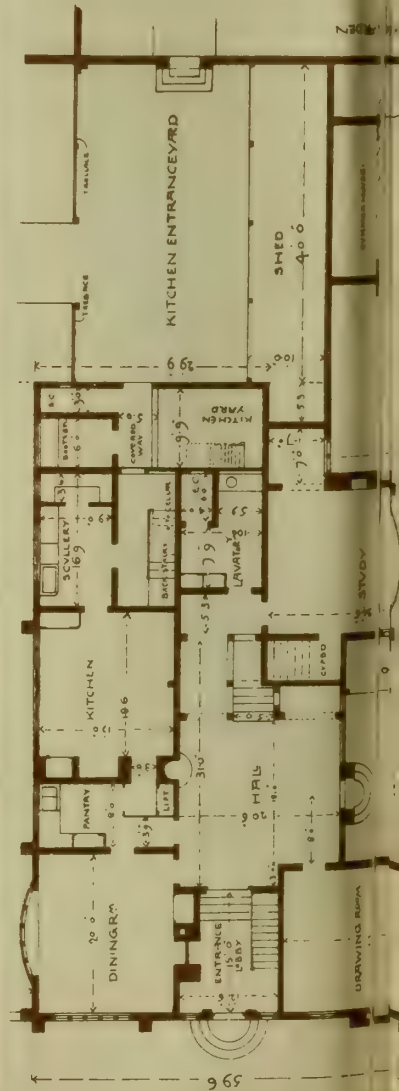
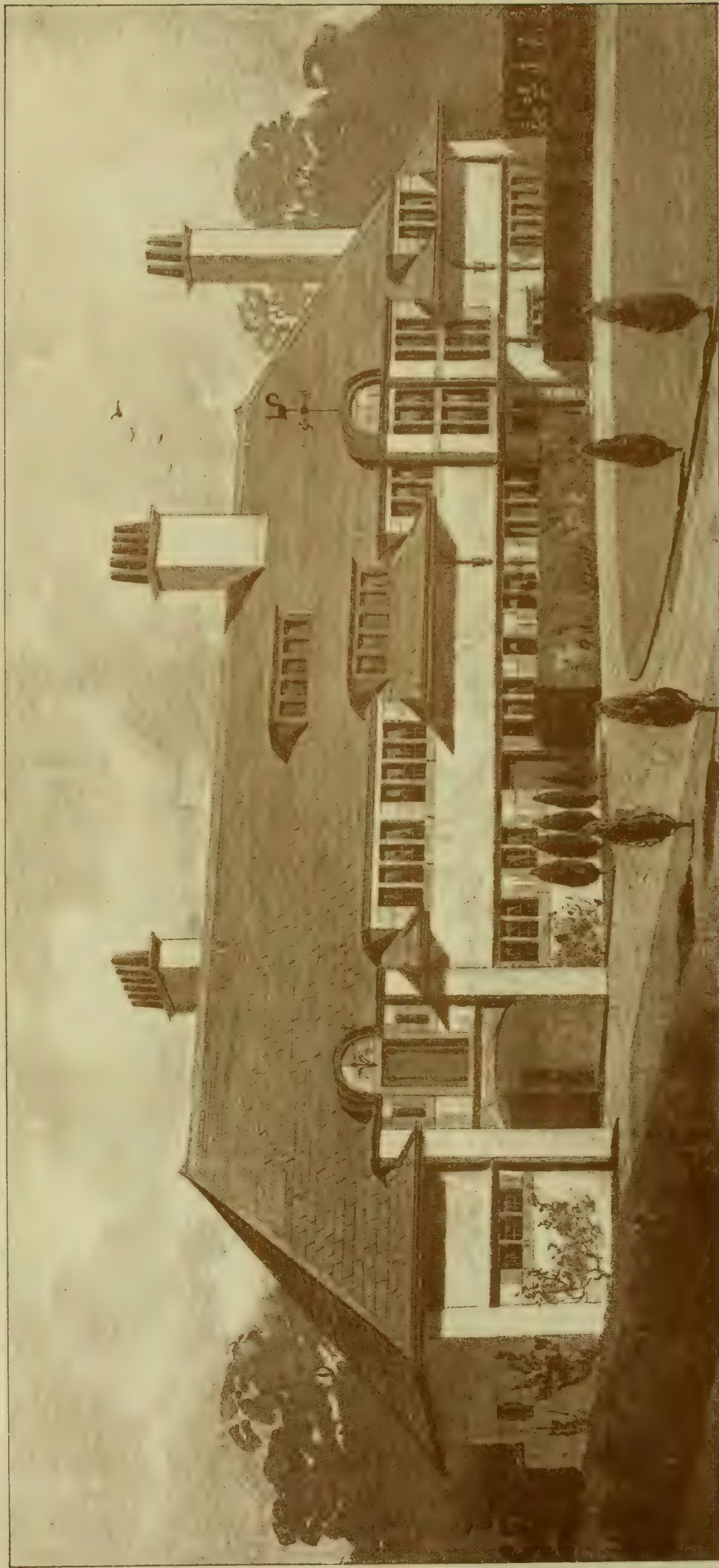
Notre-Dame-de-la-Couture.  
Hernay — France —



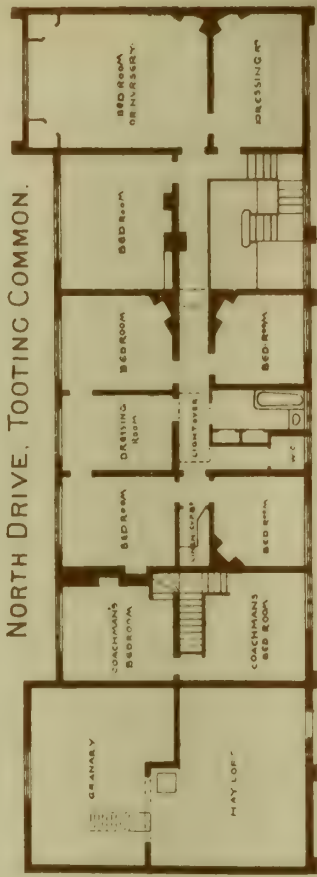








NORTH DRIVE, TOOTING COMMON.

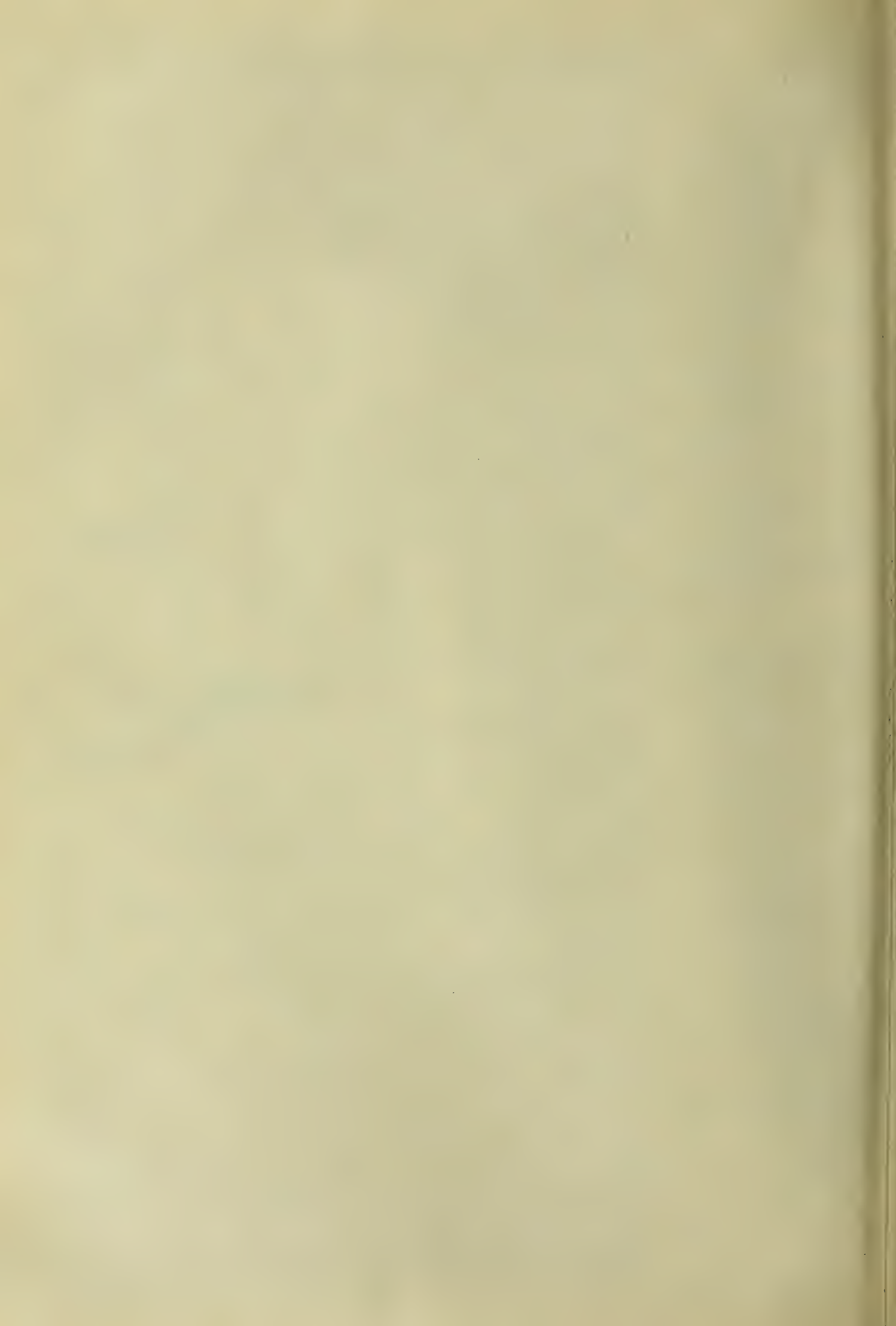


B6DROM PLAT.





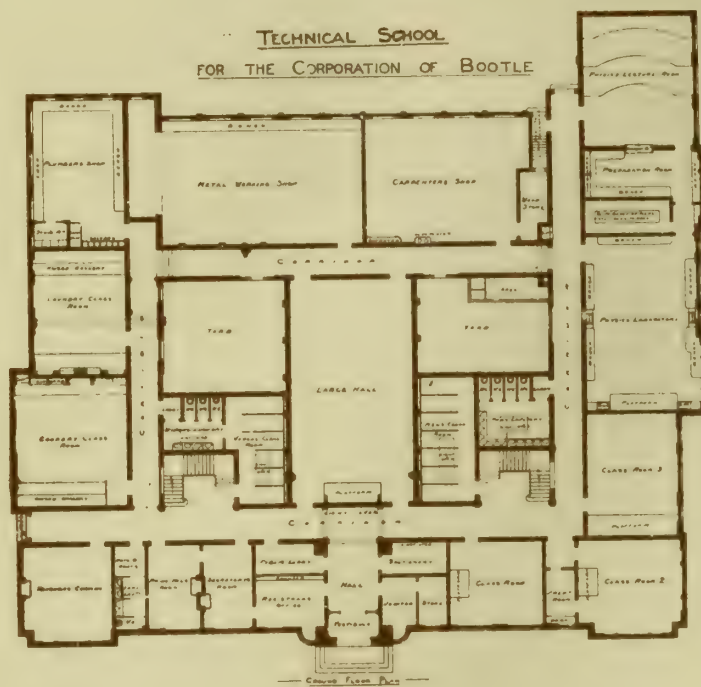












BOOTLE TECHNICAL SCHOOL  
SELECTED DESIGN.

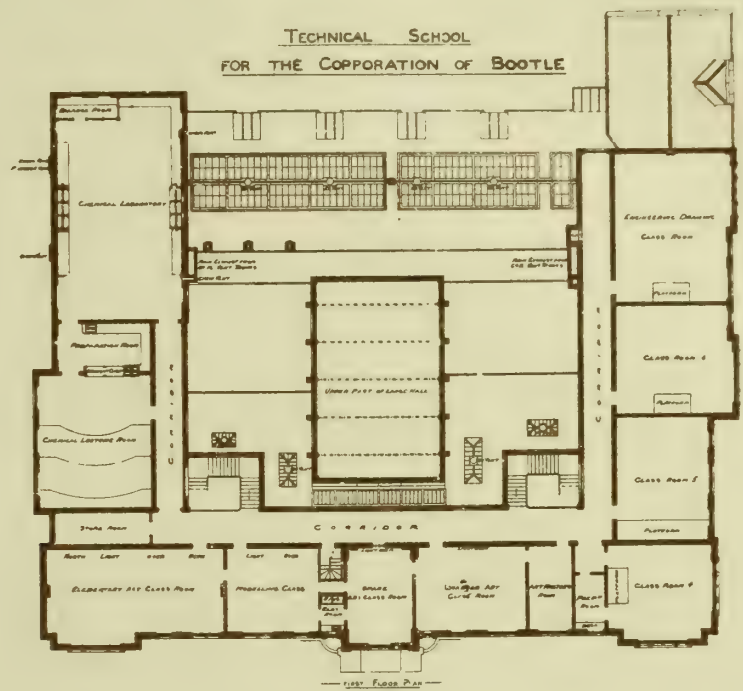




SEP. 2, 1898.

AL SCHOOLS.

& CALLON, ARCHITECTS.



Reed & Callon, Archts  
2, Princess Margaret  
St. Victoria St. S.



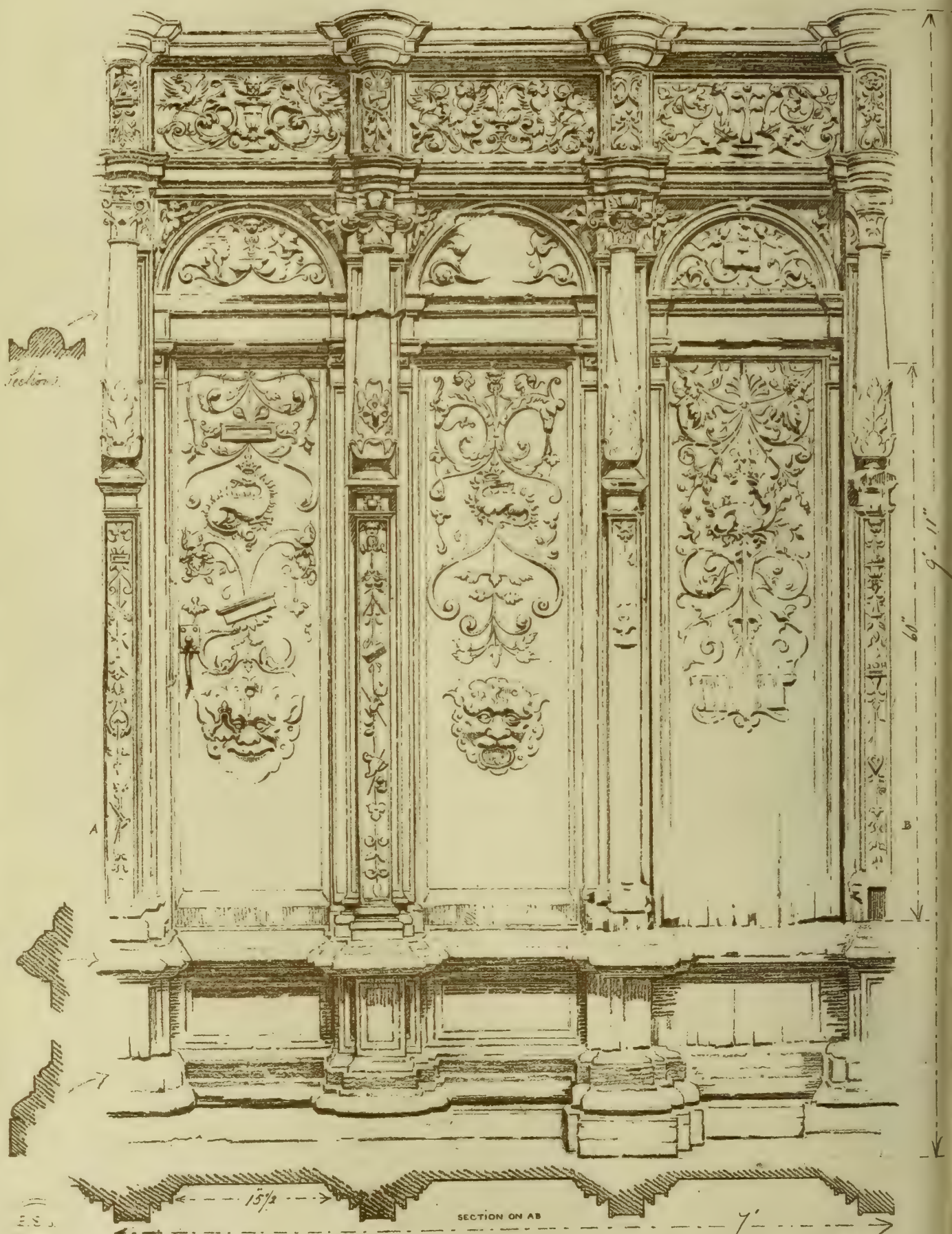






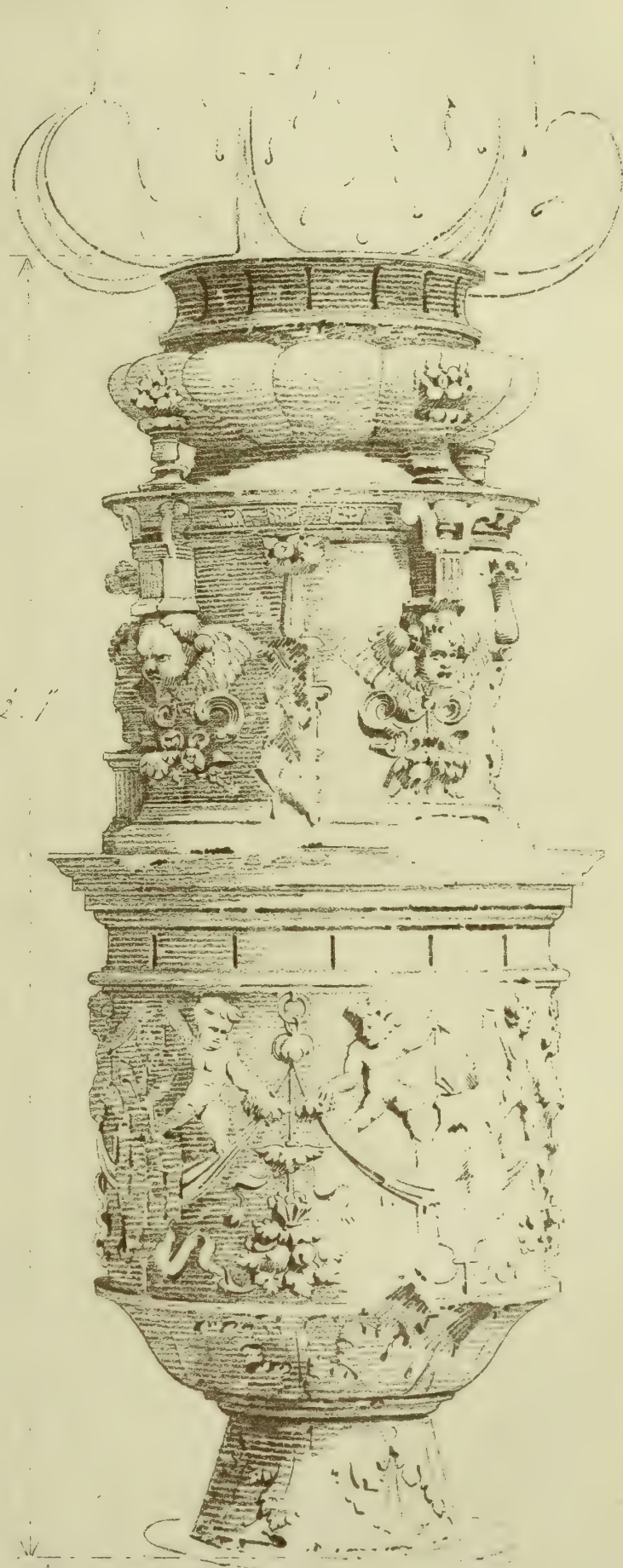
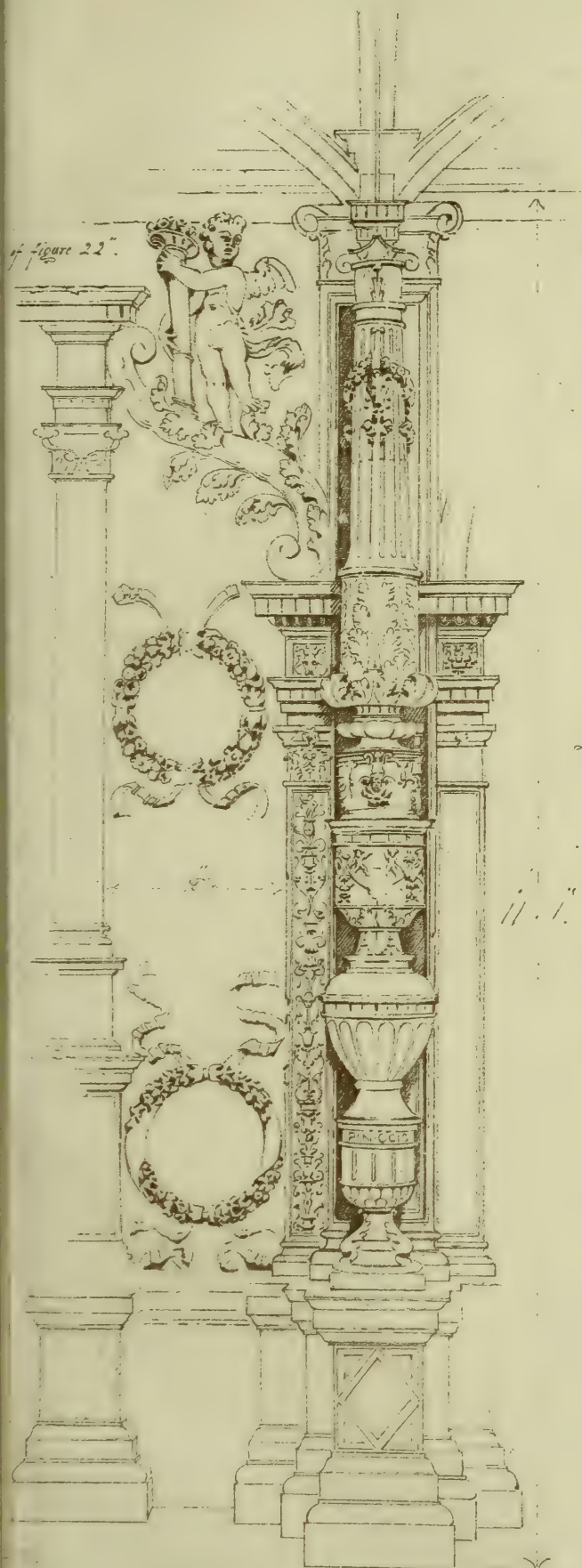


From 15<sup>th</sup> cent.  
 - Cell in tower of a carved wood doorway in Drawings Coll.



This has been drawn chiefly on account of its mouldings which are not only very characteristic of work of this period but very fine of their kind. Much importance is shown in the arrangement & details of the mouldings of the capitals & thus compare with those of the base which though delicate in treatment are very broad, the latter shade being most carefully studied.





French 16<sup>th</sup> cent.

Part of a portion of the carved stone. Found in the Louvre collection.

A very noticeable example of the French work of this period, selected principally for the column which is divided in a characteristic way. The various divisions are most conspicuously adorned to obtain emphasis & this is aimed without any sacrifice of work, with surprisingly little loss of breadth or effect.



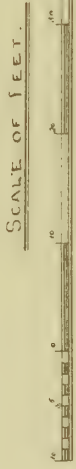




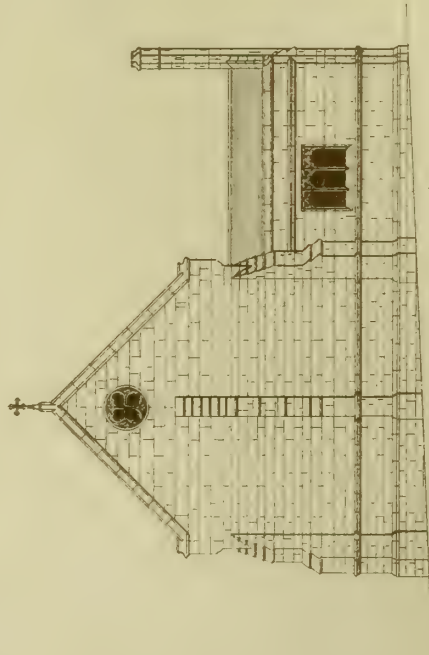




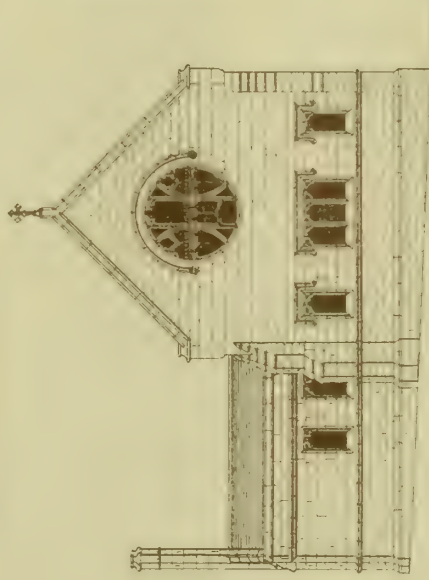
ELLINGHAM HALL.  
NORTHUMBERLAND.



DUNN HANSON & FENWICKE ARCHITECTS.



EAST ELEVATION.

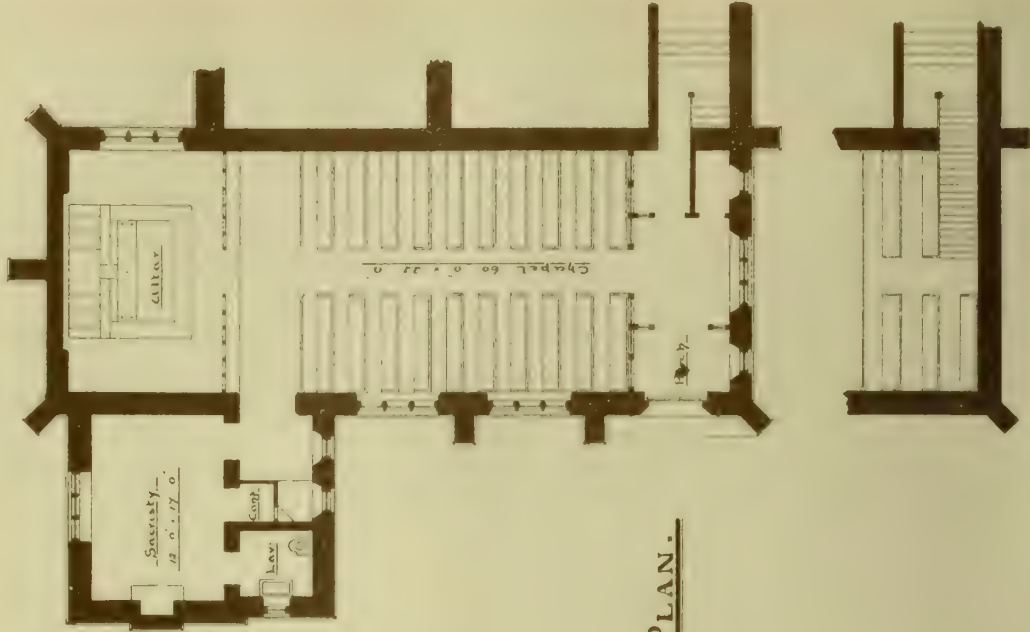


WEST ELEVATION.



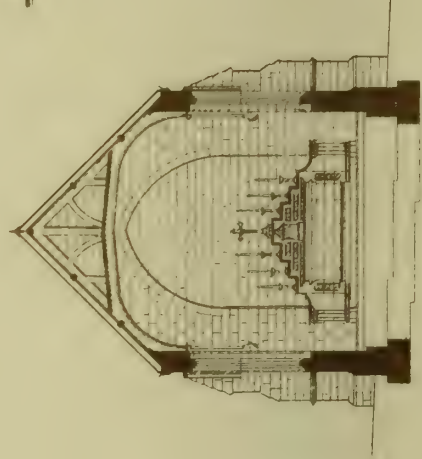
NORTH ELEVATION.

THE ORATORY.  
FOR SIR JOHN HAGGERSTON.



PLAN.

GALLERY.

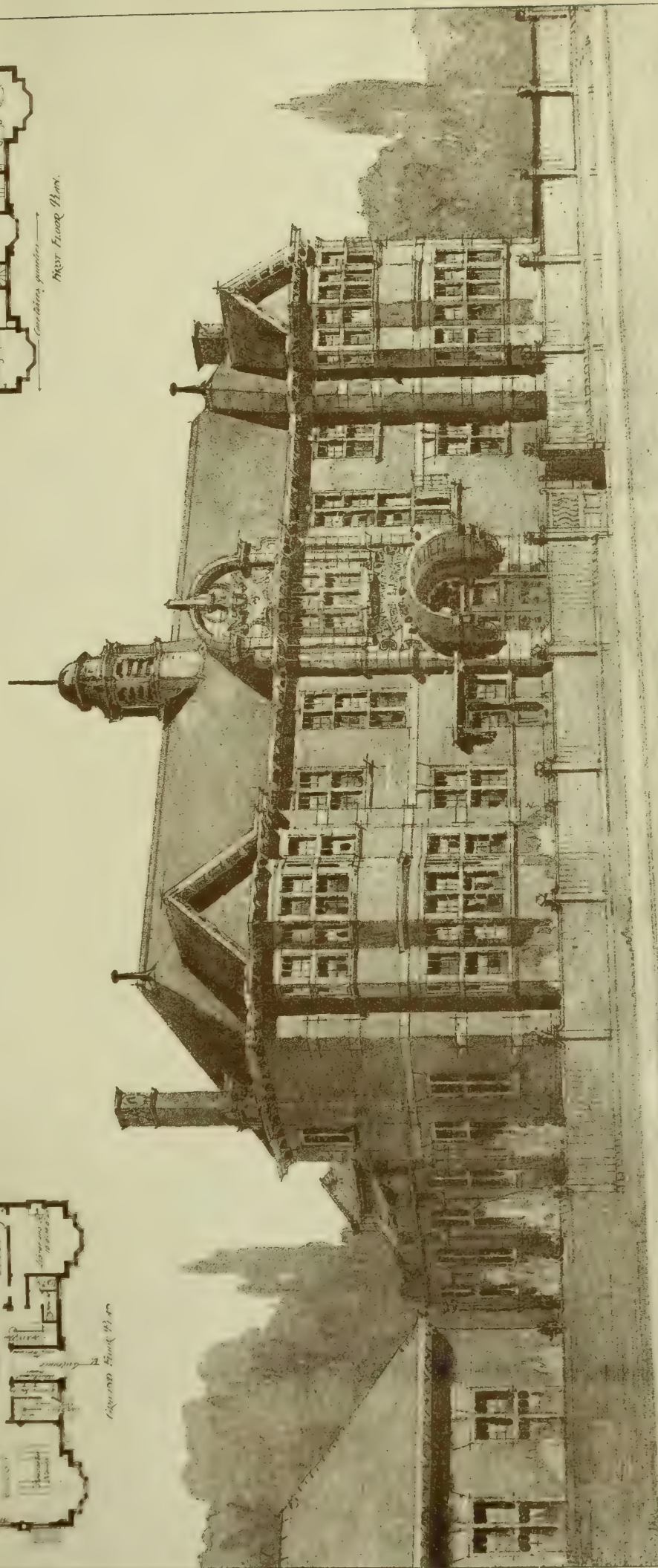
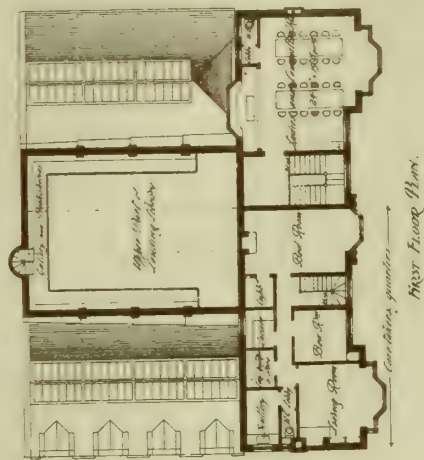
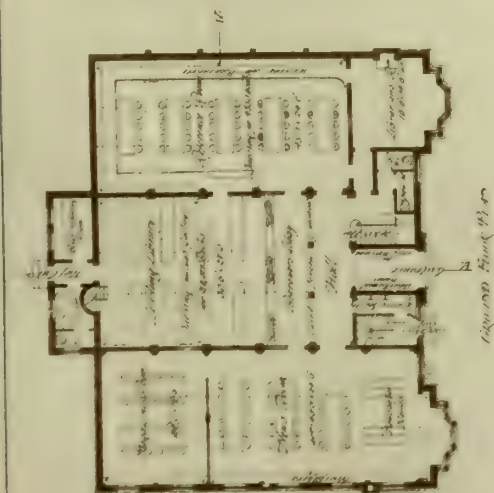


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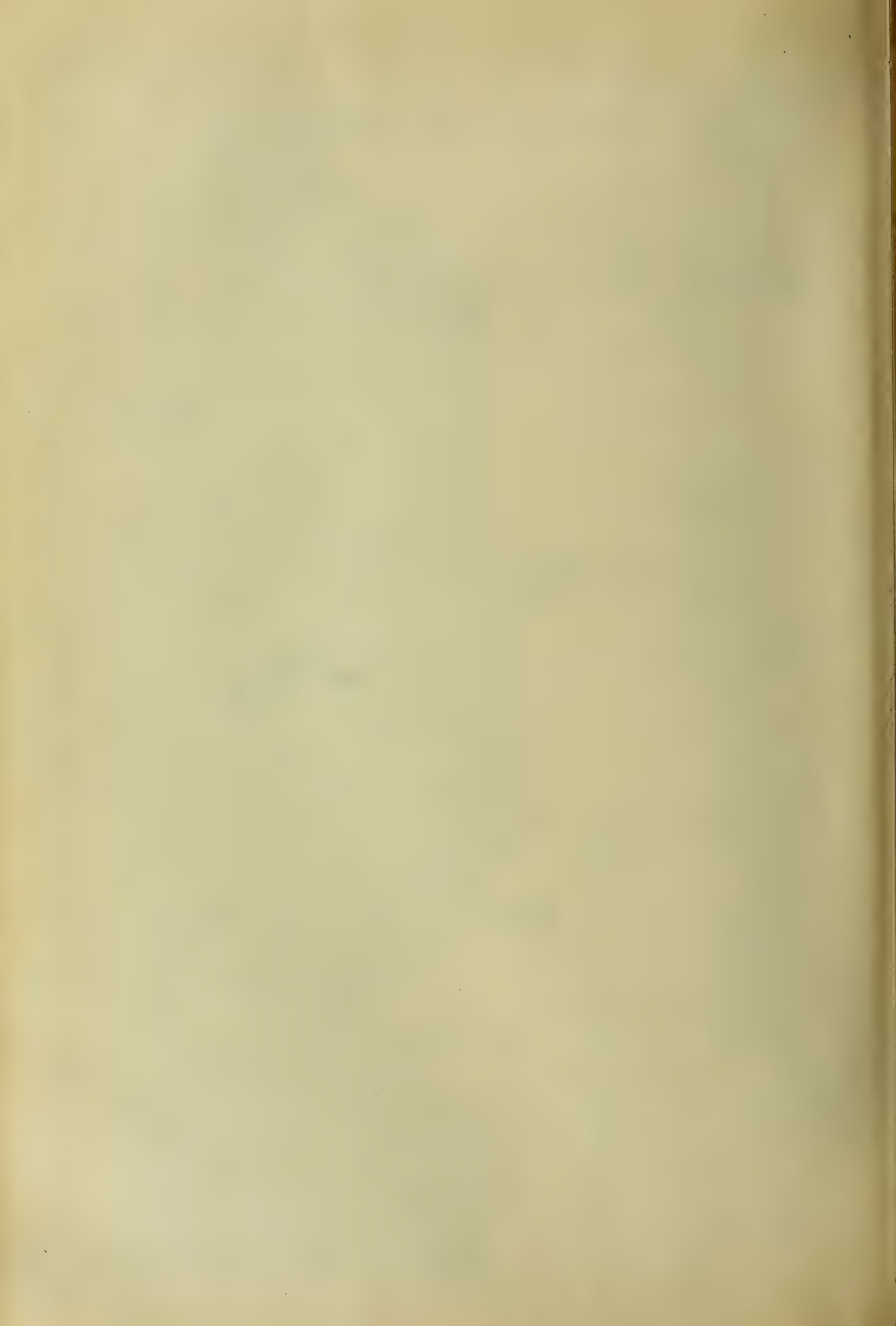


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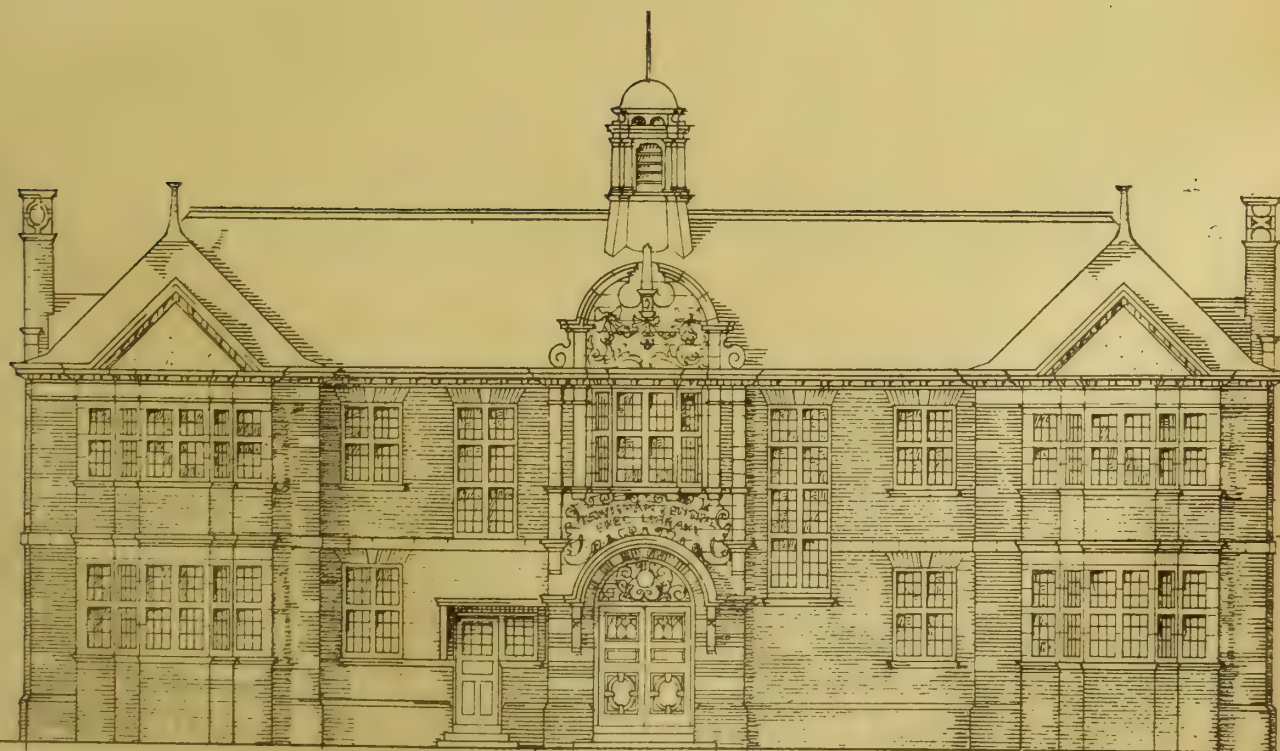
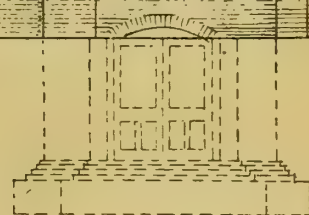








*SIDE ELEVATION*



*ELEVATION TO HIGH ST*



# Intercommunication.

## QUESTIONS.

[12024.]-**Fence between Houses.**—The wood paling between my neighbour's garden and my own has become loose through decay of posts. The fair side of fence is on my side. Can I call on my neighbour to repair, or should we both defray the cost?—**TENANT.**

[12025.]-**Sketch Plans.**—I made two or three different sketches for a small villa. My client accepted one, and said he would get it carried out by a local builder. He has not built yet to my knowledge. Quite twelve months have elapsed, and he has not asked me for my account. Am I justified in sending in my charge, or will it be prudent to wait a little longer? I thought of charging 2½ per cent. on estimate.—**INEXPERIENCED.**

[12026.]-**Church Seats.**—I should be obliged if any of your readers acquainted with church work will give me the dimensions of a comfortable seat—its height, width of seat, height and slope of back, distance from back to back, and how much space should be given to each person? Also the kind of framing?—**A. J. T.**

[12027.]-**Casement Fastening.**—A "Practical" would like to be informed of a good casement fastener, simple and strong, and the probable price. The principal object is to bring the meeting stiles close together, so as to exclude rain.—**CAMEO.**

[12028.]-**Proportion of Stairs.**—Which is the easiest proportion of riser to tread? Is a 1 in. tread and a 7 in. riser suitable for a house of superior character?—**TITUS.**

[12029.]-**Green Stains on White Facing-Bricks.**—Can any reader of the BUILDING NEWS suggest an effectual method of removing unsightly green stains that sometimes appear on the surface of white facing-bricks in new work?—**CIVIS.**

[12030.]-**Deodorising Asphalt.**—Two years ago I erected a large room, and laid the space underneath the floor with tar asphalt. This has recently begun to smell, causing much annoyance. I shall be glad if any correspondent will suggest a remedy.—**N. H. H.**

[12031.]-**Concrete Building.**—I shall be glad if any of your readers can tell me of any practical guide to concrete construction in which the material is placed and rammed between moulds made of boards bolted together. I believe in America buildings have been constructed with walls, floors, columns all of concrete prepared or erected in moulds in this manner. Any information will oblige.—**A. LEARNER.**

[12032.]-**Staging in Small Hall.**—Would any reader give most practical and economical way to erect staging in a building to accommodate 150 persons? Building is 25ft. 6 in. wide and 20ft. high; staging at one end over fixed seats. Particulars as to required strength of timbers will oblige.—**STAGE.**

[12033.]-**Green Colour of Copper Roofing.**—How is it that copper coverings in London do not attain the beautiful green colour they do in the country? I understand that the green covering is a carbonate of copper, which forms on the surface. The only places where this colouring is observable in London is the top 10ft. of copper lightning conductors of tall chimney-shafts to furnaces, where the smoke of the chimney appears to come in contact, and provide the carbon for the carbonate; below that level the copper band gradually shades off into black, and all ordinary roof and cupola coverings are black also. One would think that carbon is provided in sufficient quantity in London air to form the green carbonate with the copper.—**W. R.**

[12034.]-**Glazes and Enamels.**—Will some reader inform me which are the best minerals or oxides to stand very high temperatures (higher than ordinary porcelain), and produce translucent colours for enamels or glazes—brown, yellow, reddish brown, and yellow brown colours, without lead if possible? Is there any work published giving full formulae of enamels and glazes of all colours and shades for porcelain and also for glass-colouring? Also, which is the best book of chemistry on minerals, and by whom published?—**OLD SUBSCRIBER.**

[12035.]-**Measuring Heights, &c.**—What kind of instrument would be best for measuring angles, in order to tell heights and distances? I suppose a sextant would be the best for the former, and a theodolite for the latter? Also, what would be about the cost of each? Are they difficult to use with precision? I am very anxious to put my knowledge of trigonometry to practical use, as it would be a great pleasure to me.—**T. SIMPSON.**

## REPLIES.

[12003.]-**Hardwood.**—Mr. J. Hollis, of Ben Rhydding, Yorkshire, supplies a hardwood floor that would exactly suit "A. T." He had better write to him, inclosing a stamp for reply. Some of the most level-headed architects in Yorkshire speak in very high terms of it.—**W. HOFFMAN WOOD, Leeds.**

[12015.]-**Strong-Rooms.**—If "Loki" will construct his strong room of cement concrete 3 to 1, using crushed slag only, two walls each 9 in. thick, with a 3 in. air-space between connected every square yard by a firebrick, and takes care to use a first-class brand of cement, say, three months old, he will be astonished at the fire-resistance offered. With an outside lining of firebrick, it will be improved.—**ALFRED G. KYLE, Newcastle-on-Tyne.**

[12015.]-**Strong-Rooms.**—I should be inclined to build the walls in well-burnt brickwork 14 in. thick, or a wall with a cavity filled in with concrete or slag-wool. The iron door should be made in sections. Apply to any strong-room maker.—**READER.**

[12015.]-**Strong-Rooms.**—Concrete walls are excellent for strong rooms; but very hard burnt bricks will stand fire equally well if not better than concrete.—**LOUIS ERWOLD.**

[12016.]-**Reservoir.**—For rules giving the thickness of reservoir walls, consult any treatise on hydraulic construction. If the reservoir is sunk in ground, the thick-

ness of wall must be sufficient to retain the ground. The walls may be of concrete, resting on a concrete bottom 18 in. thick, or of brickwork in cement mortar, 1 part Portland cement to 6 parts ballast and sand, cement rendered inside. The concrete should be laid in stepped horizontal courses, the face of the wall finished in finer concrete. The thickness of wall may be about one-fourth the height, or, say, 2ft. 6 in. at base, and battered 1 in 6. The concrete footings should be wide.—**G. G.**

[12016.]-**Reservoir.**—The thickness of the wall depends on the soil to a large extent. In some cases merely a skin of brickwork is employed, backed with puddled clay.—**L. E.**

[12017.]-**Dadoes.**—Dado framing can be fixed to the wall by aid of battens as suggested by "Constant Reader," and in fixing skirting care must be taken to allow the wood to shrink and swell if the skirting be a wide one. This is sometimes done by fixing the top edge and tonguing the lower into the floor-boards.—**L. E.**

[12017.]-**Dadoes.**—I should fix the dado by nailing to the wall or plugging battens 2 in. by 3 in. in three horizontal lines. The dado rail would have one batten behind it, and should be ploughed to receive the boarding or framing. The skirting would also be secured to the lower batten, and also to a fillet nailed to floor.—**ARCHITECT.**

[12018.]-**Rainwater Collecting.**—Mr. C. G. Roberts, Haslemere, Surrey, is the inventor of an apparatus for separating the dirty from the clean and utilisable rainwater to which "Loz" refers. I have seen the apparatus in action, and can speak of its merits. It is small, and does not occupy much space, and can be fixed on any rainwater downpipe. Write for particulars.—**G. H. G.**

[12018.]-**Rainwater Collecting.**—There are several inventions for separating the rain-water, so that the foul water goes down the drains. One is the patent of Mr. C. G. Roberts, of Haslemere; another form of separator will be found at the Sanitary Institute and Hornsey Sanitary Museum, both of which can easily be seen in operation.—**L. E.**

[12019.]-**Staircases.**—I can recommend "Young Joiner" to peruse "Colling's" "Handrailing and Stair-casing," which is published by Messrs. Crosby Lockwood and Co. at the small sum of 2s. 6 in., with the usual deduction if obtained through discount booksellers.—**L. E.**

[12020.]-**Teak Floors.**—In my opinion, wood tongues or dowels are preferable to iron tongues in laying floors, and the joints can be made in any of the ways described in "Model Specifications" in this journal.—**L. E.**

[12021.]-**Water-Bars.**—I should advise "Builder" to use J. Hill and Co.'s registered water-bar, made in brass; it can be used for casements of wood opening inwards or outwards. It is made in two forms, and can be screwed to sill of casement frame. Address of maker is 109, Queen Victoria-street. A small aperture at the lowest part allows any moisture to escape.—**G. H. G.**

[12021.]-**Water-Bars.**—"Builder" ought not to find much difficulty in making ordinary casements watertight if he uses a water-bar in the sill and fixes a weather-board on the outside of the lower rail of the sash. This weather-board is not always needed.—**LOUIS ERWOLD.**

[12022.]-**Dilapidations.**—The Surveyors' Institution in Savoy-street deals with dilapidations, and it would be to the advantage of "B." to pass through their Institution exams., and he will also be recommended the books that will be most of use to him.—**L. E.**

[12022.]-**Dilapidations.**—The surveyor of dilapidations has to ascertain the neglect or waste committed by the tenant in keeping his premises in repair. The terms of the lease give power to the lessor to enter and make a survey of premises from time to time. Before the expiration of the lease a survey is made, and a notice to repair is served upon the tenant. The subject in all its bearings has been treated by Woodfall's "Landlord and Tenant," and a report was published by the R.I.B.A. Prof. Banister Fletcher's work on the subject should be obtained.—**G. H. G.**

[12023.]-**Iron Ties to Roof.**—The stress on the iron tie is first calculated, and the required section is obtained by dividing the safe tensile load on the material to be used into the stress that the tie-rod has to bear.—**L. E.**

The new workhouse infirmary at Radruth, erected from plans by Mr. Sampson Hicks, was formally opened on Tuesday in last week.

The Dean of St. David's is appealing for funds to restore the eastern chapels of St. David's Cathedral, in memory of Bishop Basil Jones, Dean Allen, and Dean Phillips. The work is estimated by the architect to the Dean and Chapter, Mr. J. Oldrid Scott, F.S.A., to cost £12,000. Dean Howell says: "Engaged as we are in effecting a thorough restoration of the mother church of the see once presided over by the patron saint of Wales, we feel that we may justly claim support not only from Welsh Churchmen but from British Christians of all creeds and classes, both within and without the Principality."

The foundation-stone of a Wesleyan college to be erected on land in the Filey-road, Scarborough, was laid on Friday. The work will necessitate an expenditure of about £10,600. The style is Late Tudor, and the building materials to be used are red bricks and Whitby stone. The dining-hall is to be capable of accommodating 100 scholars, and the schoolroom 200 boys, and will be capable of extension. The architects are Messrs. Hall, Cooper, and Davis, of Scarborough, whose design selected in competition was illustrated by elevations and plans in the BUILDING NEWS for Sept. 3, 1897, and whose revised and enlarged scheme was shown in our photo-lithographic pages so recently as the 12th ult.

## LEGAL INTELLIGENCE.

**IMPORTANT TEST CASE.**—**SLOP-WATER CLOSETS** AND THE LOCAL GOVERNMENT BOARD.—Some time ago the Lincoln Corporation gave notice to an owner of property to take out several Duckett's slop-water closets and to substitute closets which entailed the use of corporation water. It was alleged that the existing closets were not sufficient water-closets, and insanitary. The owner declined to comply with the notice, and the corporation, therefore, carried out the work, charging £17 as the cost thereof, payment of which was refused by the owner, and an appeal was made by him to the Local Government Board. A local inquiry was held in March last, and evidence taken by the inspector. The decision of the Local Government Board has now been given, and an order made that the owner be not called upon to pay the charges of the corporation, or any portion thereof, and that the corporation pay the Local Government Board's costs in the matter. The effect of this decision is that slop-water closets are recognised by the Local Government Board as being sufficient water-closets, and may, therefore, be used as such. The closets referred to were Duckett's well-known Patent Closet Arrangement B.

**A PONTEFRAC ARCHITECT'S CLAIM.**—At Pontefract County Court on Friday, Judge Rukes was occupied for several hours in hearing a claim brought by Messrs. J. H. Greaves and Company architects, Pontefract, Castleford, and Gools, to recover £23 9s. 2d. from Messrs. Wigfall and Sons, brushmakers, Pontefract, balance of account for services rendered. Mr. J. O. Greaves, of Wakefield, sat with his Honour as assessor. The claim was in respect of the preparation of plans, &c., for the rebuilding of the defendants' works after their destruction by fire. Mr. Greaves' original estimate was for £2,000, but the specifications were cut down until the tenders accepted amounted to £917. Even then, Mr. Wigfall, by striking out items after item, pared the total down to £731 14s. 7d. Mr. Wigfall then required plans of the conversion of a portion embraced in the original plans into a dwellinghouse, and as he refused to await the sanction of the Corporation before proceeding with the work, Mr. Greaves was put, it was claimed, to very great trouble.—His Honour reduced the claim by £9 6s. 6d., and judgment was given for £14 2s. 8d., less £3 12s. 3d., paid into Court.

**SERIOUS CHARGE OF BRICK STEALING.**—At Woolwich Police-court on Friday, William Anstead, 65, carman, Lakedale-road, Plumstead, and Henry Robinson, 43, bricklayer, 134, High-street, Plumstead, were charged on remand with stealing 5,000 bricks, value £11 5s., the property of Harry Sanford, builder, Charlton. Daniel Sullivan, 50, builder, 46, High-street, Plumstead, was charged with receiving the bricks, knowing them to be stolen. Anstead and Robinson were in the employment of the prosecutor, who had building operations in various parts of the district. Anstead had to cart bricks from a brickfield in Wickham-lane, Plumstead, to prosecutor's building works, including 11 houses in William-street, Woolwich, near the police-court. Robinson was foreman bricklayer at these 11 houses. Anstead, instead of delivering the bricks there, carted some loads to some new houses in Bastion-road, Plumstead, which Sullivan was building. On Anstead being accused of the theft, he admitted carting 5,000 bricks to Sullivan's houses, saying that Robinson told him "to drop a few loads." He admitted that he received £3 from Sullivan, and that he believed Robinson had a like sum. Anstead and Sullivan pleaded guilty; but Robinson protested his innocence, and Mr. Paul Taylor committed them all for trial. They were admitted to bail, Sullivan in £100, and the other two in £20.

**IN RE P. T. McCUE, MANCHESTER.**—A meeting of the creditors of Patrick Thomas McCue, builder, was held before the Official Receiver, Mr. C. J. Dibb, at the Manchester County-court offices yesterday, and Mr. Edwin Bradshaw, chartered accountant, of Warrington, was appointed trustee. According to the statement of affairs prepared by the debtor, his total liabilities amount to £4,584 12s. 9d., of which £657 11s. 9d. is expected to rank for dividend. The estimated deficiency is £213 8s. 8d. Debtor attributes his failure to building properties which were too good and putting too much material into them.

The urban district council of Shoburney have been exercised in their minds by the consideration of an application from a person writing from Gloucester-gardens, Hyde Park, asking for permission to lay three disused railway horseboxes on a small piece of ground in front of Shoburney Cottage, to use as a bungalow for the week-end in summer for sea-bathing. It was pointed out that if sanction was given the horseboxes would doubtless be utilised as dwellings all the year round, and ere long the entire sea-front might be expected to be bordered with dismantled and worn-out railway carriages. Eventually the application was refused.



## WATER SUPPLY AND SANITARY MATTERS.

**BELFAST NEW WATER SUPPLY.**—An inspection of the works in connection with the Mourne water scheme by the members of the city and district water board took place on Tuesday and Wednesday in last week. The commissioners drove on the first day to Knockbracken to view the service reservoir there. Afterwards they proceeded on an inspecting tour over the entire lines of pipes, and several of the members descended into some of the tunnels and made personal investigation of them. Sleeping at Newton, the members proceeded on the Wednesday to the north end of the tunnel, which is being constructed by Messrs. H. and J. Martin, Limited, through Slieve Donard, and were able to make their way a little more than half a mile into the side of the mountain. At the south end the tunnel has been completed to the extent of three-quarters of a mile. The party subsequently drove to the Silent Valley, the site of the reservoir for the complete supply, and during the evening they returned to Newcastle. With the party were Mr. L. L. McCassey and Mr. M. McCullough, the engineers, and Mr. Bell, Mr. McCassey's principal assistant.

**BISHOP'S CASTLE.**—The corporation of this town having applied for a loan of £1,600 for lining a reservoir at Maes Gwyn in Shropshire, which had developed such numerous leaks as to be useless for its purpose, Mr. Herbert H. Law, Assoc. M. Inst. C.E., Local Government Board Inspector, attended at the town hall on Tuesday last to hold a public inquiry. Mr. E. Griffith, town clerk, in answer to the inspector, stated that the loan was required to complete the reservoir at Maes Gwyn, which had a capacity of 2,500,000 gallons. The population of the borough at the last census was 1,586, which is a slight decrease from the previous census. The assessment was £4,210 gross. The borough surveyor, Mr. J. Hamer, gave evidence as to the construction of the dam and the probable cause of the defects. Mr. E. S. Cobbold, consulting engineer to the corporation, stated the methods he proposed to adopt in lining the reservoir, by using a layer of cement concrete 6in. thick with a core of Callender's pure bitumen sheeting. He considered it hopeless in such fissured strata to expect a watertight reservoir, unless it was lined throughout, and after consideration he decided to adopt concrete with a bitumen core as being the most simple, economical, and efficient method of carrying out the work. Mr. W. T. Curry (engineer for the contractors, Messrs. Callender, 11, Victoria-street, London, S.W.), in reply to the inspector, stated that Callender's pure bitumen sheeting had been used with entire success for the lining of an ornamental pond with an area of  $1\frac{1}{2}$  acres at Govan about 13 years ago. It had also been used for lining the Randymere Reservoir with a capacity of 14 million gallons at Whitby, under the direction of Mr. J. Mansergh. It had also been used for lining tanks for the Belper, Burton, and Swadlincote, and East London Waterworks, as well as a number of swimming baths, also numerous other large works where it was necessary to resist moisture, such as the Forth Bridge, Tower Bridge, and the Waterloo approaches to the Waterloo and City Electric Railway. The methods proposed in lining this reservoir—viz., by two thin layers of concrete with a core of Callender's pure bitumen sheeting, are the usual means of applying the material in open reservoirs of this class. No opposition being offered, the inspector declared the inquiry closed.

**CARNARVON.**—Dr. S. W. Wheaton has presented to the Local Government Board a report with reference to the sources of water supply for the borough of Carnarvon, which has for some years past been unsatisfactory, more particularly by reason of its liability to pollution by liquid refuse coming from the village of Rhyd-ddu. The supply is obtained from the river Gwyrfa, which issues from Llyn-y Gader as a large stream, and, three miles lower down the valley, falls into Llyn Quellyn. At the intake,  $6\frac{1}{2}$  miles distant from the town of Carnarvon, the water flows from a dam through copper gauze screens directly into an iron pipe, by which it is conveyed, without filtration, to a reservoir constructed  $2\frac{1}{2}$  miles outside the borough. The whole of the Gwyrfa Valley above the intake is occupied by farms, situate on the banks of a stream which falls into the river Gwyrfa. The Gwyrfa also receives the whole of the liquid refuse from the village of Rhyd-ddu, which has a population of about 150 persons. The two authorities in whose districts the village is situated—the Gwyrfa and Glaslyn rural district councils—have up to the present failed to come to any arrangement for a joint system of sewerage. Each district council has caused plans to be prepared for the sewerage of that portion of the village which is under its jurisdiction, but nothing further has been done. Dr. Wheaton doubts whether filtration can, in the present condition of the supply, be trusted to secure a uniformly wholesome water, he indicates the further measures which are necessary before such a result can be obtained, but expresses his preference for Llyn-y-

Aywarden as a source of supply which is almost entirely free from risk of pollution. At the present time the water of the last-mentioned lake is not used for any purpose.

**MAIDSTONE.**—The three inspectors of the Local Government Board appointed to inquire into the epidemic of typhoid fever at Maidstone during 1897 have prepared a report, in which they state that they have no hesitation in coming to the conclusion that the epidemic was caused by the pollution of the water supplied by the Maidstone Company from their Farleigh sources. It is true, however, that there is abundant evidence that grave sanitary defects existed in the construction of some of the sewers and many house drains and closets within the borough.

**WELLINGTON, SALOP.**—The completion of the new scheme for dealing with the sewage of the town was celebrated on Friday. The outlay has been over £10,000. Among the more important improvements which the new system has effected is the interception of the rainfall from a portion of the Ercall Hill, an area of 115 acres, which formerly joined the same channel as that taken by the sewage, thus increasing the volume of matter to be dealt with. By a separate drain the water is now carried to Wrekin-road, and there the ordinary summer flow is received by a tank under the street with a capacity for storing 10,000 gallons; this supply will be utilised for watering the streets, being conveyed in pipes to Cemetery-road, so as to enter the water-cart tanks by gravitation. The pipes connected with the tank are capable of carrying 5,700 gallons of water per minute, and any excess of water will pass away by means of storm overflows. About thirty new manholes and various ventilating shafts have been provided on the town sewers. The sewage will follow a new course to the sewage grounds near Admaston, where it undergoes. Precipitation of the solids results from their contact with chemicals, and they finally pass from the tank in the form of sludge, while the clarified liquid runs along 15in. channel pipes, being liberated through a sluice to irrigate a division of the land and filter through the soil, after which it finds its way into perforated pipes to the brook. The council have at their disposal for irrigation purposes nine acres of land, and there are sufficient sluices to allow of a ninth part of the area being irrigated at one time. The works have been carried out from plans by Mr. T. S. Stooke, the engineer, under the direction of Mr. Morley, the urban council's surveyor.

## CHIPS.

At Stornoway, on Monday, the new secondary school erected by the Stornoway School Board in connection with the Nicolson Institution was formally opened. The cost has been over £2,000.

Mr. A. Harrison, for the past five years chief assistant to the borough engineer of Newport, Mon., has been appointed surveyor to the vestry of St. George the Martyr, Southwark.

The parish church of St. Mary, at Shaw-cum-Donnington, has recently been enriched by the addition of a lych-gate. It has been erected by Messrs. J. Norris and Sons, of Sunningdale, from designs by Mr. James H. Money, architect, Newbury. It is in the Decorated style, and is the gift of Mr. W. P. Blackburne-Mazs, of Shaw House, as a memorial to his wife, who died at Sea Point, Cape Town, in the spring of last year.

The special committee of the town council of Preston, appointed to consider the borough surveyorship vacancy created by the death of Mr. Hudson Reah, have recommended to the council the appointment of Mr. Thomas Cookson. Mr. Cookson is an old servant of the corporation, and for some years has held the responsible position of assistant surveyor. A sub-committee have under consideration the questions of salary and duties.

At a meeting of the committee of the urban district council of Romford, Mr. H. W. Simpson, surveyor, of 108, Fenchurch-street, E.C., was appointed to take out the quantities for the new public baths.

Extensive alterations are being carried out at the City Asylum, Dartford, Kent, and special consideration is being given to the ventilation, which will be carried out on the Boyle system.

The members of the Norfolk and Norwich Archaeological Society made an excursion last week to the churches of North Elmham, Bristley, Gressenhall, Scarning, East Dereham, and Elsing.

A destructive fire broke out on Tuesday night in Blackwall-lane, East Greenwich, upon the cement works of Messrs. Hollicol and Co. The property attacked was comprised in a building of two floors, 100ft. long and 50ft. wide. The outbreak was on the ground floor, and by the time the local firemen had got to work a third of the entire building was involved. The fire was not overcome until a late hour and the premises had been very seriously damaged.

## Our Office Table.

OWING to the success which has attended the exhibition of pictures of the French school, which is being held in the Corporation of London Art Gallery, Guildhall, this summer, Mr. Whitworth Wallis and the committee of the Birmingham Corporation Art Gallery are making arrangements for a certain number of the pictures to be transferred to Birmingham on the close of that exhibition. Absolute want of wall-space at Birmingham Gallery allows only for the borrowing of about some forty pictures; but these are all works of art of high quality by the foremost of modern French painters. The Duchess of Albany is lending an excellent example of Jala-bert—"Christ Walking on the Sea"—and the Countess of Casa Miranda (Madame Christine Nilsson) has promised her magnificent Benjamin-Constant, called "The Pastime of a Spanish Kalife." Lord Strathcona lends "The First Communion," by Jules Breton, and Mr. John Balli the great work by Meissonier, nearly 10ft. long, called "Friedland, 1807," which represents the wild gallop of the Cuirassiers as they dash past Napoleon and his staff, shouting "Vive l'Empereur!" The Lord Mayor of London is lending six works from his collection, by Bouguereau, Rosa Bonheur, Charles Jacque, Van Marcke, and Henriette Browne. Among the other artists represented will be Gérôme, Harpignies, Corot, Daubigny, Bastien-Lepage, Burnand, Delaroche, Isabey, Diaz, Courtois, Courbet, Fantin-Latour, Frère, Raffet, Monchallon, and Meunier. The exhibition will be open to the public about September 14, and will probably close at the end of November.

Mr. CHARLES H. LOWE, M. Inst. C.E., F.S.I., surveyor to the Hampstead Vestry, says, in his annual report to that body: "The nearest approach to the ideal road from the cyclist's point of view is the wood-paved carriage-way, and, now that the experimental stage in the use of Jarrah and other similar hard woods has been passed, the only thing standing in the way of their more general adoption for paving purposes is the initial cost. The supply of the material is practically unlimited, and, with the cost reduced—and it is reasonable to expect that this will be effected by the competition in the trade—there is no reason why Jarrah should not be used in paving the more important streets, such as are now coated with the best quality broken granite." Referring to motor-cars, Mr. Lowe says: "If ever the day does come which shall see the high-ways taken possession of by the horseless carriage, that same day will witness the difficulty of maintaining a smooth surface surmounted, for every wheel will have a rubber tire, and the decrease in the number of horses pounding the roads with their hoofs will be so marked that the destroying agents in the roadway will be reduced to a minimum."

THE autumn provincial meeting of the Auctioneers' Institute will be held at Brighton on Thursday and Friday in next week, the 8th and 9th inst. On the first day the council will be received by the Mayor, Sir John Blaker, and will hold its business meeting in the Pavilion. The second day will be occupied in visiting the waterworks, the electricity generating station, the School of Technology, and other works connected with the Corporation. In the evening there will be a banquet in the Pavilion, when the president, Mr. Edward Dobson, of Bradford, will occupy the chair, and will be supported by the Mayor, members of the Corporation, local Members of Parliament, and others.

THE School of Art Wood-Carving, which has hitherto been held in the Central Technical College, South Kensington, has now been removed to the Imperial Institute, in which rooms have been granted for its use, and in which it will be reopened after the usual summer vacation on Monday next, the 5th inst. Free studentships in both the day and evening classes of the School are maintained by means of funds supplied by the City and Guilds Institute for the advancement of technical education and by the Drapers' Company. Some of these studentships are at present vacant, and forms of application for them, also information as to the school generally, may be obtained by letter addressed to the manager, School of Art Wood-Carving, Imperial Institute, London, S.W.

THE efforts which are being made in New



York to have a new building code prepared for the enlarged city is in the hands of a widely representative committee, consisting of delegates from the New York Chapter of the American Institute of Architects, the New York Board of Fire Underwriters, the New York Board of Trade and Transportation, the Mason Builders' Association, the Association of Master Plumbers, the Architectural Iron Manufacturers, the Builders' League, Mechanics' and Traders' Exchange, Building Trades' Club, Real Estate Exchange, the Real Estate Owners' and Builders' Association, the North Side Board of Trade, West End Association, Upper East Side Association, and the New York Fire Department. Three delegates from each of these bodies form a committee, which have been holding meetings for several months, and are expected soon to promulgate a draft of the proposed building regulations.

The Sanitary Institute have just published an illustrated and classified list of sanitary appliances which have been examined and approved by a committee of experts at the exhibitions held under the auspices of the Institute between 1889 and the present year. The illustrations of the list make it easier for reference, and the various appliances included in the list pertain to all the sanitary appliances of the house, both in its construction and domestic management, and also to the larger field of hospital and municipal sanitation. Some of these have, of course, in the ten years since the judges first acted been superseded, and others have been improved upon, but by far the larger number have won their way into, and retained, popular esteem.

The largest raft of piles ever seen at San Francisco arrived in that port on August 2 in tow of a steamer from Astoria, Oregon, at the mouth of the Columbia river. The raft was of the cigar-shape pattern, and the long tow was most successfully accomplished. In the big pile were 6,000,000ft. of lumber. The largest raft brought to San Francisco heretofore contained 5,000,000ft. of lumber. The raft and her escort attracted a great deal of attention as they proceeded up the bay towards Long Bridge. The big bundle of piles appeared to be in excellent condition, and hardly looked as if they had just arrived from a long ocean voyage. They were tied up at Long Bridge without mishap. The piles were bolted together by iron rods passing through them and cross beams, and the ends were bulkheaded, so as to prevent any disturbance by the action of the sea. In addition to these securities, heavy lashings were tied about the raft at intervals of every 10ft. Some rough weather was encountered on the voyage, but the raft was not broken in the least.

The artificial sandstone made at Uccle-Calevoet, Belgium is (says a contemporary) a silicate of lime obtained under conditions that are probably similar to those which presided at the formation of natural sandstone—viz., the presence of hot water and great pressure. In its manufacture 80 per cent. by weight of very clean coarse sand, well dried, is intimately mixed with 20 per cent. of hydraulic quicklime, finely ground and kept in an anhydrous condition; and this mixture is charged into a roughly-made plate-iron box, the sides of which are kept in place by chains and cotters so as to be easily released. The box, well filled with the above-named mixture, is introduced into a closed boiler filled with hot water, that is kept for 72 hours under the pressure of six atmospheres—88lb. per square inch—and at the temperature of about 329° Fah. On emptying the boiler and opening the plate-iron box a block of sandstone is found, presenting exactly the same appearance as natural sandstone on leaving the quarry, but having the advantage of being absolutely homogeneous. The artificial sandstone is so soft when taken out of the box that it may be cut with a knife; but it hardens very quickly after exposure to the atmosphere, while giving up its moisture and acquires considerable strength. Compression tests, carried on at the Malines testing station of the Belgian Government, have shown that this artificial sandstone can only be crushed by a pressure greater than 5,689lb. per square inch—while it is not affected by frost, and does not absorb more than 6 or 7 per cent. of water, even after prolonged desiccation. The white freestone of France will only stand a compression strain of about 1,422lb. per square inch—so that the artificial sandstone has four times its resistance to crushing strain. It is estimated that this artificial sandstone can be produced,

including all charges, for about 5d. per cubic foot, compared with which figure, French freestone of not the best quality, obtains more than 1s. 1½d. per cubic foot—in large blocks of irregular shape; while various tints may be given to the artificial product, which resists climatic influences better than natural stone.

#### CHIPS.

The Northern Hospital at Liverpool is being rebuilt from plans by Messrs. Pennington, Son, and Harvey, of Liverpool, and is now practically complete. Messrs. William Thornton and Sons, of Toxteth Park, Liverpool, are the builders. The new building, which is faced with brickwork, and is very plainly treated, will contain 200 beds for patients besides a home for nurses.

The foundation stone of a new technical institute for Taunton was laid by the Mayor on Tuesday. The site, which is in Corporation-street, and adjoins the municipal buildings, has been presented by the town council, and the expense of the erection of the building is being shared by the Taunton Corporation and the Somerset County Council.

Mr. R. H. Bicknell, from the Local Government Board, held an inquiry at the parish offices, Tipton, on Tuesday, in reference to the application of the district council for permission to borrow £4,500 for the laying out of the new Victoria public park. Mr. Hopkins said that for the purpose of commemorating the Royal Diamond Jubilee a committee obtained subscriptions amounting to £1,500, with which they purchased 34 acres of land, and handed it over to the district council for the purpose of forming a public park for the inhabitants. The council now wanted £4,500 to lay the land out. The inspector examined the plans, prepared by Messrs. Barron and Borrowash.

The spacious hall of the new higher grade school in High-street, Heckmondwike, was opened on Tuesday. The architect is Mr. A. A. Stott, of Heckmondwike, and the accommodation comprises places for 1,090 scholars. The building has been erected at an inclusive cost of £18,000. There are chemical laboratories provided, science and art classrooms, lecture-rooms, and eleven classrooms for elementary instruction, all opening out of the Forster Hall. In addition to this there are classrooms for infants opening out of a smaller hall, and rooms for manual instruction.

A new organ has been provided by the Wesleyan Methodists of Birmingham for their mission services at the Central Hall, Corporation-street, in that city, and the opening ceremony took place yesterday (Thursday) afternoon. The organ has been erected by Messrs. Walcher and Co., of Ludwigsburg.

A fire broke out on Sunday, in Brussels, on the historic Grand Place, in the top story of the ancient Bourse, which dates back to the 15th century. The famous building adjoining, which was erected in the 16th century, and was formerly the Palais de Justice, narrowly escaped destruction.

An extraordinary general meeting of the London Tramways Company was held at the company's offices, Cemberwell, on Monday, when resolutions passed at a previous extraordinary general meeting were confirmed. The resolutions agreed to the sale of the company's undertaking to the London County Council for £850,000, apart from a short length of 2½ miles, and the Lawson-street Depot, for which they were to receive a further sum of £22,872.

At a meeting of the Works Committee of the Aberdeen Harbour Board held on Monday, a motion in favour of the reconstruction of the Aberdeen graving dock on the existing site, at an estimated cost of £125,000, was adopted. The question will be submitted to the Harbour Board for decision.

Towyn-on-Sea, Merioneth, was *en fête* on Tuesday week, the occasion being the gift to the town of a promenade and shelter by Mr. John Corbett, ex-M.P. for Droitwich. The public gift was formally handed over, and addresses were delivered. The market-hall was subsequently opened by Mr. Corbett.

At Herne Bay, portions of an estate of 63 acres of freehold building sites on the Western Esplanade were sold by auction on Wednesday week, a second sale being held on Wednesday of this week. Since the first sale of plots, which took place about three years ago, a number of residences have been erected on the front portion, and many others are in course of construction. Good prices have ruled at the sales. Sites to the value of upwards of £40,000 have changed hands, the best positions on the estate securing £12 per foot frontage.

The tower erected on Brandon Hill, Bristol, to commemorate the discovery of America by the Cabots, will be opened next Tuesday by the Marquis of Dufferin and Ava. It has been erected from designs by Mr. W. V. Gough, architect, 24, Bridge-street, Bristol.

## Trade News.

### WAGES MOVEMENTS.

THE SCOTCH FURNITURE TRADE DISPUTE.—Mr. Alex. Gossip, secretary of the Allied Cabinet Makers' Executive Committee, has written to Mr. Russell, secretary of the Employers' Association, offering terms which may lead to a settlement of the dispute. Mr. Gossip calls the attention of the masters to the recent vote of the men, which was adverse to the principal of piecework, and proposes:—(1) "That in any case where a man may not be considered qualified to earn the minimum rate of wages, his particular case be considered by the employer or his representative and the workmen employed in the shop. (2) On the question of repeat work, the average time, if desired, can be arranged between the employer and the workmen in that particular shop. (3) That the men resume work on the old conditions pending a settlement of the other disputed points." A meeting of the Employers' Executive was held on Tuesday to consider the proposals. It was agreed to forward a reply to the men stating that, after giving the proposals careful consideration, the committee regret that they cannot accept those in lieu of piecework. The committee could not approve of any arrangement for the fixing of the number of hours for the output of work, and in no circumstances could they agree to a resumption of work until all the points in dispute have been settled. The committee further point out that, in the event of the men agreeing to the principle of piecework, the Executive will be willing to arrange for a conference for the purpose of devising the most favourable conditions of piecework for the members that can be arranged, and also for the adjustment of the other points in dispute.

WORCESTER.—The plasterers are out on strike. They asked for an additional penny per hour, which was refused by the employers on the ground that the state of the trade does not warrant it. The strike has caused some inconvenience to the builders. The men for some time past have been agitating for the employers to agree to a new code of rules, which would entitle them to an advance of wages for overtime, and would place them upon the same terms as regards rules as masons and bricklayers. The masters were willing to sign this code, and are still willing to do so, but they do not see their way to give the increase of one penny per hour, and they also consider it unreasonable at this time of the year.

#### CHIPS.

At Preston Town Council on Friday a memorial was read from ratepayers objecting to the gift of £500 to the widow and daughters of the late borough surveyor, Mr. Hudson Reah, and the question was referred back for counsel's opinion on the powers of the council in the matter.

The formal taking over of the Aberdeen tramway system by the corporation was celebrated on Friday by a procession of decorated cars. The town council paid the purchase price of the tramways, amounting to £84,735, representing £15 per share, and also took over the temporary loans, amounting to £10,000, and the mortgages of £9,050.

The Grimsby Corporation have adopted an electric-lighting scheme at an estimated cost of £40,000, which sum includes provision for an electric-tram service.

The contract for the new clubhouse for the Foyle Rowing Club, Londonderry, has been let to Mr. Joseph Ballantine. The site is on the Strand-road below the old tennis-ground, with a frontage of 30ft. to the river. The clubhouse will have a bath-room and gymnastic requisites. The upper portion of the building will consist of an entertainment-room accommodating 200 persons. The building is being erected from the plans of Mr. J. P. M'Grath, C.E., Foyle-street, Londonderry.

The aggregate realisation at the Mart last week was £25,246, as much as could be expected in the slack season, and much better than that recorded in the corresponding period of last year—£15,600. There has been considerably more activity in the provinces, the returns being very satisfactory for the time of year, and prices for land continuing to show a good improvement.

The University of Edinburgh has just received from the Hon. John Macgregor, of Rangoon, member of the Legislative Council, and head of the firm of Macgregor and Co., large timber traders in Burma, the sum of £500 as a contribution to the fund that is being raised for the endowment of a Chair of Forestry.

Over £6,300 has now been raised towards the £10,000 which the London Playing Fields Committee are trying to raise for the purchase of Prince George's Ground, Raynes Park, as a playing field for Londoners of the poorer classes.



# THE BUILDING NEWS

## AND ENGINEERING JOURNAL.

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FRIDAY, SEPTEMBER 9, 1898.

### EAST HAM PUBLIC BUILDINGS COMPETITION.

THE designs for the proposed Public Buildings at East Ham, including a Free Library and Technical Institute, which the urban district council of that place invited in competition, are now on view, and we avail ourselves of the early opportunity afforded us of examining the drawings. The premium of 100 guineas has, with the advice of the referee, been awarded to the design No. 7. The joint authors, Mr. Henry Cheers, Twickenham, and Mr. Joseph Smith, Blackburn, have fairly fulfilled the conditions of the council. The site is bounded by Barking-road on the north, High-street South on the west, and on the other two sides by proposed new streets. The two former roads meet at a rather sharp angle, and we think the authors have disposed the three blocks to advantage. They are well grouped on the area, and broken up so as to form an agreeable ensemble. To describe first the ground floor. A lofty tower of good proportions rises over the main entrance of the town hall block at the north-west corner. The departments for the clerk and surveyor occupy the main entrance front to the High-street, on either side of a spacious hall; the general offices are placed on each side of entrance, and the clerk's private office in a retired position near main staircase. The surveyor's drawing-office and spare room face north (Barking-road), entered from a main corridor, which runs from end to end, west to east, and is 10ft. wide, and well lighted. Next to the surveyor's department is placed the collector's large office, 49ft. by 20ft., facing the same road, and the improvement clerk's office on the other side of corridor at the end, together with the private office, audit-room, &c., which are thus kept together. In the centre of the south side of corridor is the small hall, 41ft. by 35ft. 6in., for various purposes, with ante-room and lavatories near; these are well lighted and ventilated; having a large bay window in the south side that is made a feature, and has a flat over. On the first floor the public hall, 100ft. by 50ft., for 1,200 people, with platform at east end, covers the main portion of offices below, and is axially placed east and west. There are good retiring-rooms on each side, and the approaches to hall are by a main public staircase at the west end, with corner entrance to Barking-road, and also by two emergency stairs at the platform end; besides these there are exits from hall on to the flat over small hall, from which two light iron stairs lead direct to the ground, thus providing for the requirements of the Essex C.C. The hall is well lighted by five large semicircular-headed windows on each side, and there are cloak-rooms at the entrance end. The hall has an end gallery as required, an elliptical ceiling in three curves; the roof is trussed with iron, ventilation being afforded by a ventilating trunk which leads to the tower. We notice that the rooms and corridors are well lighted, and the rooms are square and carefully disposed.

The police-court block is semidetached, and though it joins the public-office block, it has a separate entrance on the ground floor from the High-street, which opens into a corridor 12ft. wide. The witnesses' room and the accommodation for magistrate and solicitors are well placed; the lavatories are convenient in their location, and the cells in the basement. The police-court is at the

end, retired from the street, while a small gallery and a double staircase, divided for prisoners and the public, project at the corner of court. The council chamber over police-court has windows on one side and is top-lighted; it has a gallery for the public, and the committee-rooms, mayor's parlour and lavatories, and the separate public entrance are convenient. The councillors' ante-room is useful.

The library and institute block is isolated and self-contained, on the north-east corner. The planning of the library on the ground-floor is compact and well studied, and the librarian's room is well placed. The library entrance is spacious, with side lobbies and a good borrowers' space before the counter. The lending-library is central, 44ft. by 42ft. top-lighted, with side bookcases. The reading-room to right of entrance is 64ft. by 24ft. 6in., and, on the other side, the reference-library is 51ft. by 25ft. The entrance to technical school is on the adjoining side; there is a cookery classroom and needlework-room, &c., on this floor, accessible from hall. Above are the technical classrooms, lecture-room, elementary art-room on north side, and laboratory, 51ft. by 24ft., all well lighted. The public baths block conforms to the conditions, and the swimming-bath can be turned into a gymnasium; it is top-lighted, with footway all round, and has the main entrance from High-street. The entrances for each sex are spacious, with good waiting-rooms. The sanitary offices form a semidetached wing.

The external design of the buildings as a whole, in red brick and terracotta dressings, is in a Free Renaissance style, but overwrought, in which Gothicised details are used. We do not like the buttresses between windows of offices, nor the lower part of tower, which is weak in the detail; the upper part of tower is pleasing in outline, and the belfry stage somewhat rich. Certain features and rococo ornament are in questionable taste, and this part of the design will bear revision. The elevations, being cut out in outline and mounted on toned paper, exhibit crispness and brightness. The authors' estimate is worked out at £52,770, cubed at from 6d. to 8d. a foot, and is thus below the aggregate sum of the Council, £55,000.

The second premium of 50 guineas is awarded to design bearing the number "5," by Messrs. Spalding and Cross. The general distribution of departments complies generally with the instructions, though not so well studied in detail. The public-office block has its two fronts, one facing Barking-road, the other the High-street. There is a well-proportioned tower over entrance to main corridor running east and west at the corner of the latter street; the clerks' offices are on the main front facing Barking-road, and the surveyors' at the eastern end, approached by main corridor. A large hall and staircase of considerable dimensions occupy the centre of the block on the south side of corridor; the accountants' department, with side corridor, forms a wing facing High-street, the end of it terminated by the tower, and the police department a return wing in the rear on south side. The small hall forms the end of the High-street front. There is space wasted in the hall and staircase; but the departments are well separated, and have distinct entrances. The library and institute block is compact and separate, also the baths, &c. The front elevation is of a Late Classic character, with rusticated dressings to windows of main front with corner corbelled turrets; it has many good points. The red brick and high tile roofs are pronounced; but we take exception to the junction of main blocks, where the gables cut awkwardly. The other elevations of library and bath are too domestic in treatment, and do not appear to harmonise with the public offices.

We can only speak briefly of another

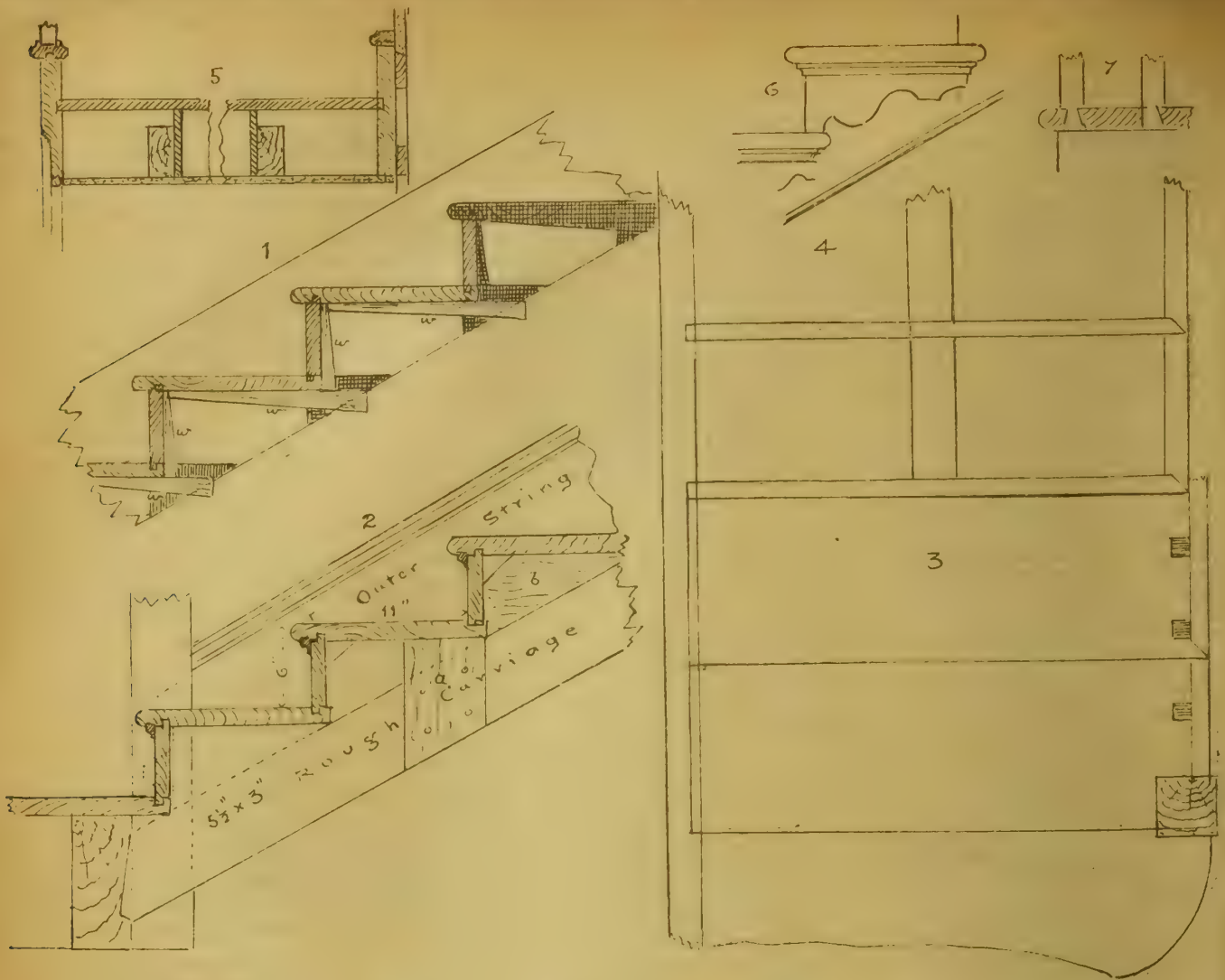
design, by Mr. F. T. Baggallay. A dignified and Classically-treated elevation faces the Barking-road, in which the library and police-court blocks form semidetached wings of plainer design to the centre public offices. These wings are separated by the entrance-halls and staircases of their respective buildings. Dignity is given by this arrangement of one continuous elevation. The centre offices or large hall is marked by a coupled rusticated order, and a *flèche*; the main entrance is squat. There is a well designed tower and cupola over entrance to police-court at the extreme end. The plan has merit; the departments are convenient and well separated. The police-court is retired from noise of street, and the chief police entrance is from High-street. There is a grand hall and stairs to public room in centre, facing main entrance to public offices, with cloak-rooms, &c., round, and the clerk's and surveyor's departments face Barking-road on each side, approached by a main longitudinal corridor; the accountants' and other offices behind. The public room above is well-lighted, and is approached by the main stairs, with a platform entrance and a gallery entrance at the ends of block in Barking-road. The technical school over library, and the chairman's and committee rooms over police-court, appear well planned and compact. The baths face High-street, and the arrangement is satisfactory.

We can only mention one or two other designs: No. 6 has some merit as a well-drawn set of a rather hazy treatment of brickwork, in which the large room is flanked by low cupolas; the library and police-court blocks in this design are attached, forming one long elevation. No. 4 is conceived in a dignified Classic 17th-century style, with detached blocks. The large hall has a corridor on each side; but the plan is not satisfactory. No. 9 is clever and spirited in design, but the plan is wasteful. The other designs exclude themselves by incoherent planning or extravagant features.

### ARCHITECTS' INSTRUCTIONS.

THE instructions of the architect are subject to so many varying conditions that it is very rarely they are carried out in their integrity, and seldom in their true spirit. Let us, for example, consider the case of a client who instructs his architect to make a design for a building in which he has full permission to carry out the work to the best of his ability without let or hindrance. Working drawings and specifications are furnished. As tenders are required, a bill of quantities is taken out by a surveyor, who is careful not to be too minute in his items, or lumps together as much as he can the requirements. Builders are invited, who take care that their prices are regulated by the items of the bill, and not so much by the drawings and specification. The lowest or one of the lowest tenders is accepted. A form of contract is entered into which binds the contractor to carry out the work according to the instructions of the architect, and that he is not to vary from the drawings or specification except by the authority of the architect given in writing, that any disagreement is to be decided by arbitration. These conditions are in many instances only a dead letter, as the architect, instead of putting them into force, wishes to avoid any dispute. The consequence is that the surveyor's quantities become the measure of the authority, and the latter document is practically substituted for the specification. And it is not easy for the architect to enforce compliance with his drawings if he knows that the item, as described in the bill, has been fairly interpreted by the contractor, that his estimate is low, notwithstanding any clause which states that the architect is not to be held responsible for the correctness of the quantities,





which must be taken as containing more or less. Of course, it will be said that in all properly-prepared contracts the architect should supervise the bill of quantities, and see that it substantially agrees with the specification and drawings. But is this honestly carried out? The practice of supplying the quantity surveyor with details of the stonework or joinery before he completes his quantities is a desirable one; but how often is it done? Take such a matter as the beds of stones. The tender of A may be several pounds less in respect of the dimensions or depths of beds than that of B, who has carefully taken them from the drawings. And so with sash-frames and sashes. They may be lumped together without the thicknesses of the linings or details being described, and a large difference in price is the result, amounting to perhaps hundreds of pounds in a large building, even if the interior finishings are adequately described in the specification.

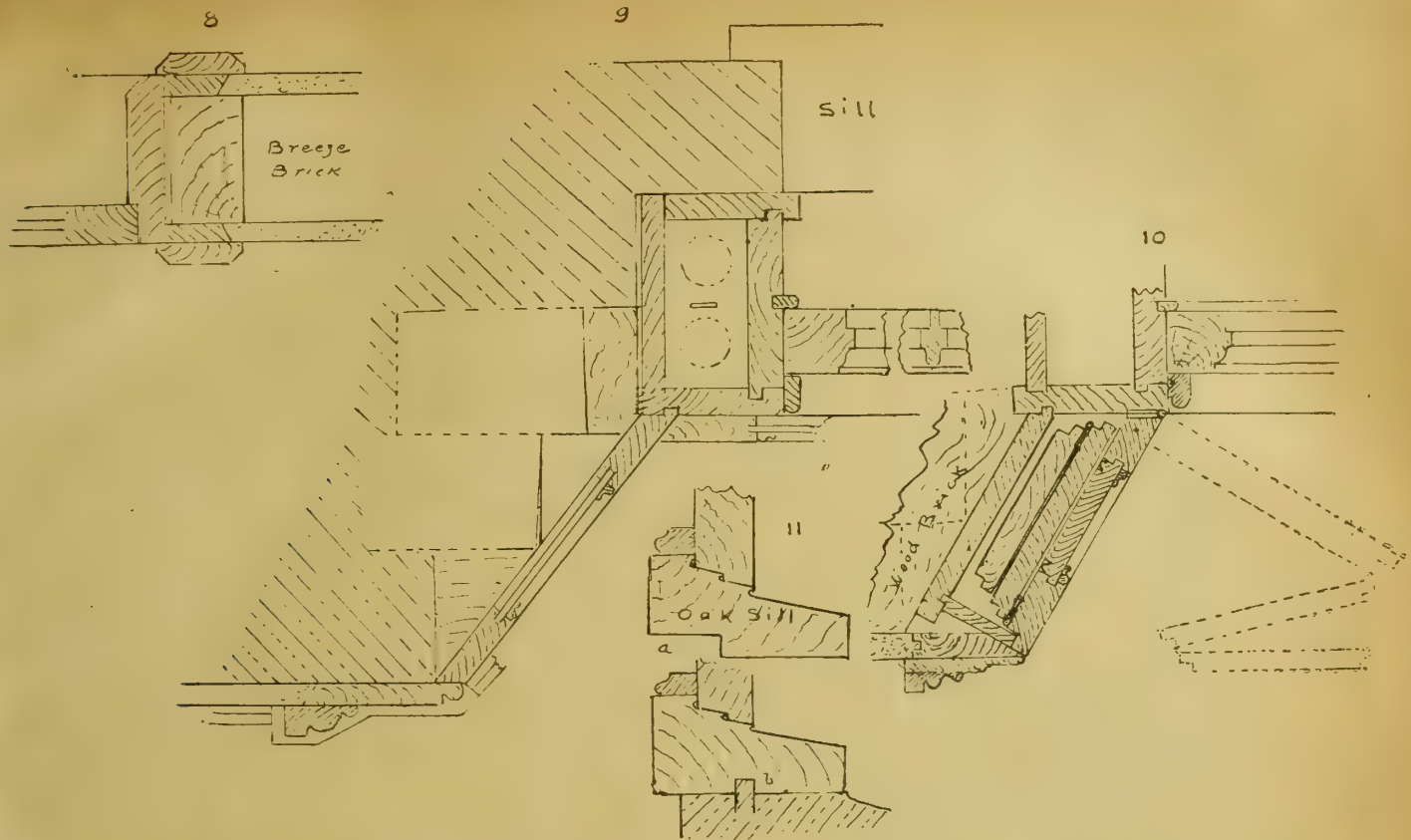
There are many safeguards in the ordinary building contract; but are they always acted on? A customary clause states the contractor is to provide everything that may be necessary and requisite for the proper execution of the works according "to the true intent and meaning of the drawings and specification taken together, whether the same may or may not be particularly described in the specification or shown in the drawings, provided that the same are reasonably and obviously to be inferred therefrom; and any discrepancy between them is to be decided by the architect"—a very good clause, but one that is difficult to put into practice, even when the word "quantities" is coupled with the other two documents as part of the contract. Suppose, for example, the drawings show a stone gable coping, the speci-

cation says nothing about it, and the quantities omit it. Is the architect justified in deciding that it is to be inferred? One can well understand how some contractors would resent his authority. To meet a case of this kind, a clause has sometimes been framed to the effect that "Should anything necessary to the design be omitted in either the drawings or other documents (or both), the same is still to be regarded as included in the tender, as if the same had been shown and described"—a clause which we venture to think would not be readily tolerated by responsible contractors.

And does the work executed in many of our important buildings under contract satisfy the architect who has any eye beyond his commission? Even where these safeguards are put into operation the executed work falls often short of the design. The architect's intentions may be, perhaps, clearly expressed in his drawings and details; but the speculating contractor prefers to accept the vulnerable specification, or the still more general quantities, in determining how little he shall do, or how much he shall leave undone. Can he not substitute inferior brands for Memel or Riga, Swedish for the best Christiania or Onega? How many ways there are of evading the intention of the architect in framing, in rebating and tonguing, and in many unseen things, or wherever he suspects the architect's knowledge is weak! The qualities of materials, or the labour upon stone offer the unscrupulous contractor easy paths of escape. Is it not easy to omit finishing the stone with a neatly dragged face, to omit such things as dowels, joggles, &c.; to neglect altogether matters of bedding and of dimensions? In the trades of the iron-monger and plumber, how easy it is to drive

a "coach and four" through any provision! The iron butt specified to be wrought may be cast, the brasswork may be replaced in many places by iron, the locks and furniture may be of inferior make. In the plumber's trade the weights of pipe and other details may be very easily evaded in the absence of skilled superintendence. In all these matters the contractor has the advantage. The most stringent clauses and safeguards in the contract, as those we have mentioned, are often so many empty threats. How is the architect to make the contractor substitute good for inferior material, or make him remove unskilful workmanship and substitute good, if he has not the means of finding out the difference? Can he prove that such-and-such timber is not the best Memel or Dantzic, or that an inferior bed of stone has been used? He must do so before he can enforce any condition of the contract. And why do the architect's instructions so often fall short of their intention? One of the reasons is that he depends too much on his drawings, hoping to see them realised by craftsmen who understand his meaning, and make up for the shortcomings of his draughtsman. The working drawing and the practical instruction are the only instruments by which the architect's intentions can be carried out; but these are often seriously discounted by the incident of cost and hindrances inseparable from the contract. By his own inability to treat material, or his slips in matters of detail, the architect reveals himself to the contractor or workman who is ready to profit by any mistake. Different interpretations may be put on some detail of the design. For instance, the architect is powerless to restrain those methods of execution or rules of the trade which have a traditional source, and his





inability to do so has caused what he intended to be done in one way to be executed in another. The builder has used his own discretion about something not very clear in the drawings, about a joint, or the conversion of material, and the result is to make the architect's detail meaningless or ridiculous. Hundreds of such cases occur in stonework, mouldings, brick details, joinery, and ironwork, and only because the workman's way is an easy way and the architect's method roundabout. These misinterpretations of design are troublesome and vexatious, though they are not always done with the intent of evasion of contract: they must be attributed to a want of mutual understanding of each other's duties.

#### MODEL SPECIFICATIONS.—XXIX.

##### STAIRCASES, SASH WINDOWS, CASEMENTS, ETC.

WE resume our clauses for staircases, and give several alternative descriptions for sashes and frames. The student is advised to make himself thoroughly acquainted with this important branch of joinery—including handrailing. In our sketches we show how the treads and risers are wedged up or housed into the wall and outer strings. The groovings are shown on the top step, and the wedges *w* and *w* (section 1). Section 2 illustrates a section of stairs through heads and risers, although it would be better to reverse the stairs, and have the handrail on the right-hand side. We also show how the treads and risers are blocked and bracketed to the fir carriages. *a* shows an upright bracket nailed at side of carriage, which, in some cases, extends the whole width of tread, and *b* shows a bracket resting on the carriage; the latter is the better plan and neater. The plan of an open cut bracket staircase with returned nosings is given (3), which describes the way of mitring the nosings, and shows the position of outer cut string and wall string, and the centre rough fir carriage (4). No. 5 is a section through stairs or landing, showing two carriages and strings, and 6 shows the end of bracket cut step. The

balusters may be dovetailed to tread either way shown, Fig. 7. We give other clauses for staircases of a superior kind.

The other sketches illustrate details of a finishing to door, with plain chamfered architrave and jamb-lining in a thin wall fixed to wood brick, or breeze blocks. Sections 9, 10, and 11 illustrate the framing of ordinary splayed window linings in thick walls, and the mode of fixing, also boxed shutters and oak sills, the latter showing two methods of fixing to stone sill, either by a rebate *a* or by a metal tongue *b*; the latter method is generally adopted.

In many specifications window sashes are too vaguely described without any thicknesses or details, and the contractor naturally takes advantage of this general description. Of course, the proper way is for the architect to give large scale 3in. or full size details of any special window. We have seen clauses like this: "Fill in windows with deal-cased frames, oak sunk and weathered sill 2in. wood sashes," without any thicknesses of casings, any reference to check rebating or throating of sills, or whether they are to have metal tongues, so that in pricing the item a very inferior class of sashes and frames is provided.

The sills of all sash and casement windows ought to have double throated beads, say, 2in. by 3in., planted on in white lead to prevent the driving-up of rain, and all transoms and the bottom rails of casements should have a check in the shape of a throated deal weather-moulding put on or formed in the solid.

In superior skirtings it is usual to groove and rebate them to the floors, and to fix the skirting to a double splayed bottom as ground for plastering, and also to a plain fillet at the floor. If the skirting is deep and of one board 9in., it is advisable to have dovetailed backings every 12in. or 18in. apart. In double sunk skirtings with three faces, the pieces are grooved and rebated together and to floors. Blocks of wood are necessary to fill in the space between plaster and back of skirting.

87. *Basement or Dog-Legged Staircase.*—The servants' staircase to be 3ft. between the strings, 9in.

"goings," and to be framed with 1½in. wrought deal treads, grooved for risers, with rounded (or moulded) nosings, housed into wall and outer strings; 1in. rebated risers, glued and blocked to treads housed into strings, and bracketed to carriages; 1½in. deal beaded (or moulded) wall strings, plugged to walls with ramps, tongued and mitred angles, heading joints, &c., and continued as a skirting round landing; 1½in. (or 2in.) wrought deal rebated and beaded close outer string, housed into newels, and prepared for plastering, finished with a capping; two 6in. by 3in. rough fir carriages to each flight. The winders to be of like description, fixed to strong bearers plugged to wall, and two dovetailed cross bearers to each tread. Turned newels, 4in. by 4in., moulded to detail with ball finials framed to trimmers and strings, and 3in. by 4in. moulded deal (or mahogany) handrail, screwed, ramped, and kneed, housed into newels, and 1½in. square deal balusters housed into strings and handrail, two to each step.

88. *Principal Staircase.*—The staircase from ground floor to second floor to be 4ft. wide, and to have 1½in. (or 1½in.) wrought deal treads, grooved for risers, and housed into strings, 1½in. wide (going), with moulded nosings, and hollow under-cut and mitred return nosings; 1½in. deal risers, rebated to treads, glued and blocked, and bracketed to carriages, housed to wall strings, and cut and mitred to outer string. Form one (or two) curtail steps, with veneered risers and scroll ends. The outer strings to be 2in. wrought deal, rebated, sunk, moulded, beaded, and mitred housed into newels, and prepared for plastering or panelling; the wall strings to be 2in., plugged to walls with ramps, heading joints fitted, ends tongued and mitred at angles, and continued round landings as skirtings. Two 7in. by 3in. rough fir carriages framed into trimmers; 6in. by 6in. turned newels with finials, and moulded according to detail, and 5in. by 3in. French-polished mahogany handrail in long lengths, screwed with ramps and knees, housed into newels. (If the soffit of staircase is panelled, specify: To be 1½in., moulded and square panelled framing, screwed to carriages and strings.)

89. *Sash Windows, Plain.*—The window openings of second floor to have 2in. (or 2½in.) Memel deal sashes (double or single hung), with best flax lines, iron weights, and iron axle pulleys in proper deal-cased frames, having oak double-sunk sills 6in. by 3in. and good spring sash fastenings. Inch angle bead to plastered jambs and soffits, inch moulded ledge to cap the plastered back, and skirting of room carried round recess; (or if wood framed back) inch deal back, moulded and panelled to match doors and skirting carried round; or the soffit jambs, back, and elbows to be of inch deal, panelled and moulded to match



doors and moulded architrave on framed and beaded grounds.

90. *Lifting Shutters*.—Add if with lifting shutters: Form an additional cased frame for lifting shutters to be hung as sashes and to descend into a proper deal casing with hinged ledge at top moulded on edge. The shutters to be bead-but and square, with brass-headed iron screw in brass screw-hole as fastening. The front of shutter casing to be panelled to match doors, and architrave also to suit the other framed work. Or—

91. *Deal-Cased Frames*.—Fit the windows of upper floors (or basement) with deal-cased frames, having 3in. by 6in. oak (or teak) sill double sunk, weathered, and check-throated, with 1½in. deal pulley stiles, lin. inside and outside linings, ¾in. back linings, with proper parting slips, beads, &c. The inside linings to be moulded as shown in detail. The beads are to be screwed with brass screws and cups. The frames to have 1½in. (or 2in.) moulded sashes with moulded (or ovolo) bars, the upper part in small squares, hung with best patent lines, or Austin's extrafine flax lines, or copper wire, over 3in. brass faced axle pulleys, and iron weights. The linings to be grooved for finishings, which are to be 1½in. rebated and moulded with architrave 4in. by lin. as per detail; or finish inside with 1½in. by 7in. window board, rebated and twice hollow moulded with bed moulding 1½in. by lin., lin. lining, and architraves 3in. by lin. as per detail. Put round and scribe to the brickwork outside of frame a 1½in. by lin. fillet moulded. Or—

Fill in windows with wrought deal cased frames, 3in. twice sunk, twice weathered, and check-throated oak sill, grooved for iron tongue, lin. grooved outside and inside linings, with 1½in. by 3in. bead; 1½in. (or 1½in.) twice rebated and grooved pulley stiles, with pocket pieces, and ¾in. (or ¾in.) parting beads; 2in. rebated head-linings, with bead blocked to lintel; ¾in. rebated back linings, ¾in. parting slips. Fit a window board with 1½in. moulded nosing rebated to oak sill, with returned and mitred ends, and put 3in. or 4in. by 1½in. moulded architrave, mitred at angles on narrow splayed grounds. The sashes to be of deal, 1½in. (or 2in.), ovolo moulded, double hung, rebated for glass, with splayed bottom rail, splayed (or rebated) meeting-rails. Each sash to have two horns moulded at ends, and to be hung with extra fine twine (or flax) lines over 3in. brass axle pulleys, and with cast-iron (or lead) weights. The sashes to be fitted with an approved brass spring sash fastener, p.c. 2s. 6d. (or fastener No. 73322 in Young and Marten's catalogue, Ironmongery), with brass lifts, 2s. per pair, and pull-down sash handles. The sashes to be glazed with 26oz. sheet glass or as directed.

92. *Inside Window Linings*.—The linings to be 1½in. wrought deal, moulded and square panel framing rebated to window-frame, and tongued at angles of soffit. The back to have three (or more) panels moulded on proper backings, grooved for moulded and rebated elbow-linings, two (or more) panels high, with angle-head fixed to grounds (see section 9). The architrave to be 6in. by 1½in. sunk and moulded, mitred at angles, fixed to lin. splayed groove, as shown.

*Note*.—For superior windows the above description of cased frames is sufficient, but the outer linings may be 1½in., grooved and moulded, the inside linings lin. thick, with 1½in. by lin. inside beading; 1½in. rebated and grooved pulley-stiles, or the pulley-stiles may be of oak or harder wood, and the bead fixed with brass socket-screws; 2in. rebated and grooved head lining; 3½in. twice sunk, weathered and throated oak sill, grooved for iron tongue; a window-capping or nosing, inside, shown by sketch. State if inside bead is rebated to pulley-stile, and if an outside guard-bead is to be planted round frame. For superior sashes 2in. (or 2½in.) moulded double, hung deal (oak or mahogany), sashes rebated for plate glass may be specified, and if so the bars may have moulded movable beads fixed with brass screws and cups, and a throated and splayed bottom rail, &c. Superior brass (or metal) fastenings, axle pulleys, and sash handles ought to be provided (state maker's name, as Boobyer and Sons or Young and Marten), and the glass to be British polished plate bedded in putty and washleather).

93. *Boxed Shutters*.—(See sketch 10.) The windows on ground-floor to have moulded and bead flush 1½in. deal shutters, and back flaps, three panels in height, hung to 1½in. (or 1½in.) inside linings by one and a half pair of wrought-iron (or brass) shutter and back flap hinges, and to have brass shutter knobs. The framed boxings to be grooved and rebated to frame with two panelled back and return linings 1½in. thick, and the architraves to be 6in. by 1½in. moulded to drawing. The soffit framing to be 1½in., one panel, wrought moulded and square, rebated to groove in frame and tongued at angles.

94. *Lifting Shutters*.—The boxings for lifting shutters to be lin. grooved outer linings, with lin. by ¾in. bead, and lin. grooved inner linings, with bead as before; 1½in. rebated and grooved pulley stiles, with pocket pieces and ¾in. parting bead; 2in. rebated and grooved head-linings blocked out, ¾in. rebated back lining, and architrave 4in. by 1½in. on grounds mitred at angles. Render brickwork at back of shutters with Portland cement ¾in. thick, and put 1½in. deal three-panel, moulded, rebated, and beaded, window back secured to boxings with four brass flush bolts for removal, with flap hinges, 2½in. brass butts, and having flush lifting rings. The two lifting shutters to be 1½in. moulded and bead-flush three-panel, each hung with patent lines (or copper wire) over brass axle pulley, with balancing weights, and put flush lifting rings to each shutter.

95. *Two-Light Windows*.—Windows with mullions or Venetian frames are often employed. The clauses may be the same as given above; but the centre mullions may be described. The mullion to be formed with 1½in. or 1½in. grooved outer lining moulded (or with cut and turned shaft), fitted to a tongued solid stile 1½in. or 2in. by 6in., or with ¾in. parting bead and inside beads 1½in. by ¾in. planted on to correspond with the inner linings of sash-frames. Or—

The centre mullion to be formed with an outside moulding (or ¾in. column grooved to receive tongue), with solid stile-piece, with parting beads and inside beads to correspond to sash-frames. The sash on each side to be hung on that side by brass axle pulley as before; each sash to have a line attached to the side-weight. (If there are two mullions and three sets of sashes, the middle sash, if to open, may be hung by a line carried over the side sash, with a double pulley boxing for weights.)

The better plan is to make the centre mullions wide enough to have a double casing and boxing for four weights (see sketch), the only difference in description being that a centre lining, say ¾in. thick, to separate the pairs of weights, be housed into grooves in the linings of centre frame. This centre casing would have a brick or stone mullion outside.

96. *Common Casements*.—Fit up openings with 1½in. deal casements, with single or two bars, or transoms, as shown, moulded and rebated for glass (or leaded glazing), hung with strong butt hinges, in solid fir wrought, rebated and beaded frames, and oak sills (as detail), with centre mullion 4in. by 3in., rebated and beaded, or chamfered, with 1½in. deal window boards complete, with brass fastenings. Or—

To be fitted with 2in. Memel moulded and rebated casements, having meeting stiles and rails, with rebated (or hooked joints), or grooved to exclude rain, in solid Memel fir wrought rebated and beaded (or moulded) frames 5in. by 3in., oak double-sunk sills hung with strong 4in. butts, strong brass knobbed latches, and brass bolts top and bottom (or with patent rod-bolt, or bolt and fastening in one, to make a close-fitting joint); or specify the openings to be filled with Burt and Potts' wrought iron (or other) casements in frames, or with Henry Hope's metal casements.

We shall give a few details of casements in our next.

#### THE ARCHITECTURAL ASSOCIATION BROWN-BOOK.

THE annual report, calendar, list of classes, and membership roll of the Architectural Association familiarly known from the hue of its paper covers as the "Brown-book," has just been published. It numbers 180 pages as against 188 last year, and shows a further improvement in the arrangement of subjects.

In their report the committee again announce a substantial increase in membership, the total number on the rolls at the close of the session being 1,218. 89 new members were elected during the session, 14 members rejoined, and the losses by death, resignation, and other causes amounted to 35. (The list of members showed it may be mentioned a total of 1,190 last year, 1,111 both in 1896 and 1895, 1,131 in 1894, 1,129 in 1893, 1,125 in 1892, 1,138 in 1891, 1,129 in 1890, 1,094 in 1889, 1,052 in 1888, 993 in 1887, 972 in 1886, 1,013 in 1885, 995 in 1884, 960 in 1883, 884 in 1882, and 863 in 1881, the present total being the highest yet recorded in the history of the Association.) The Jubilee Premises sub-committee has met from time to time, and it has been decided that before establishing a fund for acquiring new premises it is desirable to

formulate some definite scheme, and with this view a well-known surveyor and land agent (whose name is not divulged by the sub-committee) has been consulted, and steps have been taken to submit to the committee offers and proposals for suitable sites or premises. "By this means it is hoped before long to bring this important matter to a practical issue." The annual excursion took place in August, the headquarters being Lancaster; the party consisted of thirty members. The meetings held during the session included an inaugural address by the President, Mr. Hampden W. Pratt, and the reading of papers by Messrs. E. O. Sachs, S. F. Clarkson, H. D. Searles-Wood, J. Osborne Smith, L. A. Shuffrey, F. T. Baggallay, John Belcher, F. W. Troup, Hippolyte J. Blanc, T. C. Cunningham, H. B. Creswell, W. Eckstein, T. Elkin, and A. T. Walmisley—all of which were fully reported in the columns of this journal. A *conversazione* was held at the *Matinée Theatre*, Langham-place; the members' *soirée* was given at the *Café Monico*, Piccadilly-circus, and the annual dinner took place at the Holborn Restaurant. The register of assistants has again proved, the committee remark, of great service to members, the number of applications for assistants being larger than in previous sessions. The library has also been well used, increases both in the number of readers and of books borrowed being reported. Visits were paid to Oxford, a new church at Roshampton, five houses near Park-lane, Claridge's Hotel, public baths at New Cross and Shoreditch, a free library at Shoreditch, the Crown Theatre at Peckham, and Camberwell police station. The educational work of the Association has shown an improvement over previous sessions, although there has been a slight falling off in the number of students attending some of the classes—still, as compared with the membership of the Association and the number of fresh names on its list during the first three years the numbers seem disappointingly few. The most largely-attended classes were in Division I.: English Architecture, under Mr. F. R. Farrow, 50 students, Greek and Roman Orders, under Mr. R. Elsey Smith, 43 students; Elementary Physics, under Mr. H. B. Ransom, 33 students; and Mensuration and Land Surveying, under Professor Henry Adams, 30 students. In Division II., the numbers ranged in the eight classes from six to fourteen, the latter representing the roll-call in Construction, conducted by Mr. F. R. Farrow. Thirty-two students joined the Studio under the direction of Mr. W. G. B. Lewis; a general improvement in the work is reported. In the extra subjects, one enlisted the sympathies of but three students, two others eight, and two more ten, the largest number, 36, joining the Discussion section.

The annual statement of accounts appended to this report is, like that of last year, of a highly satisfactory character, showing that the Association now pays its way. With a total income for the year of £1,702 2s., an excess of receipts over expenditure is shown of £150 8s., which sum is carried to the premises and general fund. The principal sources of income are members' subscriptions, which realised £861 13s. 6d., and entrance fees £189 (against £841 2s. 6d., and £178 10s. respectively last year), and students' fees £573 19s. 2d. (against £605 15s. 9d.—a slight falling-off), while the main items of outlay were: Lecturers' and instructors' fees £491 8s. 5d. (almost the same as last year, £484 7s. 2d.); rent, which again figures at £230; and salaries, £205 11s. 9d. The "Grant to A. A. Notes, £100," one of last year's items of outlay, is not repeated. "Subscriptions in Arrears," which in last year's balance-sheet figured at £113, has this year risen to no less than £131—nearly a seventh of the total receipts from this source.

The fifty-second annual general meeting will be held on Friday evening, October 7th, when the inaugural address will be delivered by the President, Mr. Geo. H. Fellowes Pryne, F.R.I.B.A., and the prizes gained during last session will be distributed. A fortnight later the annual *conversazione* will take place, and the subsequent meetings of the session will be:—October 28, "Excavations at Thebes" (illustrated by lantern views), by J. E. Newberry, A.R.I.B.A.; Nov. 11, "Arts and Crafts," by H. Wilson; Nov. 25, "Oriental and Bay Windows," by Paul Waterhouse, F.R.I.B.A.; Dec. 9, "House-planning from the *Æsthetic Point of View*," by H. H. Statham, F.R.I.B.A.; Jan. 6, 1899, "The Position of Architecture among the Arts," by Edwin T. Hall, F.R.I.B.A.; Jan. 20, Illustrated



Lantern Lecture, "Ancient and Modern Buildings in Palestine," by Beresford Pite, F.R.I.B.A.; Feb. 3, "Stained Glass," practical demonstration, by Christopher Whall; Feb. 17, "Colour Decoration," by Cole A. Adams, F.R.I.B.A.; Mar. 3, "Public Baths," by A. Saxon Snell, F.R.I.B.A.; Mar. 17, "Reflections on the English Renaissance," by Reginald T. Blomfield; April 14, "Modelling as Applied to Architecture," with practical demonstrations, by F. W. Pomeroy; April 21, Members' Soirée; April 28, "Specifications," by F. W. Macey; and May 12, "Soil and Aspect in Relation to the Dwelling-House," by Dr. G. V. Poore, L.R.C.P., and Election of Officers.

#### THE BRITISH ASSOCIATION AT BRISTOL.

THE annual meeting of the British Association, which is being held this year in Bristol, was inaugurated at the People's Palace on Wednesday night by an address from the President, Sir William Crookes, F.R.S., who took as his topic "The Supply of Wheat to the United Kingdom and then to the Whole Civilised World." The President discussed methods of fixing atmospheric nitrogen and converting it into valuable nature, and proceeded to deal with more purely scientific subjects—the liquefaction of hydrogen, the constitution of matter at absolute zero, the newly-discovered gaseous elements, the Zeeman phenomenon, Röntgen ray discoveries, practical and theoretical, cathode rays and the fourth state of matter, Uranium and Polonium rays, unsuspected sources of energy, spectroscopy, and a new element. An exhibition was opened at the Drill Hall by the Marquis of Dufferin. The sectional meetings opened yesterday (Thursday), and will be continued until the evening of Wednesday next.

Section A (Mathematics and Physics) was presided over by Professor W. E. Ayton, F.R.S. An International Conference on Terrestrial Magnetism and Atmospheric Electricity was also opened yesterday in connection with Section A, and Professor Rücker delivered a short address. Saturday's sittings will be devoted to mathematics and meteorology, and papers on experimental electricity will be taken on Tuesday next.

The President of Section B (Chemistry) is Professor F. R. Japp, of Aberdeen University, who took as the subject of his address "Stereochemistry and Vitalism." He discussed Pasteur's researches in molecular asymmetry, and demonstrated the correctness of his belief, now generally questioned by chemists, that life is necessary for the production of optically active organic compounds, deduces from Pasteur's results the inadequacy of any interpretation of the phenomena of life which is based solely on the mechanics of atoms. Professor Ramsay and Dr. Morris Travers gave an account of their recent discoveries, especially in reference to "Neon," one of the three new constituents of the atmosphere; and Professor Sydney Young reviewed and summarised his physico-chemical investigations under the title of "Some Researches on the Thermal Properties of Gases and Liquids." Dr. W. J. Russell is expected to give to-day (Friday) an account of his work on the action of certain peculiar and special radiations from metallic surfaces upon photographic plates.

Section C (Geology) is presided over by Mr. W. H. Huddleston, F.R.S., whose address, delivered yesterday, dealt mainly with certain points in the geology of the South-West of England, east of Dartmoor. Special attention was directed to the Ordnance Survey map on the scale of four miles to an inch, which has lately been issued. The principal alterations were briefly described and discussed. Accepting Bath as a centre with a radius of about 50 miles, attention was drawn to the great variety of geological formations within that area—a variety not to be matched elsewhere in an equal space. Some of the results of recent observations were referred to, and certain peculiarities, long known in connection with the district, noticed—for instance, the passage of the old red sandstone into the Devonian, and, again, of the carboniferous limestone into part of the culme measures. Even in Mesozoic times, the contrast presented by the inferior oolite of Dundry to that of the Cotswolds has given rise to much discussion. In tectonic geology, likewise, the Gloucestershire coalfield exhibits a remarkable change in the strike of the beds, indicating that two distinct systems of movement must have been at work

within that area. The possible evidences of glacial action in the Cotswolds was discussed, and mention was made of the more recent changes which are known to have taken place in the estuary of the Severn. Among the papers promised for this section are the following:—Professor Hull, F.R.S., "On the Sub-Oceanic Features of the North Atlantic"; Mr. A. Strahan, "On the Revision of the South Wales Coalfield by the Geological Survey"; Mr. E. B. Wethered, "On the Building of the Clifton Rocks"; Mr. S. S. Buckmar, "On the So-called Midford Sands"; Mr. H. B. Woodward, F.R.S., "On Arborescent Markings in Carboniferous Limestone"; Professor Lloyd-Morgan, "Some Notes on Local Geology"; and the Rev. G. C. H. Pollen, "On the Further Exploration of the Newydd Caves, North Wales."

Professor W. F. R. Weldon, F.R.S., presided over Section D (Zoology and Physiology), and in Section E (Geography) the president is Colonel George Earl Church, the subject of whose address yesterday was "Argentine Geography and the Ancient Pampean Sea." Col. Church endeavoured to prove that the Plata drainage area was in a recent geological period much more extensive than it is to-day; that its most northern limit was 10° 44' south latitude, and that nearly the entire waters which now unite to form the Madeira river, the main affluent of the Amazon, once flowed southward into a Pampean Sea, which penetrated 1,400 miles inland, north to almost 19° south latitude. Incidentally the president of the section dealt with various topics of interest in connection with the past and present hydrography and physical geography of South America. Among other points he maintained that a great ancient lake (115,000 square miles) was formed in the valley of the Beni and Mojós after the latter was cut off from its southern connection with the Pampean Sea.

The President of Section F (Economical Science and Statistics), Dr. J. Bonar, dealt in his address with "Old Lights and New in Economic Study"; and Section G (Mechanical Science) was presided over by Sir John Wolfe-Barry, who in his address touched upon the growth of British shipping and the recent and future demands for dock accommodation throughout the kingdom, with some reference to the city of Bristol in this connection. He also adverted to the necessity of further facilities for experimental research and to the work of the committee which has recently been sitting, on the nomination of Government, in order to inquire into and report on the establishment of a national physical laboratory. Mr. Davidson will read to-day a paper on "New Works at the Barry Docks, South Wales." The paper will describe certain important works which have been lately and are now being carried out on these docks; the section will make a special visit to see these important works to-morrow (Saturday). Mr. C. Johnson will give a paper on "Hydraulic Jointing." This will be a description of the process which was to have been brought out by Hooley's last company, which was never formed. It is a mechanical device for uniting tubes such as are used in cycle frames, &c. There will be among other papers "Description of an Instrument for Measuring Small Torsional Strains," by Mr. E. G. Coker; by Mr. Alex. Siemens on "Electric Motors in Engineering Workshops"; by the borough electrical engineer of Bradford, Mr. Gibbins, on "The Hiring of Electric Motors by Local Authorities to Small Industries as carried out at Bradford"; and on "Electric Power and Lighting in Bristol Waggon Works," by Mr. Giepel. Other papers will be:—"A Description of the Municipal Electric Works, Bristol," by the borough electrical engineer, Mr. Proctor; "Corrosion of Gas and Water Pipes by Earth Currents," by Professor Fleming; "Scheme for Improvement of the Severn Waterway to Birmingham," by Mr. Marten, chief engineer to the Severn Commissioners. Mr. Dibdin will read a paper on "The Conditions Necessary for the Successful Treatment of Sewage by Bacteria."

The President of Section H (Anthropology) is Mr. E. W. Brabrook, C.B., and the main subject of his address was the unity of the anthropological sciences. Wednesday next, the closing day, is reserved provisionally for archaeological papers. The report on the Lake Village at Glastonbury and Professor Lloyd Morgan's paper on the prehistoric antiquities of the neighbourhood of Bristol will be of interest; and Professor Petrie promises a summary of recent

research among the first three Dynasties in Egypt, and a note on the Terramare settlements which underlie certain North Italian towns.

SECT. I. (Physiology) is this year combined with Section D (Zoology). Section K (Botany) is presided over by Professor F. O. Bower, F.R.S. Eight excursions have been arranged for to-morrow (Saturday), and another eight for Thursday next. At the end of the meeting there will be a five days' excursion to Exeter, Torquay, Plymouth, and Dartmoor.

In accordance with our custom for many years past, we shall give reports next week of those addresses and papers of special interest to our readers, and fuller abstracts of other proceedings will be found in the current issue of the *English Mechanic and World of Science*, and that of next week.

#### CHEMICAL AND PHYSICAL QUALITIES OF PAINTS AND PIGMENTS.

FROM what has been given concerning the composition and adulteration of pigments, the reader will be able to understand the chemical and physical changes that occur in the number of pigments as used in painting.

White-lead is the basis of all tints, and as a matter of fact it is compounded with almost every other pigment, for no single pigment is used in its natural purity or intensity of colour, except it be in small quantity. A consideration of the above chemical and physical qualities of white-lead, therefore, will enable the reader to understand some of the reactive changes that occur in a paint of which white-lead forms a base.

Now we have seen that commercial white-lead consists of about three-quarters equivalent of carbonate of lead to one quarter of hydrate of lead. We have also noted that the latter component has no covering power or opacity, while carbonate of lead alone does not form such a good quality paint as when combined with one-fourth hydrate of lead; consequently the composition of the commercial white-lead forms the ideal pigment so far as its physical qualities are concerned.

When considered chemically, however, the commercial white-lead is not so perfect a pigment as the above named would lead one to suppose. Thus hydrate of lead unites very rapidly with linseed oil to form linoleate of lead, which is a compound—called a lead soap—that is easily dissolved in water. The process by which this saponification has been brought about is due to the lead base uniting with the fatty oil acids, linolein, &c., in the linseed oil, whereby the constituent of water in the lead hydrates are eliminated therefrom, and the glycerine constituent of the oil is also eliminated. Consequently by this union of the hydrate of lead and linseed-oil vehicles a thorough decomposition of the pigment and oil takes place, the product being a lead soap that is miscible in water and a fluid that also combines with water.

Carbonate of lead does not so readily saponify with linseed-oil, and therefore a pure carbonate of lead is more permanent than a mixture of carbonate and hydrate. Some ten years ago the writer published in a contemporary the results of a series of experiments he made on the permanency of (a) pure carbonate of lead; (b) pure hydrate of lead; and (c) a mixture of the carbonate and hydrate of lead when mixed with linseed-oil as a paint. Each compound was painted over a dried patch of lampblack ground up in linseed oil, and when each patch of lead pigment was dry on the blackboard each patch was rubbed daily for a definite time with water, and also with water slightly acidulated with sulphuric acid. It should be mentioned that the black ground of lampblack was laid on a glazed earthenware tile, so as to preclude the possibility of the oil vehicle of the lead paint being absorbed. Thus the oil vehicle was enabled to dry wholly and solely into the patch of lead pigment. The results of these experiments were that the pure hydrate of lead was the first to become translucent—i.e., wear away—and show the black ground beneath. The next in order was the mixture of carbonate and hydrate of lead, while the pure carbonate of lead did not show any signs of the black ground beneath.

These experiments were instructive in showing that, provided a suitable compound could be used to replace the treacherous lead hydrate, then the permanency of white-lead in linseed oil would be assured. As we have said, the lead hydrate increases the unctuousity and covering power of the pigment, and what is therefore wanted is a compound that shall fulfil the same condition. Now



as a result of further experiment, the writer has proved that a mixture of pure carbonate of lead and Griffiths's zinc-white (which is an oxychloride of zinc) fulfils all the conditions necessarily required in a white pigment. The proportions are 2 parts of white-lead to 1 part of Griffiths's white; the covering power is then much increased, the unctuousity also increased, while the softness of tint obtained by mixing this compound white with staining colour is much better than the crude tint obtained with white-lead only. Such a compound-white pigment is one which is as permanent as it is possible to expect any pigment to be in which lead is a component. A familiar example of the evanescence of white-lead is exhibited by wayside sign-posts. The lettering on these boards is usually done in white-lead on a lampblack ground. After a few years' exposure to wind and rain, the white letters become partially, if not totally, washed off, leaving the black ground bare of lettering. The vanishing of the white-lead is due to the cause above mentioned—viz., the presence of hydrate of lead in the pigment. Another chemical defect of white-lead, and one which is common to all pigments possessing a lead basis, is the readiness with which the lead pigment becomes decomposed in the presence of sulphur, whereby the metallic lead base of the white-lead unites with the sulphur to form a new compound—viz., sulphide of lead—which is black in colour. For this reason it is not safe to expose white-lead paint to the action of sulphurous fumes or gases in the air, nor to mix it with pigments which possess a sulphur component. Every painter knows that a coat of white-lead will, after exposure to the air, sometimes assume a buff or brownish-drab tone. This darkening of the tint is solely due to the chemical action of sulphur on the constituents of the white-lead paint. Thus, when the white-lead pigment is decomposed or split up into its constituents by the saponifying action of the lead hydrate on the linseed oil, the components of the lead pigment are free to unite with other bodies to form other combinations, and such combinations actually do occur, with a portion of the lead base of the pigment uniting with the sulphur to form black sulphide of lead; consequently the coat of white-lead paint consists of particles of undecomposed white carbonate of lead and of black sulphide of lead, the amount of the latter body determining the darkness of tone assumed by the coat of paint. The sulphur may be present either in the form of gases in the air or as an ingredient of some other pigment, such as vermilion (which is a sulphide of mercury), ultramarine (which possesses sulphur as a component), emerald green (which is a sulphide of arsenic), &c. In any case, however, if the lead pigment had not become decomposed by the saponification above referred to, the activity of the union of sulphur with the lead base would be lessened, and consequently the coat of white-lead paint would retain its whiteness for a greater length of time; therefore, to preserve the purity of tone of commercial white-lead, such pigment should be ground up in a vehicle which does not readily suffer decomposition like linseed oil does, but in one which dries rapidly and solidly throughout its depth, whereby the coat of paint will become dry and hard before the chemical reactions have time to take place. Such a vehicle is a varnish or oleo-resinous one, as has been already referred to. The mixture of driers with white-lead paint will not prevent the darkening of tint, because, although such driers will not cause the coat of paint to dry rapidly, yet the composition is one that is actually injurious to the white-lead pigment, which, with a coat of varnish over the white-lead paint, protects the paint from the darkening, because, as we have seen, the union of sulphur with the lead component can take place internally (by the union of the white-lead with pigment containing sulphur). The sole remedy consists in excluding hydrate of lead as a component of "white lead," and using the pure carbonate of lead mixed with some other body that is not injurious to it. Pure carbonate of lead, as we have already seen, is not sufficiently opaque to exhibit the good covering power expected of a white-lead paint; but the union of oxysulphide of zinc with pure carbonate fulfils all the conditions required in a paint of lead, for, notwithstanding the fact that the oxysulphide of zinc possesses sulphur as a component, the sulphur component does not react on the white-lead because it is so intimately combined

with the zinc compound that a furnace-heat will not separate the two. It is only in the case of a badly-made oxysulphide of zinc where disastrous results occur, because, if not properly made, the oxysulphide of zinc will contain an excess of free sulphur, which will act in the destructive way mentioned above.

In the case of chromates of lead (yellow chromes) those pigments saponify with linseed oil, and consequently suffer the same disastrous consequences as white-lead. In this case, however, the commingling of the particles of sulphide with the undecomposed particles of yellow chromate tend to produce a greenish tint to the paint, whereas in the case of the redder chromates of lead, such as orange mineral and red chromate, scarlet chrome, &c., the commingling of the black particles with the red ones tend to produce a brown chocolate hue.

Apart from the saponification of lead chromates, they also suffer other chemical reactions, such, for example, as being deepened and darkened in tone by alkalies, and even practically dissolved by alkaline bodies. As a consequence of such action, yellow chromates of lead cannot be mixed with lime or similar caustic bodies, because such alkaline body would deepen the tone of yellow, making it redder in hue, while the presence of alkaline components in any pigment mixed with yellow lead chrome would practically decompose the chromes, whereby they would be more or less destroyed.

Similar results occur with green pigments, such as Brunswick green, wherein lead chromate forms a component. The alkalinity of any alkaline body such green pigments are brought into contact with darkens the yellow component of the green pigment, and at the same time such alkali also exerts a destructive action on the blue component of the green pigment. The blue component is a form of Prussian blue, which is a pigment that changes to brown by the chemical reaction of alkalies on it. One of the chief causes of destruction of colour and permanency in Brunswick green is the addition of common driers to the paint. The true safeguard consists in the use of a quick-drying oleo-resinous vehicle with such green pigments, whereby the coat of paint becomes dry and hard before chemical reaction has had sufficient time to produce disastrous results.

One peculiarity that painters have probably noticed concerning Prussian blue—a component of a green paint—is that the green hue disappears when such paint has been exposed to the air some time, and such green coat becomes virtually a lightish-blue one. This change of colour has been brought about in this way. The saponification of the yellow-lead chrome constituent has caused that component to be washed away out of the paint by successive showers of rain, &c., leaving the blue constituent of the paint as a thin, light wash of colour. This blue, being a Prussian blue, becomes deepened in colour on the addition of oxygen from the air; but the physical action of strong sunlight has a bleaching action on the Prussian blue, and, as a consequence, instead of the blue becoming deeper in tint by the absorption of oxygen, as fast as it does so the colour is bleached out of it, and a mere ghost of a blue colour remains. Many painters can readily recall to mind such effects on outside woodwork—such as wooden window shutters, palings, &c. The destruction of what was originally a coat of green paint occurs because the lead soap that was formed by the union of the yellow chromate of lead with the linseed-oil vehicle has been washed away from the coat of paint by the action of wind and weather, leaving a bare skin of blue paint behind, which skin itself suffers incipient decomposition and change, until eventually that vanishes also, leaving behind a mere shred of what was originally a fairly thick coat of paint. If this thin wash of blue paint be examined, it will be seen to be just like a water-colour stain on the wood-work.

In our next article we shall deal with the chemical and physical reactions brought about in paint by oxygen.

H. C. S.

Mr. William Kelly, of the firm of D. Kelly and Sons, builders, Kirkmichael, Isle of Man, at eleven o'clock on Saturday morning bathed from the shore at Kirkmichael. He swam some distance out to sea, and then was seen to sink suddenly. Late on Saturday night his dead body was found near the scene of the accident. He was an excellent swimmer, and was probably seized with cramp.

### THREE-HINGED MASONRY ARCHES; LONG SPANS ESPECIALLY CONSIDERED.\*

By DAVID A. MOLITOR, M.Am.Soc.C.E.

(Continued from p. 313.)

A COMPARISON of the last assumed data and the final dimensions obtained in Table No. 5 is given in the following table, from which it is clearly seen that the last assumed arch ring gave dead loads and dimensions which could scarcely be improved by further computations:—

Point.	Assumed Dimensions.		Computed Dimensions.		For Half Total Live Load as found in Table No. 2.
	D.	y.	D.	y.	y
	cm.	in.	cm.	in.	in.
0	88	0 00	88	0 00	0 00
1	112	0 05	110 4	0 043	0 042
2	131	0 18	129 8	0 188	0 185
3	145	0 45	145 8	0 440	0 442
4	154	0 80	156 4	0 820	0 824
5	162	1 29	163 3	1 339	1 346
6	166	1 96	168 0	2 002	2 012
7	167	2 80	169 7	2 825	2 842
8	168	3 79	166 6	3 833	3 844
9	169	4 98	162 7	5 016	5 026
10	150	6 38	151 8	6 397	6 408
11	134	7 96	133 3	7 994	7 998
12	106	10 00	106 0	10 000	10 000

The above agreement between  $y$  and  $y$  illustrates very strikingly the statement previously made—viz., that the line of thrust, for a case of entire span covered with one-half the uniform live load, represents practically the centre line of the arch. It will be noticed that the tensile stresses on the intrados at points 6 and 7 (see Table No. 5) are slightly in excess of the allowable, being 2.8atm., as against 2atm. allowed. This would probably be safe, but having set the limit at 2atm., the excess of 0.8atm. must be provided for, either by giving the section larger dimensions at these points, or by introducing a few iron rods to take up the excessive tension. The latter method will be adopted merely to illustrate the application of the formula. The sectional area of iron required for an arch of 1cm. width is by equation (45) —

$$a = \frac{k_1^2 D \left( \frac{D}{2} - \frac{k_1 D}{3(k_1 + k_2)} \right)}{2 f v (k_1 + k_2)}$$

in which  $k_1 = 0.8atm.$ ,  $k_2 = 40atm.$ ,  $D = 169.7cm.$ ,  $f = 700atm.$  (10,000lb. per square inch), and  $v = 75cm.$ , leaving about 10cm. of concrete outside the iron. By substituting these values in (45), and solving, it is found that  $a = 0.002cm.^2$ , or for an arch 1m. wide  $0.2cm.^2$  would be required, or 3 rods of 3mm. diameter for each metre of arch, or 7 rods of 2mm. diameter, whichever may be preferable.

(f) Design of the Hinged Bearings.—The radius of curvature of the rolling surface according to Winkler, Heinzerling, or Melan is given by  $r = \frac{2N}{\pi k l}$ , in which  $N$  = the maximum normal pressure on the bearing = 390,543kls. for 1m. width of arch,  $l$  = length of rolling surface = 70cm., and  $k$  = allowable unit working stress = 240 atm. for cast iron under slow motion. Then—

$$r = \frac{2 \times 390,543}{3.14 \times 240 \times 70} = 15cm.$$

To find the height of the bearing necessary to distribute the stress over the concrete, let—

$h$  = height of the bearing  
 $D$  = thickness of arch ring adjacent to the bearing = 106cm.  
 $b$  = width of bearing = 100cm., but the rolling surface is only 70cm.  
 $N$  = normal pressure on the bearing for 1m. width of arch = 390,543kls.  
 $T$  = tangential stress on the bearing for 1m. width = 11,860kls.  
 $M$  = maximum bending moment on the bearing.  
 $I = \frac{b h^3}{12}$  = moment of inertia of vertical section through axis of roller.  
 $k$  = allowable unit stress = 500atm. for cast iron, quiescent load.

Then—

$$M = \frac{N}{D} \times \frac{D^2}{8} = \frac{N D}{8}; \text{ also } M = \frac{k l}{h} = \frac{N D}{8}$$

which solved for  $h$  gives—

$$h = \sqrt{\frac{3 N D}{4 k b}} = \sqrt{\frac{3 \times 390,543 \times 106}{4 \times 500 \times 70}} = 30cm.$$

\* Read before the American Society of Civil Engineers.



The coefficient of friction between cast iron and stone is about 0.6; hence a tangential stress of 0.6 N = 234, 300kl. would be required to slide the bearing-plate. The existing tangential stress is only 11,860kl. However, a small rib is provided on the bottom of the plate to prevent sliding during the erection of the structure. To diminish the sliding friction between the roller surfaces of the bearing, it is intended to make the radius of the convex surface 15cm. and that of the concave surface 16.5cm. (not shown on the drawings), thus converting the sliding friction into rolling friction. The arc described by these rollers, for the extreme movements of the arch, is so small that the point of contact between the rolling surfaces would not be appreciably displaced, and there is absolutely no danger of unequal distribution of pressure on the casting, even were the motion to reach 1° of arc.

(g) *Composition of the Concrete.*—The full section of the arch ring for a distance of 2m. from the hinges, and all outside the middle third of the arch ring; also the floor arches and the exposed surfaces of abutments and piers for a depth of 20cm. from the surface, shall be of concrete, composed of 1 part Portland cement to 2 parts sand to 3 parts limestone. The middle third of the arch, the surfacing of the roadway under the asphalt composition and the cores of the small piers shall be of concrete, composed of 1 to 3 to 6. All other concrete shall be mixed 1 to 4 to 8, except the abutment foundations.

(h) *Camber.*—The camber to be allowed in the arch ring will now be found for the condition that the bridge, when completed, carrying the dead load and a live load of 200kls. per square metre, shall be at its true level at 0° Centigrade. To realise this, the falsework must be super-elevated by an amount equal to this camber plus the settlement which the former may undergo up to the time of closing the arch ring. The settlement in the falsework should be determined by actual tests made prior to construction. After the arch ring is closed at mean temperature of, say, 24° Cent., and under no stress, it should be above its geometrical shape by the amount of the camber. Hence, the camber will be equal to the deflection at the crown caused by the dead load and the uniform live-load of 200kls. per square metre, and a diminution in temperature of 24° Cent. below the mean. Then, under ordinary temperatures and loads, the arch will usually be above its theoretical position, which is very desirable, as the horizontal thrust is materially increased by a diminution in the rise of the arch. The thrusts N resulting from the assumed case of loading are found in Table No. 6, using equations (26), (27), and (36). The shortening in the successive arch section between the crown and the abutment, for the respective values of N, are also found in Table No. 6 from equation (46). As the assumed case of loading is one of symmetry, only the half arch is treated. The concrete to be used for the arch-ring should possess an ultimate compressive strength of 220atm. at probably the age when the bridge will be first tested. From Table No. 6 the average unit working stress, for the case of loading just above mentioned, will be seen to be 23atm. Then the values of  $\epsilon$ ,  $\alpha$ ,  $E$ , and  $E'$  can be taken from the data given under Section V. (d), as follows:  $\epsilon = 0.0009$ ,  $\alpha = 0.0000088$ ,  $E = 295,000\text{atm.}$ , and  $E' = 3,000,000\text{atm.}$  For  $t = -24^\circ\text{Cent.}$   $\epsilon + \alpha t = 0.00111$  and  $\frac{1}{E} + \frac{1}{E'}$

$= 0.0000372$ , which values are used in Table No. 6 to find the  $\Delta L$ 's. The abutments themselves will be somewhat displaced as a result of stress and temperature effect, though the shrinkage will probably have taken place prior to closing the arch ring. Hence the equation for the shortening in the abutment may be written  $\Delta L = -\frac{N L}{E + E'}$  Taking  $F = 69,000\text{cm.}^2$  as an average value, and  $L = 1,000\text{cm.}$ ,  $\Delta L$  becomes 0.23cm. This displacement is considered in the graphical solution on Plate XLVI. (published on p. 281 in our issue of the 26th ult.), but not in the analytical solution here following. From Table No. 6, the value of  $\delta = \sum \frac{\Delta L}{L}$   $= 4.521\text{cm.}$ , of which 3.693cm. is permanent, and 0.828cm. is elastic. Also  $n = \sum \frac{\delta}{L}$   $= 3.789\text{cm.}$ ,  $f = 1.00\text{cm.}$ , and  $\frac{b}{2} = 3.600\text{cm.}$  Hence, from equation (49)—

$$C_1 = \left(1 - \frac{\delta}{n}\right) \sqrt{f^2 - \frac{b^2}{4}} = 3,731.85\text{cm.}$$

and from equation (50)—

$$\Delta f = f - \sqrt{C_1^2 - \frac{b^2}{4}} = 16.79\text{cm.}$$

This agrees very closely with the value 16.65cm., obtained from the graphical solution on Plate XLVI. When the displacement of the abutments, amounting to 0.23cm., is included, the total deflection at the crown will be 17.5cm. The deflections at any other points of the arch ring may be scaled from the diagram, Plate XLVI. If the falsework were absolutely rigid, the crown of the arch would require a super-elevation of 17.5cm., so that the arch, if close at 24° Cent., and when carrying its own weight and a live load of 200kls. per square metre, will have a rise of 10m. at 0° Cent. The design of the falsework is not made a part of this problem.

(i) *The Pressure on the Abutment Foundations.*—This is found to be 4.76atm. (see Plate XLVI.) This, for the character of the substrata, assumed in the problem as hard clay, is in no way excessive. However, when dealing with a specific case, the pressure area may be made any desired quantity, and the foundation pressure be diminished to such intensity as may seem safe for the particular case. The fact that small settlements in the abutments of three-hinged masonry arches are not attended by any serious consequences, especially when sufficient camber was put into the arch during construction, makes it perfectly safe to exceed the pressure limits on foundations hitherto allowed for arches without hinges, by from 50 to 100 per cent.

(j) *Estimate of Quantities.*—The following table contains the quantities of Portland cement concrete of the various mixtures for the different parts of the structure:—

Structural Parts.	Quantities of Concrete in Cubic Metres.				
	1:2:3	1:2.5:4	1:3:6	1:4:8	1:4:8:3st
Arch ring .....	978	—	478	—	—
Floor piers .....	165	—	52	—	—
Floor arches and floor .....	328	—	—	—	—
Two abutments and wing walls .....	141	—	—	1 661	—
Two abutment foundations .....	—	60	210	—	1 664
Totals in cubic metres .....	1 612	60	749	1 661	1 664
Totals in cubic yards .....	2 103.5	78.5	979.7	2 172.6	2 176.5

#### ESTIMATED QUANTITIES.

Items.	Quantities.	
	Metric units.	U.S. units.
Portland cement concrete, mixed, 1c. : 2s. : 3 broken stone .....	1 612m <sup>3</sup> .	2108.5 cu. yd.
" " " " 1 : 2.5 : 4 " .....	60 "	78.5 "
" " " " 1 : 3 : 6 " .....	749 "	979.7 "
" " " " 1 : 4 : 8 " .....	1 661 "	2172.6 "
" " " " 1 : 4 : 8 b.s., 3 stone .....	1 664 "	2176.5 "
Louisville cement concrete 1 : 6 : 12 broken stone .....	720 "	941.8 "
Earth excavation .....	5 400 "	7063.0 "
Asphalt pavement over abutments, 15cm. concrete found .....	176m <sup>2</sup> .	210.3sq.yd.
Asphalt composition 6cm. thick over bridge .....	600 "	717.0 "
Concrete footwalks over abutments .....	88 "	105.2 "
Concrete balustrade over abutments .....	44m.	144.3 feet
Iron hand-railing over bridge .....	150 "	492.0 "
194m. of steel grooved rail, 80lb. per yard, or 39.76kl. per m. ....	7 713kl.	16 970 lb.
972 steel rods, 2.5cm. diam., 3.05m. long, nuts each end, at 12.4kl. ....	12 052 "	26 514 "
120m. 7 at 14.9kl. per m. or 10lb. per foot .....	1 788 "	3 934 "
Metal in expansion joints of roadway .....	5 000 "	11 000 "
Cast-iron hinge bearings .....	81 600 "	179 520 "
Falsework .....	72lin.m.	235.2lin.ft.

Unit prices have not been inserted in the above table because these are too much dependent on local conditions and market values. However, a liberal estimate of cost for the entire structure as designed, including 10 per cent. for engineering contingencies, would be about 96,000dol.

#### SLAG BRICKS IN GERMANY.

F. W. LUERMANN, in an article in *Stahl und Eisen*, gives his experience in the manufacture of bricks from granulated blast furnace slag. The direct production of building and paving stone from fluid slag, he says, is nothing new. Such slag bricks, however, did not prove a suitable material for dwelling-houses, because they are, like glass, impermeable for air as well as steam. In human habitations the aqueous vapour exhaled by the occupants would condense on cold days on both windows and walls, thus rendering the rooms damp and unhealthy. On the other hand, brick manufactured from granulated blast furnace slag is permeable and hygroscopical—that is, both air and steam can penetrate them.

The first one to produce granulated slag or slag gravel for brick making, by passing the fluid slag through water, was Eugene Langen, an employé of the Friedrichs Wilhelm mine, near Siegburg, Westphalia. This process causes disintegration: silica is separated in a soluble condition, in which it easily hardens in the air and combines just as easily with caustic lime. The single grains of the slag gravel, when compressed tightly, are bound by the soluble silica; and when ground to a fine dust, so that the particles come into closer contact with each other, the binding by the silica therein is sufficient for the production of good building bricks. Bricks from ground slag, however, require a longer time for hardening than those manufactured from granulated slag. By mixing granulated slag with dust from slag which has crumbled in the air good bricks can be produced without any addition of lime, but the hardening process is rather slow. Hardening takes place quickest in from six to eight days with bricks to which about 10 per cent. of burned and slaked lime has been added.

Granulated slag, from its passage through water, contains from 19 to 33 per cent. of water, according to its porosity—a fact which has to be considered in shipping. Its weight ranges between 1,100lb. and 1,500lb. per cubic metre (35.3c.ft.); that of ground slag runs as high as 2,900lb. Ground slag can be added to the mixture of granulated slag and lime when dense and strong bricks are to be produced.

The bricks may be given any shape desired; and they will preserve this shape, because they are not burned. They show sharp edges and smooth surfaces, and give the best satisfaction when as little mortar as possible is used. The natural colour of slag bricks is that of greyish

white sandstone. The weight ranges, according to dryness and slag used, between 6½lb. and 7lb. The strength of slag bricks fully equals that of ordinary burned bricks; 24lb. to 28lb. per square centimetre (1.55sq.in.) is usually considered the highest admissible burden for ordinary bricks. Well-hardened slag bricks can withstand, theoretically, burdens up to 160lb. and 180lb. The resistance of slag bricks to high temperature is quite remarkable. Heated to a pale red, when the carbonate of lime begins to decompose its strength will not be injured. Even if a part of the lime should be decomposed at such a high temperature, and thus rendered caustic, carbonic acid is again absorbed at a lower temperature, and the brick again becomes as strong as it was before. For the construction of chimneys and stacks, slag bricks are used with advantage, as the products ascending contain a large quantity of free carbonic acid, which is delivered to the bricks. For the same reasons, it is well adapted for lining limekilns and walling in boilers.

Slag bricks are five times as permeable as ordinary-burned bricks. Their porosity also is greater than that of burned bricks; while they do not absorb water as quickly as burned bricks,



they regain their permeability quicker than the latter. A burned brick filled up its pores with water in 12 hours, while a slag brick required 190 hours to get thoroughly soaked.

To test whether slag bricks have dried and hardened sufficiently to be safely used, a small piece of brick tied to a string is dipped into a cold concentrated solution of sulphate of soda and hung up in a room. By the evaporation of the water in the solution and the crystallisation of the soda, which in its action resembles the formation of ice, bricks that will not resist frost are destroyed, each crystal needle carrying a little cap of the material from which the brick was produced. Not slag bricks alone, but any other, can be tested in the above-mentioned manner as to their power of resistance to frost.

Slag originating from puddling and Thomas pig iron produces the best bricks, while Bessemer and foundry slag ranks second. At several German works the cost of production of 1,000 bricks is only 10s. sterling. From 6,000lb. to 7,000lb. of granulated slag and 450lb. to 700lb. of burned lime are required for the production of 1,000 bricks.

#### THE CANTILEVER BRIDGE: ITS DESIGN AND CONSTRUCTION.—II.

THERE are three particular cases, in connection with the stresses upon cantilevers, which most frequently present themselves for investigation and solution. In addition, there is also a general case, which, although more of a theoretical than of a practical character, is yet of some importance, since by substituting certain useful and working values for the symbolic data assumed in the calculations, it will enable problems to be solved outside the limits of the other three. These four are all the examples it is proposed at present to inquire into. The two questions we are just now concerned in analysing are the bending moments and the shearing stresses, the former being designated by the letters B.M., and the latter by S. The length of the cantilever outside, or clear of the support by which it is fixed, or *encastré*, is put equal to L. When dealing with cantilevers, the two most usual dispositions of the load are (1) when it is situated at the extreme free end of the length, and (2) the other when it is supposed to be uniformly distributed over the whole length. Example (1) is shown in Fig. 1, in which W is the weight, y the distance from it to the point at which the bending moment and the shearing stress, produced by the action of the weight, are required. From what has been stated in Article I. respecting the moment of any force about any point, it is evident that the moment of the weight W, with regard to any point, such as P, in the cantilever, is directly proportional to the leverage or lever-arm; that is, the horizontal distance from the weight to the point. Consequently, the bending moment at the point P will be given by the equation—

$$BM = W \times y \dots\dots\dots(1)$$

At the free end of the cantilever, the lever-arm  $y = 0$ , so that the bending moment there is zero. But at the fixed end, y attains its maximum value, which is  $y = L$ , so that the bending moment also has its greatest value there, and is—

$$BN = W \times L \dots\dots\dots(2)$$

Now for the shearing stress, which, it should be observed, has no moment, but is simply the weight itself transmitted, unchanged in amount, throughout all the different sections of the cantilever to the fixed extremity. Attention should be paid to the difference of conditions obtaining in these two descriptions of stresses. The one—provided always the weight remains unaltered—varies at every different point in the cantilever; the other is constant throughout the entire length, and has the general expression—

$$S = W$$

As a check upon the algebraic calculations, the elegant method of graphic statics may be employed, for which purpose let  $W = 1$  ton,  $L = 10$  ft., and  $y = 6$  ft. Then, by the present computation, we have for the bending moment at the point P—

$$B.M. = 1 \times 6 = 6 \text{ ft.-tons}$$

At the fixed end this becomes—

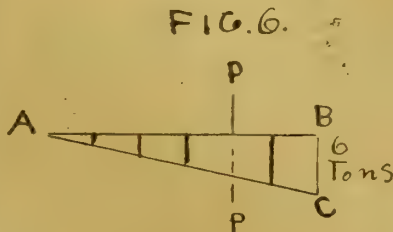
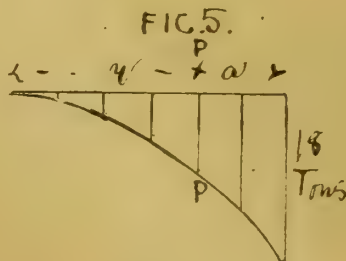
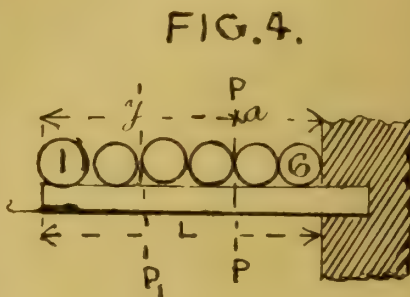
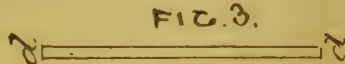
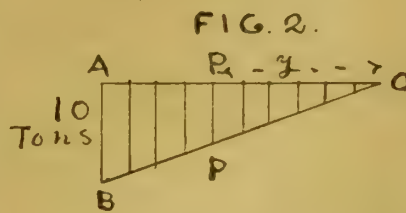
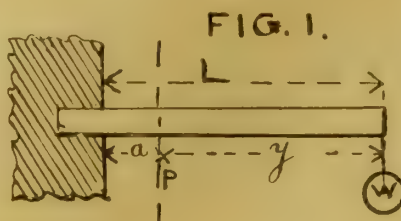
$$B.M. = 1 \times 10 = 10 \text{ ft.-tons}$$

and the constant shearing force is—

$$S = 1 \text{ ton}$$

The graphical diagrams in Figs. 2 and 3 will serve to test these results. Divide the horizontal

line A O in Fig. 2 into ten parts, corresponding to the ten separate feet in the total length of the cantilever in Fig. 1. Make A B equal to the maximum bending moment upon any convenient scale—that is, equal to 10 tons; draw the line B O, and from each of the divisions in the horizontal line A O draw a series of vertical lines to meet B O in Fig. 2. Each of these vertical lines, measured on the same scale as that to which A B is drawn, will give the bending moment at each foot of the length L of the cantilever in Fig. 1.



For example, if the sixth vertical ordinate P P in Fig. 2 be measured, it will scale six tons, equal to the bending moment found by previous calculation for that particular point. Again, in Fig. 3 let d be made equal to the shearing stress, complete the small rectangular diagram, and it shows that the shearing stress is constant throughout the whole length of the cantilever.

While there is an abundance of useful and interesting examples of the practical use of cantilevers under the conditions just considered, the next case to be investigated is equally well in evidence. The former is mostly applied where

the raising, lowering, swinging, and general translation of heavy weights are in operation, and the latter includes all balconies, verandahs, galleries, and other structures unsupported by posts, pillars, or columns, and in which the load is regarded as uniformly distributed over the whole length of the cantilevers carrying the superstructure. Before entertaining this second problem, a few additional remarks will not be superfluous respecting the first solution given in Figs. 1—3. In some of the innumerable text-books and treatises dealing with applied mechanics—a subject which appears from the most recent issues to embrace at least every known, and occasionally unknown, example of constructive architecture and engineering in the whole world—definitions somewhat different from those just enunciated are put forward. We find, therefore, that the bending moment is defined as follows, restricting its application for the time being to the case before us. The bending moment at any point in the cantilever is the algebraical sum of all the moments of all the bending forces acting on each side of that point. Referring to Fig. 1, there is only one bending force equal to W; but there are an almost infinite number of bending moments produced at so many corresponding points in the cantilever, by that single bending force. The maximum bending moment for the cantilever in Fig. 1 has been found equal to—

$$B.M. = W \times (y + a) = W L \dots\dots\dots(5)$$

That is the bending moment acting to the left of the point P; but the bending moment on the right of the same point is—

$$B.M. = W \times y \dots\dots\dots(6)$$

and, according to our definition, we have for the bending moment at the point P—

$$B.M. = W L - W a = W (L - a) \dots\dots\dots(7)$$

But since, by the conditions of the question—

$$(L - a) = y,$$

the identity of equations (6) and (7) is apparent. For the definition of the shearing force, the rule is that the shearing force at any point of a cantilever, under the conditions of loading already laid down, is the algebraical sum of all the forces acting on each side of that point. In Fig. 1 there is only one force which acts to the right of the point, which is the weight W, and therefore the shearing force is equal to W. By inserting the values of the symbols employed in these three different calculations, they will all be found to agree, with an accuracy quite sufficient for all practical and constructive purposes.

The next case is represented in Fig. 4, which is that in which the load is supposed to be uniformly distributed over the whole length of the cantilever. It is immaterial how many weights or loads may be applied, or what their respective amounts may be, provided only that they are all equal to one another. Six have been taken in the present instance as quite sufficient to show the application of the principle involved, and at the same time to avoid interfering unnecessarily with the space at our disposal. There are two methods which can be employed for solving the problem, which is to find the bending moment and the shearing force at any point, P P, of the cantilever. One of these may be termed the long, and the other the short or the synoptical, form of the first. The length of the cantilever is 6 ft., and each weight is equal to one ton. It is an axiom in mechanics that each weight may be considered as acting at its centre of gravity, so that if  $w_1, w_2, w_3$ , and  $w_4$  be the four weights to the left of the point P P, and  $d_1, d_2, d_3$ , and  $d_4$  the distances of their centres of gravity respectively from the same point, then the bending moment of each weight will be

$$w_1 \times d_1 + w_2 \times d_2 + w_3 \times d_3 + w_4 \times d_4,$$

and since the total bending moment at the point P P will be equal to the sum of all the separate moments, we shall have as  $w_1 = w_2 = w_3 = w_4 = 1$  ton.

$$B.M. = w_1 (d_1 + d_2 + d_3 + d_4).$$

But, from the diagram,  $d_1 = 3.5$ ,  $d_2 = 2.5$ ,  $d_3 = 1.5$ , and  $d_4 = 0.5$  ft., so that the value for the bending moment is—

$$B.M. = 8 \text{ foot-tons.}$$

By similar reasoning, the maximum bending moment at the fixed end will be—

$$B.M. = 18 \text{ foot-tons.}$$

The shorter method, which, however, does not explain the reason of the process so clearly and satisfactorily, is as follows. The four weights to



the left of the point P P may, as already postulated, be assumed to act at their common centre of gravity at P<sub>1</sub>, so that, as the distance of P<sub>1</sub> from the point P P is equal to  $y \div 2$ , the bending moment at P P is—

$$B.M. = 4 \times 2 = 8 \text{ foot-tons, as before.}$$

More generally, if  $w$  be the uniformly-distributed load per unit of length, or, as in this example, per foot run, and  $y$  the distance of any point from the free end, the equation is written—

$$B.M. = w \times y \times \frac{y}{2},$$

$$\text{from which— } B.M. = \frac{w_1 \times y^2}{2}$$

Substituting in the case of the maximum bending moment at the fixed end of the cantilever the proper values,  $w_1 = 1$ , and  $y = L = 6$ , the formula becomes—

$$B.M. = 1 \times 6 \times \frac{6}{2} = 18 \text{ foot-tons.}$$

which is the same result obtained by the other method. It is convenient to write the last equation in the form of—

$$B.M. = \frac{w_1 \times L^2}{2} \dots \dots \dots (8)$$

which is the equation to a parabola with the origin at the free end, and points out that the path of the bending moments is also a parabola and not a straight line, as in the preceding example in Fig. 1.

A comparison of equation (2) and (8) will serve to demonstrate that the load a cantilever will support when uniformly distributed over its entire length is exactly twice that it will carry at the free end. Let B M, as previously, represent the maximum bending moment which the cantilever supports at the free end, and B<sub>1</sub> M<sub>1</sub> the maximum bending moment when the same load is uniformly distributed. Assuming that *ceteris paribus* the other conditions of the two cantilevers are identical—and this assumption is indispensable—the relation between the two equations becomes—

$$W = w \times L,$$

thus then we obtain, making the proper substitutions—

$$W \times L = B.M.,$$

$$\text{and } \frac{W \times L}{2} = B_1 M_1,$$

therefore, finally we obtain—

$$B_1 M_1 = \frac{B.M.}{2}.$$

This relation with regard to the loading of cantilevers deserves attention, since it is very analogous to the conditions which prevail in the case of a horizontal beam or girder supported at each end. In this case, if a load be carried at the centre of the girder, the latter will support twice the same load uniformly distributed over the span.

After calculating the bending moments for each foot of the cantilever in Fig. 4, their values can be plotted to scale, according to the rules of graphical statics as shown in Fig. 5, and the vertical ordinates will represent their amounts. If there were a large number of separate loads on the cantilever, and it was, as it frequently is, unnecessary to find the amount of every independent bending moment, the parabolic curve could be drawn from the data given by any one of the numerous geometrical methods in ordinary use. There is still the shearing force to be considered, and it is evident that as each weight gives rise to a separate shearing force, it follows, therefore, that the shearing-stress, at any point in the cantilever in Fig. 4, is equal to the sum of the external forces situated between that point and the free end of the cantilever. But the shearing forces are equal to the weights, so putting  $w$  for each weight in tons, or in whatever units may be adopted, and  $n$  for the number of weights between the free end and the point at which the shearing-stress is required—that is, at P P in Fig. 4. The shearing stress is given by the equation—

$$S = w \times n.$$

For the point P P we have  $w = 1$  ton and  $n = 4$ , and thus—

$$S = 4 \text{ foot-tons.}$$

The shearing-stress, it will be seen, increases uniformly from the free end, where it is equal to zero, to the fixed end, where it is a maximum. Let the horizontal line A B be drawn (see Fig. 6), and from the end B, the vertical perpendicular line B C. Make the latter on any suitable scale

equal to the 6 tons, the maximum shearing-stress at the fixed end of the cantilever, and draw the line A C. The vertical ordinates, measured on the same scale, will give the shearing-stresses at each lineal foot of the cantilever. Thus the difference between the graphical representation of the shearing-stresses in a cantilever with a single weight supported at the free end, and one with the same or any other load uniformly distributed over its whole length is that the former may be represented by the ordinates of a rectangle and the latter by the ordinates of a triangle. The visible sign afforded by cantilevers subjected to the two different descriptions of loading just investigated, that they were affected by stress, would be their deflection. This deflection does not in the two instances follow, as might not unreasonably be expected, the same law which governs their strength. Calling the respective deflections D and D<sub>1</sub>, their relations are—

$$D : D_1 :: \frac{1}{3} : \frac{1}{8}$$

All the common factors in the calculations, which are too complicated and tedious to insert here, have been eliminated, as it is only the ratio between them that is required at present. It is assumed that the sections of the cantilevers are uniform throughout their entire length, or what amounts to the same, that their moments of inertia are constant quantities, two conditions which are very rarely, if ever, fulfilled in practice in any built-up beam or girder of any dimensions worthy of notice. In the next article, the theory of the cantilever bridge will be investigated, and the difference and especial points which serve to distinguish it from all other types of bridges.

T. C.

#### FIRE PROTECTION IN BOSTON.

CONSUL-GENERAL SIR D. COLNAGHI describes, in a report to the Foreign Office, the fire department of the city of Boston, Massachusetts. The Boston Fire Department, of which Colonel Russell is the present head, has control over an area of about forty-three square miles, containing a population of about 500,000, or about the same as Birmingham. This area is divided into twelve "fire districts." The fire department is headed by a fire commissioner, appointed for three years by the mayor, and eligible for re-appointment. A chief of department is the executive officer of the commissioner, and, when present, has command at all fires. After him follow a first assistant chief, second assistant chief, eleven district chiefs, the superintendent and assistant-superintendent of fire alarms, and various clerks and officers. The active force comprises forty-five engine companies, including two double companies, two fireboats, seventeen ladder companies, twelve chemical engines, two water towers, one independent hose company, two combination waggons, chemical and hose, and three combination ladder companies, chemical and ladder. These companies are distributed through the twelve fire districts, each district being under the supervision and command of a district chief. The total force of the department in uniformed and ununiformed men is 849. A captain, lieutenant, and ten men constitute an average engine or ladder company. Every man is ready for duty at a moment's notice for twenty-one hours out of the twenty-four, the three remaining hours being reserved for meals. Implicit obedience to superior officers is required, and men, horses, and apparatus are kept under constant inspection and drill. On joining the Boston Fire Department to-day a man is trained in a departmental drill school for thirty days, and enters upon a life profession.

Distributed throughout the city are 601 fire-alarm boxes, connected electrically with the fire-alarm office in the department headquarters, where night and day two operators are on duty to receive all alarms of fire sent from the boxes and repeat them to the different engine-houses. Within one and a-half minutes after the sounding of the first alarm, an engine, followed by a hose-wagon, ladder-truck, and chemical are on their way to the fire, and the box man in charge indicates the position of the fire. The captain of the engine, who is thoroughly acquainted with the hydrants in his district, immediately places his engine.

With the apparatus on duty at a large fire, a section of the city would be left unprotected were it not for the system in force of covering the denuded territory. Thus, in the event of a fire requiring a second or third alarm, the companies in the adjacent districts move to the houses of

those companies which have responded to the call. There are two maps of the city with pegs in them indicating the location of the companies at the engine-houses—one at the night headquarters of the chief of department and one at the fire-alarm office. The pegs in these maps representing the companies that have responded to the first, second, third, and perhaps following alarms are taken out, and the pegs representing the covering companies are put in their places. Thus by means of these maps and a running card it is easy to be seen how the city has been left protected. Care is taken not to leave any one district absolutely defenceless.

The Consul-General gives a list of the engines, steam and chemical, hose, ladder, trucks, water-towers, &c., in service. The new horseless propellers have a capacity of 1,350 gallons per minute. The ladder trucks carry ladders from 10ft. to 65ft. in length, and are fully equipped with medicine chests, life lines, and a complete assortment of fire appliances. Five of these ladders are of the aerial pattern, which can be raised to a height of from 85ft. to a 100ft. by means of cranks and a screw on a turntable. Fire-escapes of the English pattern are not in use, but life-saving nets are employed in the event of persons having to jump from a burning building. The water-tower consists of a cylinder set in a square case like a telescope and mounted on wheels. It can be raised perpendicularly by chemical or water pressure. The inner tube is then elevated by a gearing until it reaches the height of about 55ft. Inside the tubing is a double length of hose, 3½ in. in diameter, connected at the lower end with six lines of hose from three engines, and at the top with a hollow arm or pipe, which can be worked up and down and to the right and left by a man standing on the platform at the tower. For fires along the water front fire-boats are used; their respective capacity is about 7,000 gallons per minute. Chemical engines form another piece of apparatus. They are always ready to go to work, the hose being light and easily handled. The capacity of the chemical engines in this department is from 50 to 100 gallons. They generally consist of two tanks, with the necessary appliances, hung on four wheels. On account of their lightness they are drawn with great speed to a fire. Carbonic acid is both the working and extinguishing agent. The total number of fires extinguished by the chemical engines in 1897 was 241. During the same year 472 fires were extinguished by the little hand or portable extinguishers. These are filled with water, soda, and a small bottle of vitriol. By turning a small valve on the top of the extinguisher the bottle is broken, which causes a pressure sufficient for the play of water on the fire through a small hose. All appliances must be ready at all times for service, and at any hour of the day or night. When through accident or otherwise anything becomes unfit for service, the department repair-shop is ready at a moment's notice to repair or replace it. Connected with the repair-shop is a school of engineers, where the men with a liking for machinery are drilled in the handling of an engine. A school of telegraphy is also attached to the department.

#### CUBAN DEVELOPMENT.

A WRITER in the *Engineering Magazine* on the "Future Industrial Opportunities of Cuba," observes that the change in the Government of Cuba will attract the engineering and contracting worker to the development of its resources, and he points out the possibilities for a successful exercise of energy and investment of capital. The writer (Wilfrid Skaff) describes the miserable roads—those for wheeled vehicles hardly exist in the country. Traffic and haulage is only possible after a long dry season; two days of rain stop traffic everywhere. Bridges are much required to render communication or transport safe or possible. The railways are fully equipped; but only exist in the western provinces. Another important need is water supply. Havana is fairly supplied, but in other towns there is little. Rain-water is stored in large stone cisterns beneath the houses. The sewerage of the towns is very backward; where drains exist they are "horrible things," built without the slightest knowledge, and the filth of years is said to produce disease and vile odours. There is no flushing, and the system of dumping house refuse along the streets is tolerated. No wonder fevers and small-pox prevail in the towns. All these



matters call for attention, and must be undertaken before long if the island is to make any progress in civilisation. Opportunities for the engineer are great in these directions. Then harbour improvements are called for; though there are several fine harbours, like those of Havana, Matanzas, and Santiago, their entrances are narrow, and there are no good piers or wharves.

Alluding to the industries of Cuba, those of sugar and tobacco are, of course, the chief. Iron and copper exist in large quantities, and can be worked to greater advantage than they are. One of the iron deposits near Santiago is being worked by American companies. The sugar industry, among others, is said to afford a wide field for enterprise; the climate and soil are well adapted to the cane, and the sugar-houses and factories are well equipped. It is said that large tracts of land are doing nothing that might be turned to use for the growth of sugar-cane, but machinery and appliances are wanting, and cane-planting machinery is not found to any great extent. Hand labour is the chief sort of labour employed. The white labour consists of native Cubans and Canary Islanders; but the Spaniards are said to be superior for general work.

#### SEDIMENT IN WATER MAINS.

**S**EDIMENT in gravity supply mains frequently causes waterworks superintendents considerable annoyance, and it is therefore interesting to note that the long Bull Run pipe line supplying Portland, Ore., has been kept unusually free from anything of the sort after certain changes were made in the screens at the head works. Mr. D. D. Clark, M.Am.Soc.C.E., assistant engineer of the works, states that when the plant was first put in service there was some trouble in screening out the fir needles, which are very abundant in the river at certain seasons. Immediately below the head works there are several small depressions in the conduit, and at a distance of about 4,000ft. there is a point where it approaches within a few feet of the hydraulic grade line. When the pipe was examined in June, 1896, collections of fine sand and fir needles were found along this section, but nowhere else. Finer screens were used, but the next year similar collections were removed, amounting in all to about a cubic yard. The examination made early in the present year resulted in taking out about 10 cubic feet only. During the present year, four wire-cloth screens have been used, with meshes arranged from a third to an eighth of an inch. These remove suspended material so thoroughly that the screens at the city reservoirs seldom require attention, and the blowing off at the distribution mains is necessary only at long intervals. A small amount of fine sand, not mud, passes through the 24-mile pipe line and collects in a slack-water pool near one of the city reservoirs; but in nearly two years the accumulation was only about  $1\frac{1}{2}$  cubic yards.

#### THE SCIENCE AND ART DEPARTMENT'S NATIONAL COMPETITIONS REPORT, 1898.

**T**HE illustrated report of the examiners on the selected works of Schools of Science and Art has this week been issued by the Department. The volume presents a highly interesting and worthy record of the National Competition for the year 1898, and the illustrations with which its pages are enriched have been reproduced from a selection of the more notable works on view in the exhibition at South Kensington. The examiner's reports attached to the list of medal and prize winners are in all cases printed under the names of those who acted as judges, and, while their remarks embodied in these reports are, on the whole, appreciative of the progress made by the competitions in the various departments, there is no hesitancy in trenchant expressions of adverse comment upon individual demerits or on sections of work where, in the opinion of the authors, the studies presented for competition are found wanting. The names of the gentlemen employed by the department as judges represent a very varied series of well-known specialists in art matters, and the list is sufficient guarantee that no one school of design, or method, or style will be permitted any undue preference in arriving at the awards. The list is too comprehensive to be given in *extenso* here; but among

those most familiar to our readers in connection with art applied to design are the names of the following well-known architects and ornamentalists:—Professor George Aitchison, R.A., Mr. T. G. Jackson, R.A., Mr. Walter Crane, A.R.W.S., Mr. J. J. Stevenson, Mr. Maurice B. Adams, F.R.I.B.A., Mr. Lewis F. Day, Mr. H. H. Stannus, F.R.I.B.A., Mr. W. R. Lethaby, Mr. W. De Morgan, and Mr. G. J. Frampton, A.R.A. About 100,000 works were submitted for examination, and from these 6,515 were chosen for the National Competition, so that it will be seen what an enormous undertaking is involved in connection with the schools of art and art and science classes throughout the country. The standard is unquestionably a high one, and in very many ways the result is highly satisfactory. Twenty gold medals were awarded, 107 silver medals, 280 bronze medals, and 609 book-prizes. The honorary awards to free students in the Royal College of Art are not included in these numbers. With regard to the report itself, every art student will be glad to have such a volume. Some of the illustrations are capital; but others, on account of the great reduction unavoidable with large works, are not so clear as could be wished, while several do not give an adequate idea of the originals in consequence of their colour or delicacy of treatment not gaining by the process of reproduction. Some of the coarser cartoons naturally come out to a small scale best, and thereby, in a way, gain an undue advantage.

#### CHIPS.

The corporation of Gloucester have appointed Messrs. Walker and Son as architects for the free public library, which is to be built at a cost of £6,000.

New granite works for Mr. T. J. E. Blann were opened last week in Pittodrie-street, Aberdeen. They cover half an acre of ground on the Spittal estate, and have been built from the designs of Mr. W. Smith, architect, of Aberdeen.

The water committee of Glasgow Corporation accepted, on Monday, the offer of Messrs. Robert MacLaren and Co., Glasgow, for the supply of 995 tons of cast-iron pipes. Messrs. MacLaren's tender was £4,958 8s. 4d. A Philadelphia firm, Messrs. R. D. Wood and Co., offered to fulfil the contract for £4,892 1s.; but, in view of the slight difference between the contracts, the committee decided not to place the order out of the country.

The House Drainage Department of the Manchester Corporation have retrained no fewer than 5,905 dwelling-houses and 274 business premises, public buildings, &c., during the year. The cost of this work amounted to £29,359 19s. 3d., which was apportioned as follows:—£20,357 4s. 7d. to owners and £8,702 14s. 8d. to the Highways Department, to be paid out of the city fund.

We regret to announce the sudden death of the wife of Mr. Charles Barry, F.S.A., past president of the Royal Institute of British Architects, of Stanley House, Forest Hill. Mrs. Barry, who died on Sunday at Worthing, was in her sixty-eighth year.

The new tower of the college at Bala has just been completed. The work was carried out by Mr. John Thomas, of Dolgellay, from the plans of Mr. Richard Davies, of Bangor.

The Lord Mayor of Manchester opened, last week, a new park in Bellott-street, Cheetham, just given to the city. It has an area of 7,500 yards super.; part is laid out for games of bowls and tennis, a second part is covered with grass, and will form a children's playground, while the remainder is planted with one or more specimens, all labelled, of almost every indigenous tree or shrub, besides some that are not natives of Britain, the variety being greater than in any other of the 38 parks and open spaces in Manchester.

New board schools are being erected at Horton, Stockton-on-Tees, and special consideration is being given to the ventilation, which will be carried out on the Boyle system.

The plans have just been accepted for a new church at High Park, Southport, to replace the Ebenezer Independent Church, which has become inadequate and inconvenient. The new structure, which will be erected at a cost of £1,250, will be of brick, with terracotta facings, and will afford accommodation for 340 persons, whilst a lecture-hall attached to it will seat 120 persons. It is hoped to commence the building of the new edifice in October.

The work of lighting Balmoral Castle by electricity was completed by the end of last week, and when the Queen arrived on Thursday there were 600 lamps in use.

#### OBITUARY.

**WE** regret to record the death of Mr. ALFRED ERNEST CHANCELLOR, of Crouch End, whose name is familiar to our readers as the author of a long series of drawings which has from time to time appeared in our pages chiefly in illustration of historic furniture and works of art shown during the past nine years at various exhibitions in London and at the sale rooms. Last year Mr. Chancellor published, through Mr. B. T. Batsford, under the title "Examples of Old Furniture," a selection of these useful and careful drawings in a book-form—a worthy record of his industry and taste. Some six months since, owing to failing health—serious bronchial and paralytic symptoms having asserted themselves—Mr. Chancellor left the office on sick leave to try the effects of rest and change of air. We are sorry to say that gradually he declined, and he passed away on Saturday last, the 3rd inst., at the residence of his father, the Rev. H. J. Chancellor, Camperdown, Bourne-mouth, in his 41st year. Alfred Ernest Chancellor was a pupil of his uncle, Mr. Frederic Chancellor, J.P., F.R.I.B.A., of Finsbury Circus, and thrice mayor of Chelmsford. For many years he remained as an assistant to his uncle from whose office he joined the staff of this journal in 1889. We take this occasion to acknowledge his single-mindedness and love of his work, to the furtherance of which he was ever ready to devote his best efforts. He wrote several poems, and treasured a literary knowledge which was the result of somewhat extensive reading. He leaves a widow and one little boy.

The late EARL OF WINCHILSEA AND NOTTINGHAM, who died on Wednesday in his 48th year, was well known for his active interest in British agriculture, and as the founder of the National Agricultural Union, which was successful, among other things, in inducing railway companies to reduce their rates for farm produce. He also reopened the famous Kirby quarries on his Northamptonshire estate. Among Lord Winchilsea's outdoor recreations were bricklaying, glazing, and even the digging of dykes, in which accomplishment, it is said, he was not surpassed by any workman in the county. In the summer of 1895 he spent nearly all his holidays in repairing the roof of Ewerby church.

Miss Ina Murray Mackenzie, the secretary of the Home Arts and Industries Association, died on the 27th ult. at Stockley, Worcestershire, from the effects of a bicycle accident. Miss Mackenzie was the second daughter of the late Murdo Mackenzie, of Mountgerald, Ross-shire.

Plans of a Young Men's Institute, which is to be erected at Crossstone by the local Young Men's Christian Association at a cost of nearly £4,000, were passed on Monday by the Motherwell Dean of Guild Court. Mr. Alex. Cullen, F.S.A., is the architect, and the plans show a building, with gymnasium, lecture-hall, and reading and other recreation rooms.

At a meeting of the East Suffolk County Council last week, Lord Henniker, Governor of the Isle of Man, was presented with his portrait, painted in oils by Mr. A. S. Cope, and hung at the recent Academy Exhibition.

A new central Hebrew synagogue, in Templar-street, Leeds, was consecrated on Sunday by the Chief Rabbi. The cost of the building is about £4,000. The premises include a synagogue with accommodation for 750 persons, and a schoolroom to accommodate 250.

Messrs. E. H. Shorland and Brother, of Manchester, have just supplied some more of their patent double-fronted Manchester stoves with descending smoke flues to the new small-pox hospital, Dagenham.

Mr. F. H. Tulloch, M.Inst.C.E., held an inquiry at the Concert Chamber, Harrogate, on Tuesday, into an application for sanction to borrow £8,500 for surface-water drainage within and without the borough of Harrogate; £580 for sewerage works and surface-water drainage; £500 for a steam road-roller and road-scarifier; and £450 for the construction of a public convenience in High Harrogate.

In consequence of the slow progress being made with the construction of the new road round the Castle Hill, Scarborough, the sub-committee have passed a resolution regretting any unnecessary delay on the part of the contractors in not expediting the work, and calling upon them to make the necessary arrangements for commencing operations at the south, or east pier, end without delay.





THE TOWN HALL AT PIETERMARITZBURG, BURNT DOWN JULY 12, 1898.

## THE BURNT TOWN HALL AT PIETERMARITZBURG.

THE accompanying view of this ill-fated structure is from a photograph by a smart young amateur, Mr. Percy F. Loney, and it obtained the silver medal at the recent exhibition of the Pietermaritzburg Camera Club. The population of this, the chief city of Natal, is 20,155, of whom 11,309 are Europeans. There has been an increase of 3,000 souls since the last census (1891). The late town-hall was certainly one of the finest buildings I saw during a somewhat extended visit to South Africa this year. Standing itself on somewhat elevated ground, and on the very best site in the city, there are several good buildings in its immediate vicinity. Just opposite is the Post Office, a fair, economically designed example of Italian Renaissance, and close by a handsome monument in memory of those who fell in the Zulu war. Its *motif* was evidently the Soldiers' Monument upon the high ground in the midst of Greenwood Cemetery at Brooklyn over and above New York harbour, a mound commanding one of the most superb views in the world. Amongst the trees, shown on the dexter hand of the illustration, is another monument, commemorating the names of the 1st Natal Carbineers, who fell in the battle with Langalibalele at Bushman's River in 1877 (I think). It is worthy of remark that whereas the Volunteer movement originated in Exeter, with the late Sir John Bucknell and a few kindred spirits, whose patriotic energy led to the formation of the 1st R.V., the Natal Volunteers were the first on record in the British Empire to take part as regularly appointed troops against an enemy, and to shed their life's blood for Queen and country. The Parliament Building is within a shot-gun range of the Town Hall. The edifice has a commanding and lofty central pediment, supported by Corinthian columns—St. Martin's-in-the-Fields-Church fashion. In front of

it is a good marble statue of the Queen—apparent replicas of which I have seen several times before. There is also hard by a colossal marble statue of Theophilus Shepstone, fondly called "Somtseu" by the native Zulus, who subscribed £250 of the total cost (£1,370) of the monument, and in Church-street, quite close, new Government offices are now building. These are of Classical design, and are being erected in an excellent local stone. The fabric's chief façade is now up to the second story, and the probable cost will be over £50,000.

The late town hall had a frontage in Commercial-road (as seen in the illustration) of 151ft., and one of 160ft. facing Church-street, and occupied a superficial area of about 20,000sq.ft. It was built of an exceedingly good local red brick, with dressings of local stone to the main entrances, &c. The clock-dials were 75ft. from the ground; the entire height of the tower 125ft. The great hall was 115ft. extreme inside measurement by 53ft. wide, and afforded sitting accommodation for 1,000 spectators. The architects for the edifice were Messrs. Street-Wilson and Percy M. Barr, and the contractor was Mr. Robert Bullen. The actual cost of erection was £42,317. The clock had four illuminated dials, each 8ft. 6in. in diameter. It was by Messrs. Gillett and Johnstone, of Croydon, and struck the hours and quarter chimes loud enough to be heard a mile or two around. Indeed, so loud are these intimations of passing time to the uninitiated, that the first night or two I spent at Pietermaritzburg they woke me up nearly every fifteen minutes. In this respect, and, indeed, in tone, they are very much like the chimes in the town hall at Portsmouth.

Perhaps the principal glory of the hall was the magnificent organ, admittedly the finest in South Africa. It was made by Messrs. Brindley and Foster, of Sheffield; the wind was supplied by hydraulic engines; its cost was £4,000; and when played, as I have heard it played

at the Sacred Concerts on Sunday evenings, by Mr. A. H. Day, the borough organist (who will be pleasantly remembered by church-going readers at Eastbourne), the instrument most worthily represented the highest standard of English organ-building art. The building throughout was lit by electric light, and the one electric street lamp in all Pietermaritzburg may be seen in the illustration, at the corner of the sidewalk by the corner of the clock tower.

Only last May, in company with my newly-acquired and pretty daughter-in-law, Mrs. William Hems, I scaled the tower, and, from the open arcading on this story above the great clock, we greatly enjoyed the cool breeze and the fine panorama around. "But," I remarked to the caretaker, looking up at the slight timbers in the Mansard roof, "scamped" as are those of jerry built houses in suburban London, "the framing is all so slight. Why, there won't be a bit left in 60 years!" Little did I think that all would be gone in 60 days! But I did think at the time, and picture in my mind's eye the superb 15th-century roofs of the great Cloth Hall at Ypres in Belgium, the most splendid oaken roofs I ever saw in my life, and passingly wondered why "Colonials" could not take inspiration from those, and such as those, instead of evidently meandering to Finsbury Park and its environs for precedents.

It was quite characteristic of the manly independence of the Colonial character, however, that when, on leaving the building and attempting to slip half a crown into the palm of the caretaker, the official in question drew away his hand with a smile and declined the proffered douceur.

On July 12th last, at 7.20 p.m., an alarm of fire was given. The fire brigade were quickly on the spot, but found themselves quite inadequate to stay the flames, even if they had had a sufficiency of water to play with—which they had not—and in two short hours the entire building was burnt completely down. Even the so-called



fireproof safes, containing the municipal documents and their contents, were consumed.

Never was there a direr public calamity. I doubt whether the great historical Fire of London affected its inhabitants more than has the loss of their Civil centre—of which they were so justly proud—hit the good people of Pietermaritzburg. "I cannot speak of the calamity," writes one of its citizens to me, "you must read the very sorrowful news in the newspapers I send. They give a fair idea of my feelings."

Exeter, Sept. 6, 1898.

HARRY HEMS.

### CHIPS.

The question of tunnelling the Hooghly is again mooted at Calcutta, as an alternative and a preferable scheme to a permanent bridge across the Hooghly in that city, to avoid the danger of the piers of the latter altering the currents of the river.

The calendar of the Bradford Technical College for the year 1898-9 has just been issued. The opening lectures announced include: engineering department, September 12, Mr. G. F. Charnock, "Power Production from Town's Refuse"; chemistry and dyeing department, September 13, Mr. W. M. Gardner, "The Utilisation of Waste Products"; and art department, September 14, Mr. C. Stephenson, "Art Handicrafts and the Training of the Craftsman."

The library committee of the Liverpool Corporation considered at their last meeting a proposal to extend the Walker Art Gallery Buildings prepared by Mr. Dyall, the plans in connection with which provide for a considerable addition at the rear of the existing buildings. The city surveyor reported that the scheme was an admirable one; but the addition would be equal to 87 per cent. of the old buildings, and would cost £29,000. The area of the present buildings was 16,000sq.ft., and the addition proposed would occupy 14,000ft. It was agreed that the city surveyor should submit plans within a month for an extension which would involve an expenditure of about £8,000, it being understood that the addition should be designed on such lines that a further extension could be made at some future date.

The proposal to construct a light railway from Irthlingborough to Kilmars, calling at Finedon, Burton Latimer, Kettering, and Rothwell, under the Light Railways Act, is proceeding favourably.

New board schools for 796 children, in Lovewell-road, Kirkley, Lowestoft, were opened on Tuesday week. Mr. W. Rushworth, of London and Croydon, was the architect, and Mr. Howes, of Norwich, the builder. The cost has been £9,636.

The Saddle Inn, Bunce-street and Grosvenor-road, Chester, is about to be pulled down and replaced by an hotel, to be built at a cost of £3,000. Mr. W. Owen, of Warrington, is the architect.

The Charity Commissioners have just issued their scheme for the future administration of Lord Lumley's Charity (Thornton Dale, and elsewhere), and the Grammar School (Pickering). These foundations are to be administered as one, by a governing body, under the name of Lady Lumley's Grammar School Foundation. A central school is to be provided on the Thornton side of the town of Pickering, suitable for not less than 40 day scholars and 20 boarders.

The urban district council of Guiseley adopted, at their last meeting, plans and a scheme submitted by Mr. Johnson (Messrs. Preston and Johnson) for proposed alterations and additions to the disposal works, also of several new sewers in different parts of Guiseley. The cost, including land, he estimated at £5,230, and the council decided to ask for borrowing powers for £5,500.

Recent investigations in Canterbury Cathedral have established the fact that the present position of the chained Bible in the north aisle of the choir was the original site of the Easter sepulchre. In a niche at this spot the Host consecrated on Maundy Thursday was in former times solemnly placed on Good Friday, and continually watched from that time until Easter Day, when it was taken out and replaced upon the altar with special ceremony. When Craumer adopted this niche for the chained Bible the upper portion of the arch was filled in with a thin curtain of stone.

A temporary iron structure to be known as Christ Church was dedicated at the east end of Northampton on Tuesday week. The church consists of a nave, chancel, and vestry, with two western porches. Provision is made for a congregation of at least 350, and the building is lined internally with woodwork and covered externally with felt and iron. The church is seated with chairs and kneeling pads; and is also fitted with altar-table, prayer-desks, pulpit and lectern, font, &c. The whole structure has been erected in four weeks by Mr. Henry Martin, under the supervision of Mr. H. H. Holding, architect, Northampton.

### COMPETITIONS.

ARCHITECTURAL ASSOCIATION MEDAL.—The awards have just been made in this competition. The A.A. Medal, together with a prize valued at two guineas, was offered for a design for a convalescent home on the south coast, to provide accommodation for 10 men, 10 women, and 15 children, disposed on two floors, and also a small chapel and dining-hall. Two of the designs were of such merit that the Prizes Committee, while awarding the medal and first place to "Ægris Solatium," by Mr. F. D. Clapham, Fryern House, Eltham, Kent; gave a second premium to "Leader," by Mr. T. Tyrwhitt, 36, St. George's-square, S.W., the recipient of the Institute Medal last year. Nine sets of designs were forwarded under motto.

TAUNTON.—A meeting of the market trustees was held on Friday, when the standing committee reported that the architects, Messrs. Samson and Cottam, had received tenders from two builders offering to carry out the contract for the erection of the new town hall in accordance with their plans, and at a sum within their estimate (about £12,000). The mayor was requested to open the tenders, and ascertain whether those who had sent them in were responsible men. The mayor performed the duty, and reported that there was no doubt as to the position of the two builders. The trustees thereupon ordered the first premium of £100 to be paid to Messrs. Samson and Cottam for the best set of plans. The second and third premiums were also directed to be paid.

The new organ erected in the Central Hall, Birmingham, for the Wesleyan Central Mission was dedicated on the 1st inst. It consists of three manuals and pedals and 35 speaking stops, and contains over 2,000 pipes. The case is of oak, and extends the whole length of the orchestra. The cost of the instrument, including installation of electric motor, which drives the bellows, and structural alterations, is about £1,200.

Mr. Thomas Fegan, wine and spirit merchant, Newry, has undertaken to defray the expense, which will amount to over £4,000, of the erection of a home in Kilmorey-street for the aged male poor and orphan children of the Roman Catholics in Newry. The building is being erected at the rear of the Home for Aged Females in Kilmorey-street, and managed by the Sisters of Mercy. It will be three stories high, 102ft. in length, and 52ft. in breadth.

The Clergy and Artists' Association will hold its third Church Congress Exhibition in the Bradford Art Gallery during Congress week, by kind permission of the committee of the art gallery, who have placed a portion of the gallery at their disposal. As before, a special feature of the exhibition will be examples of work executed under the auspices of the association. There will also be examples of the work of Sir W. B. Richmond (who is a member of the committee), of Mr. G. F. Watts and Mr. Holman Hunt, and of other individual artists and craftsmen working in churches. The exhibition will be free. Artists desiring to submit examples of their work may do so by communicating with the Secretary, 6, Millbank-street, Westminster.

The members of the Hampshire Field Club visited, on Wednesday week, Headbourne Worthy Church, where Mr. T. W. Shore contributed interesting information concerning the parish. They next drove to Stoke Charity Church, which was described by the Rev. G. W. Minns. Micheldever Church was next visited, and thence to Stratton Park, where the members were received by the Earl of Northbrook. A paper was read by Mr. Shore, the pictures and curiosities of the house were examined, and there was also a walk round the grounds.

Some two years ago the Queen's statue at Bombay was defaced, and the stains could not be removed. Professor Gajjar, late of the School of Art, Baroda, has now deleted a large portion of the spots, and will in a short time restore the head and crown to their pristine state.

The amalgamation has been arranged of two old-established businesses, Gillow's, of Oxford-street, and Bontor's, of Bond-street. Thomas Bontor and Company have occupied their Bond-street premises for over 150 years as importers of Oriental rugs and carpets. Gillow's was founded in Lancaster a considerable time before 1716, to which date the existing books of the firm go back. The earliest records of the house are lost, having been destroyed, it is believed, in the Scotch incursion of 1745. The London house was established about the middle of the last century. Owing to the Bond-street premises hitherto occupied by Bontor and Co. being wanted for a bank extension, the firm has united with Gillow's, and the combined businesses will henceforth be carried on at the enlarged Oxford-street premises.

### Engineering Notes.

GLASGOW.—The memorial-stone of a new bridge spanning the tributary river Cart, between Langside and the rapidly-growing suburb of Newlands, was duly laid last week. The old Millbrae bridge was only 12ft. wide. The new structure, which is in the course of erection alongside of it, is 50ft. wide. The total cost of £4,523 is borne to the extent of £1,300 by the County Council of Renfrewshire, which shares the responsibility for the bridge along with the Corporation of Glasgow. The bridge is of Lochaberbriggs red sandstone, with ring heads, springers, and parapet of grey granite, and the inside of the arch of white rock. The abutments will be surmounted by iron railings in extension of the parapet, and the foundations are of concrete, 12ft. below the scour of the river. Messrs. John White and James Lang are the joint engineers, and Messrs. Morrison and Mason, Limited, of Glasgow, are the contractors.

The Stockport Corporation is about to make an effort to acquire the property of the Waterworks Company which supplies Stockport and a surrounding district, in which the total population is over 200,000.

The total revenue from the forests of the whole of India for the year 1898-99 is estimated at a crore and 73 lakhs, and the total expenditure at a crore and 5 lakhs, leaving a net income of 68 lakhs on the year's working.

The Local Government Board for Ireland have intimated to several public bodies in the south that they are not disposed to sanction the undertaking of new works till the new Local Government Act for this country comes into operation in March next.

The Bradford school board have accepted tenders for the erection of the new Carlton-street Higher-Grade Girls' School and the junior teachers' central classes, amounting to £10,660 10s., including mechanical ventilation. The higher-grade school will have accommodation for 713 scholars, and the junior teachers for 135. The new premises will occupy the north-west corner of the present school, and will be 146ft. long by 69ft. wide. There will be practically four floors—sub-basement, basement, ground-floor, and first-floor. The sub-basement will be used wholly for the mechanical ventilation apparatus, boiler, and engine.

The new lighthouse on St. Mary's Island, opposite Whitley, Northumberland, opened last week, replaced the Priory Point lighthouse at Tynemouth. It has been built from plans by Mr. Thomas Matthews, engineer-in-chief to Trinity House, by Mr. J. L. Miller, contractor, of Tynemouth, the ironwork being supplied by Messrs. J. Twiddle and Co., of Newcastle-on-Tyne.

At Nelson, Lancs, a Local Government Board inquiry held by Major General Crozier on Thursday last week into the application of the Nelson Town Council for the sanction to a loan of £40,000 for the purpose of gaswork extension, and of £20,000 for the purpose of private street improvements.

The foundation-stones of the new Union Chapel, Deanshanger, were laid on Thursday in last week. Mr. J. Coker, of Wolverton, prepared plans for the new church, and the tender of Mr. A. P. Hawtin, of Northampton, who contracted to erect the building for £524, was accepted. Other expenses will bring up the total cost to £600. This amount will suffice to erect an inexpensive chapel, 33ft. by 23ft., with a schoolroom 14ft. by 23ft. 6in., and offices. The schoolroom will be fitted with a movable partition, opening into the chapel, which will thus seat quite 200 persons.

At the meeting on Monday of the city council of Wells, Somerset, tenders for the building of a new town-hall and post-office were opened. There were six tenders, the highest being £10,695, and the lowest £9,192 10s. The architect's estimate was £4,850, so that the prices read out caused very great surprise. None of the tenders were adopted, and the whole question was referred to a special meeting of the General Purposes Committee.

A memorial turret quarter-clock with four large external dials has been given to the parish church, Normanton, Yorks. The clock has all the latest improvements inserted by Lord Grimthorpe, and was made and fixed by Messrs. Potts and Sons, of Guildford-street, Leeds, and Newcastle-on-Tyne. The clock was formally set going on Wednesday week.

The subscribers to the fund for a technical institute to be built at Stratford-on-Avon have accepted the gift of Mr. Elgar Flower of a site in Henley-street, which will allow of the erection of a room 40ft. by 50ft. for a school of art, and of other apartments on other floors.



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ILLUSTRATIONS.

NEW BREWERY AT NINE ELMS, S.W.—TECHNICAL AND SECONDARY SCHOOL, CHIPPENHAM: SELECTED DESIGN.—PREMIER HOTEL, DOVER STREET, W.—VILLA RESIDENCE, COLWYN BAY.—SOMERSETSHIRE SKETCHES: LECTERNS AT WELLS CATHEDRAL AND YEovil CHURCH; SOUTH TRANSEPT, DUNSTER.—CABOT MEMORIAL TOWER, BRISTOL.

Our Illustrations.

MESSRS. THORNES' NEW BREWERY, NINE ELMS LANE, Vauxhall, S.W.

THE view shown in our illustration is taken from the brewery yard, and shows the proposed brew-house, copper-house, boiler-house, chimneyshaft, cask-washing shed and stores, and part of the intended maltings, the structure in the background being the fermenting house. The whole of the proposed works, together with an extensive area of cellars, and the enlargement and rearrangement of fermenting house, together with the brewery plant and machinery, has been designed by Mr. G. T. Harrap, A.M.I.C.E., and Mr. William H. Duffield, A.R.I.B.A., brewers' consulting engineers and architects, of 34, Queen-street, Cannon-street, E.C., and is in course of erection under their supervision. Contract No. 1, consisting of enlargement and rearrangement of fermenting house and cellar, was executed by Messrs. Turtle and Appleton, of Clapham Junction, and the constructional ironwork by Messrs. Young and Co., of Piccadilly. Contract No. 2, nearly completed, and consisting of 1,800 superficial yards of underground cellars, cask-washing shed, stores, &c., is being executed by Mr. G. Parker, of Peckham, builder, and the constructional ironwork by Messrs. Eastwood Swinger, of Derby. Contract No. 3, consisting of brew-house, copper-house, boiler-house, and chimney shaft, is being executed by Mr. G. Parker, of Peckham, and the constructional ironwork by Messrs. Eastwood Swinger, of Derby. The total amount of contracts Nos. 1, 2, and 3, together with machinery and plant, is about £32,600. The elevations are being executed in yellow stocks, with red and glazed brick dressings liberally treated with stone; the roofs are tiled. The interior facings are of glazed bricks throughout. The floors are of concrete, and paved with asphalt and granolithic paving. All the staircases are of iron, and therefore the whole of the new work is practically fireproof. The brew-house, which is 100ft. high, is mostly carried on cast-iron columns and wrought girders. Electric light will be utilised in the buildings for lighting. Every care has been taken in the design and construction of this brewery, not only in the buildings themselves, but also in the plant and machinery, to bring them thoroughly up to date, and to embody the most modern principles in this industry.

SELECTED DESIGN FOR THE CHIPPENHAM DISTRICT TECHNICAL AND SECONDARY SCHOOLS.

A LIMITED competition has recently taken place for the Chippenham District Technical and

Secondary Schools, and the design of Mr. Robert E. Brinkworth, F.S.I., of Chippenham, Wilts (which we this week illustrate) has been placed first by the assessors and accepted by the committee. The building had to be suitable, not only for a technical school, but also a secondary school, and a very large amount of accommodation was asked for at a comparatively small cost. The site being large, and good foundations easily obtainable, it was desirable, from the standpoint of economy, as well as convenient planning, to have a large portion of the building only one story in height; it also facilitated top ventilation and more satisfactory grouping and isolation of the various departments. The stipulated cost of £3,500 (small for so large a building) only allowed for something very simple and unpretentious in the way of exterior, and symmetry and the judicious massing of the parts is relied on for this. On entering the building from the main entrance the principal room is found on the right and the caretaker's room on the left, and the hall, without being unnecessarily large or pretentious, will, with the columns and staircases, have a dignified appearance. The rooms constituting the boys' department are on the left and the girls' on the right; the large room for examinations, drill, and elementary art, being centrally situated between the two, entered from the first landing of the main staircase with floor between the ground and first floors, thereby providing under bicycle storage and shelters, 7ft. 9in. in height, storage for coal, coke, &c., and heating chamber. The windows in the side of this room would be fitted with shutters, so that light would come only from the large north window when the room was being used for art purposes. The first floor is devoted solely to the science department, and the second contains only the advanced art room. The material proposed is red brick with a sparing use of Bath stone in the central portion of the front elevation and the boys' and the girls' entrances. The roofs to be covered with green slate. The floors are to be of fireproof construction, and for the most part laid with wood block flooring. The heating will be by hot-water pipes and coils, inlet ventilation being obtained by ventilators fixed at the back of the coils and pipes, and outlet by means of turret ventilators.

PREMIER HOTEL, DOVER STREET, W.

THIS hotel, now rapidly approaching completion, occupies the site of that formerly known as "Holloway's Hotel," which was for many years one of the most frequented hotels of the upper classes in London. The building is being carried out in accordance with the designs and under the superintendence of Mr. G. D. Martin, architect, Pall Mall East, S.W., and will consist of eight floors. The basement has been planned for kitchens and the offices of the management, there being also a gentlemen's lavatory. The ground floor will contain a large dining-room, vestibule entrance-hall, reception and service-rooms, telephone-room, marble staircase, and hydraulic elevator. On the six upper floors there will be ladies' and general drawing-rooms, smoking-room, and about 50 bed, sitting, and dressing-rooms, and also ample bath and lavatory accommodation. The elevation, which is a Free treatment of Renaissance, is carried out in red brick, with Bath-stone dressings. The ground-floor façade is executed in grey Aberdeen granite. The whole of the floors and the roof are of fireproof construction.

HOUSE, COLWYN BAY, NORTH WALES.

THIS residence, as well as the stables adjoining, have been built for Mr. E. C. Minchin, of Emell Castle, King's County, Ireland. They are constructed of buff-coloured bricks, with terracotta moulded cornices and stringcourses, and command an extensive view towards the south up the beautiful Nant-y-glyn Valley and also of the sea to the west. The buildings, boundary walls, and entrance gates have been carried out from the designs and under the superintendence of Messrs. Booth, Chadwick, and Porter, architects, of Colwyn Bay and Manchester.

SOMERSETSHIRE SKETCHES.

THE Dunster screen leading into the choir aisle out of the south transept is a very well-known example of Somersetshire woodwork, rich in detail, and in a fine state of preservation. The peculiar contrivance of the upper part of the piers of the archway in which this screen is located is

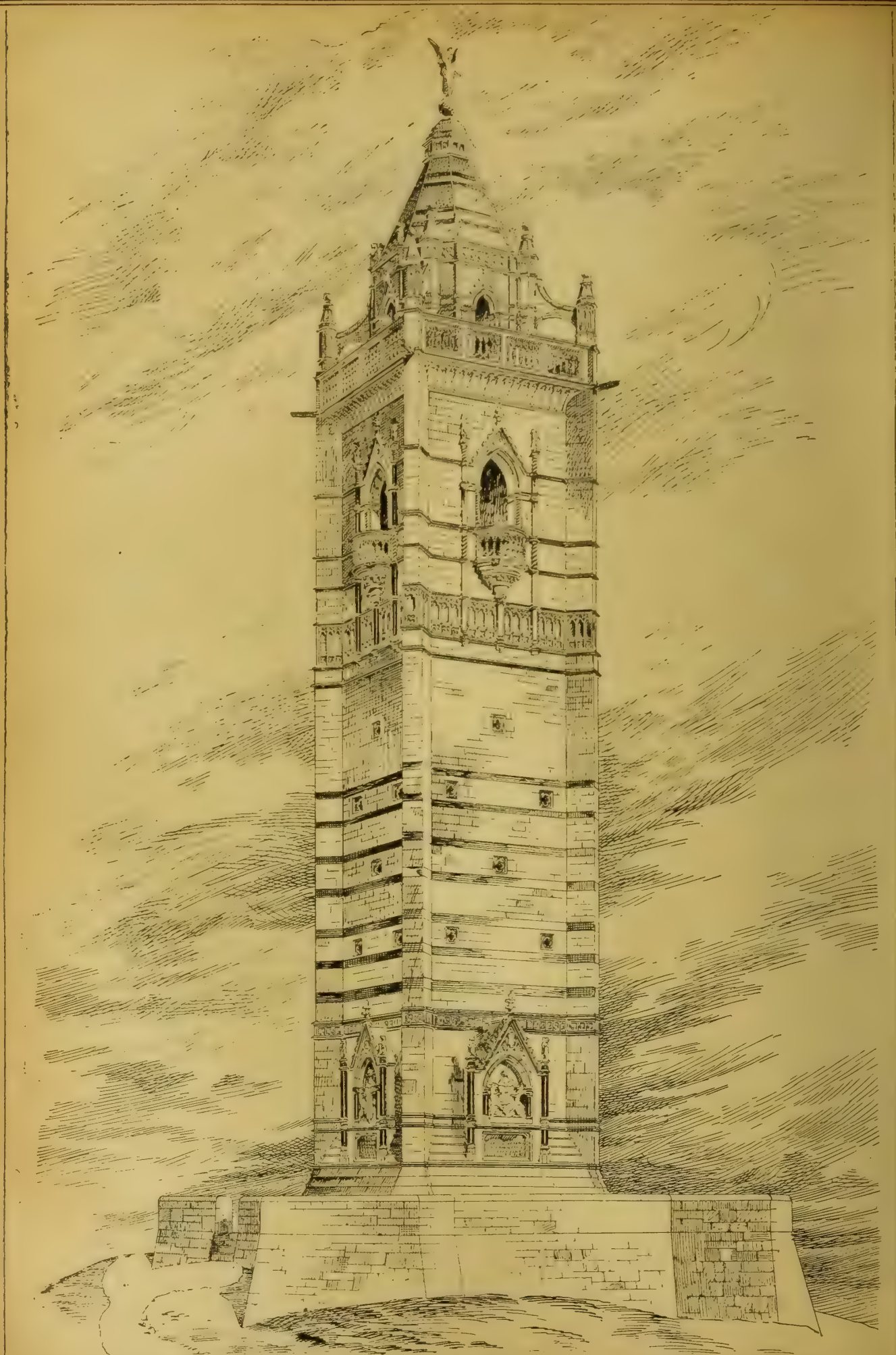
more ingenious than beautiful, and although the woodwork was evidently designed for its position, for which the screen is indeed well suited, there can be no doubt that this corbelling over of the respond shafts does not enhance the screen, probably because an archway of so odd and striking an outline attracts too much attention by its singularity. Mr. W. Haywood, in his careful sketch which forms the central subject of one of our double-page plates to-day, has somewhat artistically minimised the dominating importance of the masonry. The two lecterns from the same skilful sketcher's folio, one from Yeovil and the other from Wells Cathedral, are very admirable examples of church furniture. The sections of the mouldings given with the views add much to their value. Few things in modern ecclesiastical fittings are more devoid of taste than the ordinary lectern. Possibly many come from the commercial factories of such things; but some which we could name as artistic failures have cost a large sum to make, and have been designed by "professional" architects. A little less "profession" and a little more art would be an improvement. Such sketches as these cannot fail to be educational.

THE CABOT MEMORIAL TOWER ON BRANDON HILL, BRISTOL.

THIS memorial was ceremonially unveiled on Tuesday afternoon by the Marquis of Dufferin and Ava, who had on June 24 last year laid the foundation-stone. The monument, which, it will be seen, takes the form of a square-built tower, occupies a commanding position on the summit of Brandon Hill, an eminence which is itself 260ft. above the level of the harbour. The tower stands 105ft. high, and has been erected by public subscription to commemorate the fourth centenary of the discovery of the continent of North America by John Cabot, who sailed from Bristol in a local ship and with a local crew. Their eventful voyage was made under letters patent granted by King Henry VII. to that intrepid navigator and his three sons, Lewis, Sebastian, and Sanctus. The tower is divided into two stages, each relieved by an ornamental balcony, the floor of the upper balcony being 75ft. from the base, whilst above rises an octagon spire of freestone, 35ft. in height, surmounted by a globe and figure symbolical of Peace, both gilded. The tower is ascended by a circular staircase of good width to the first stage, and above that there is a spiral staircase to the second stage. The treatment of the design is typical of the style prevalent in England at the time of Henry VII. In the panels upon the four sides of the base are appropriate sculptured designs, and also tablets bearing suitable inscriptions. One of these concisely narrates the history of the memorial; another, decorated by the representation of a dove and olive branch, records that it is placed there by the Bristol branch of the Peace Society, "in the earnest hope that peace and friendship may ever continue between the kindred peoples of this country and America." Brass plates are affixed to the balustrades of the upper balcony indicating the direction and distances of various cities in England and abroad, and also pointing out the buildings of interest to be seen from the balcony. On the plates, too, are engravings of the buildings mentioned, and also an indication of the height of the balcony—viz., 334ft. above ordnance survey datum. Amongst the names of places on the plate on the west side is that of "Canada," which, it is stated, is about 2,400 miles distant, and is the land first seen by Cabot, A.D. 1497. The tower has been built from the designs of Mr. W. Venn Gough, architect, 23, Bridge-street, Bristol.

Classes have been organised in building construction and drawing at Westbourne Park Institute, Porchester-road, Bayswater, and will be taught by Mr. Harold Busbridge, assisted by Mr. John Lawrance. These classes are especially intended to aid those engaged in the building trade, who are seeking appointments as building and sanitary inspectors, manual instructors, builders' foremen, draughtsmen, and other positions where a knowledge of architectural drawing and construction are required. Many of Mr. Busbridge's former students are now occupying similar positions, owing in a large measure to the knowledge gained at these classes. An honours class has been organised especially intended for those who have passed the advanced examination, and who are preparing for Civil Service appointments in H.M. Office of Works, or for the professional examinations of the Surveyors' Institution, or the Institute of Architects.





THE CABOT MEMORIAL TOWER, BRISTOL.—MR. W. V. GOUGEON, Bristol, *Architect*.





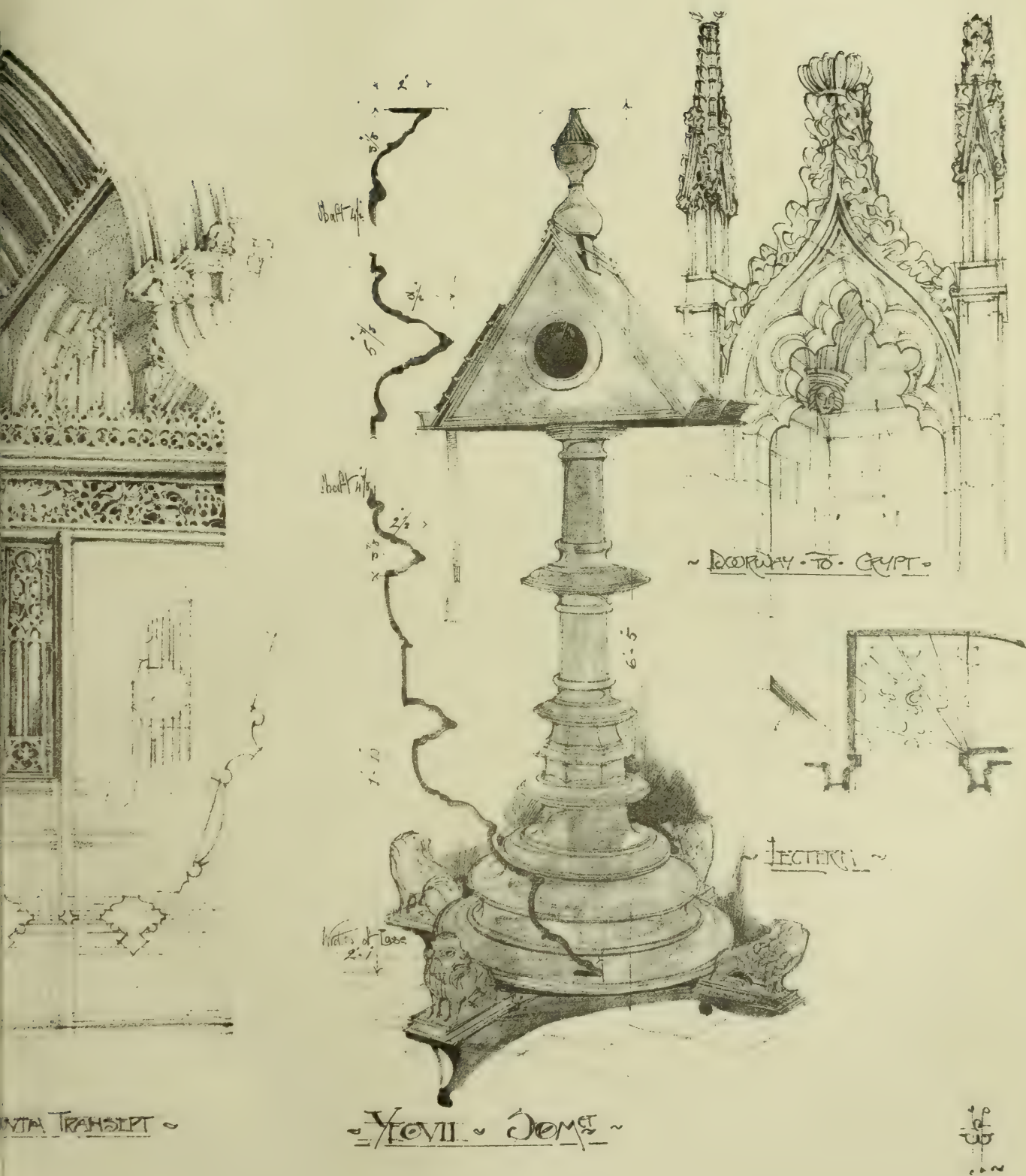


INTERIOR - R. WELLS - CATH.



~ DYNSTER - SCREEN -



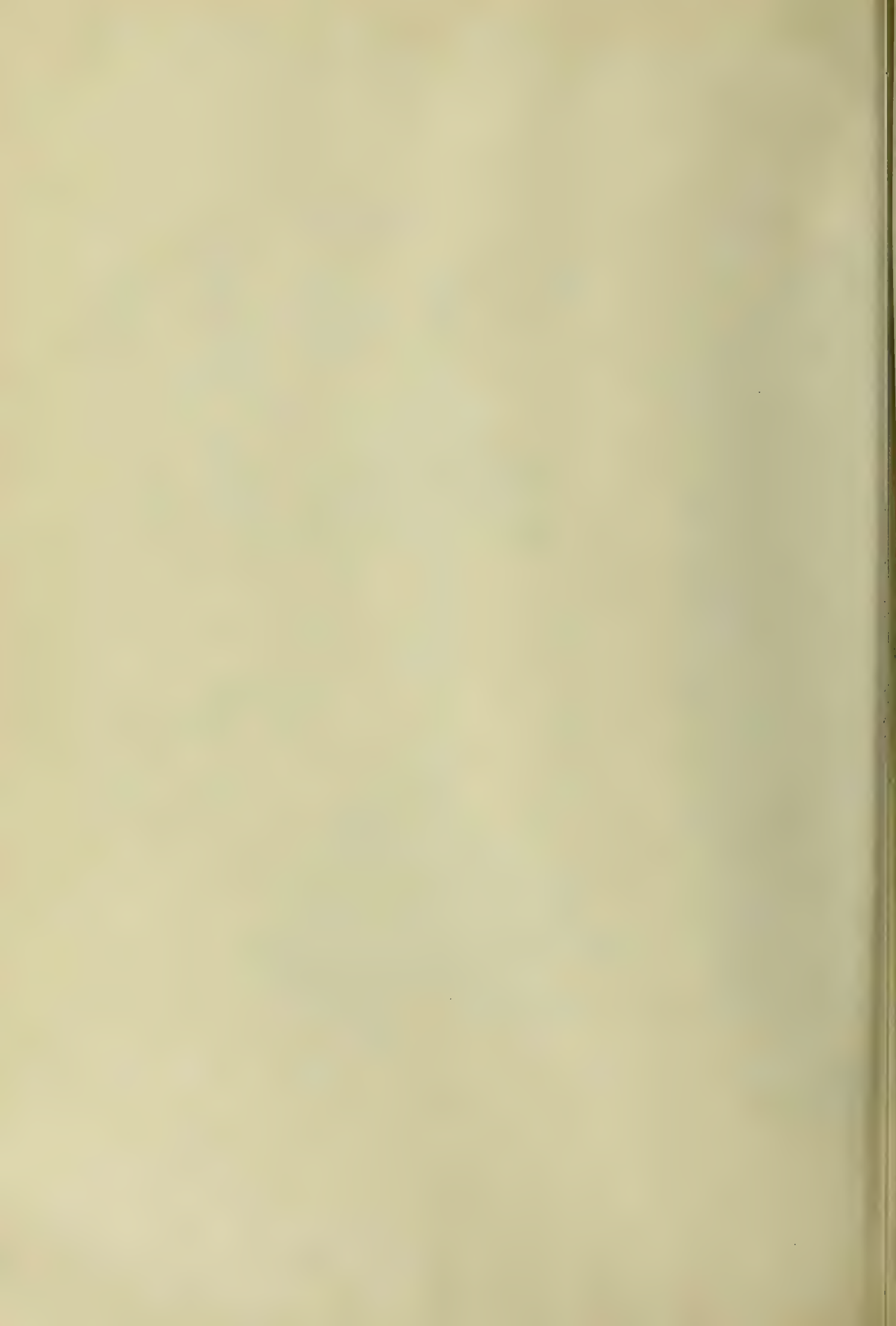


SANTA TRINITY

YEOVII DOME

BY WILLIAM HAYWOOD.





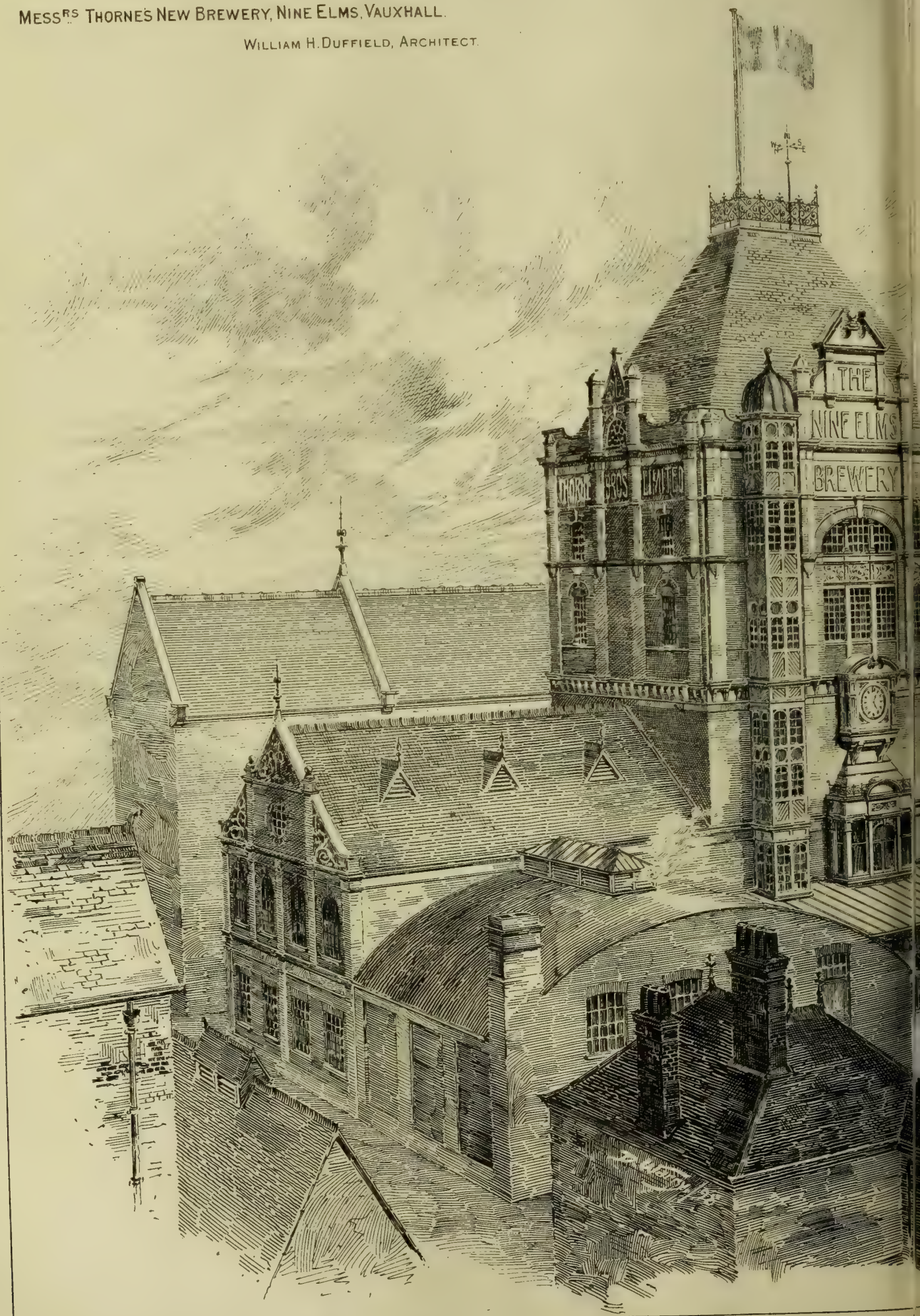






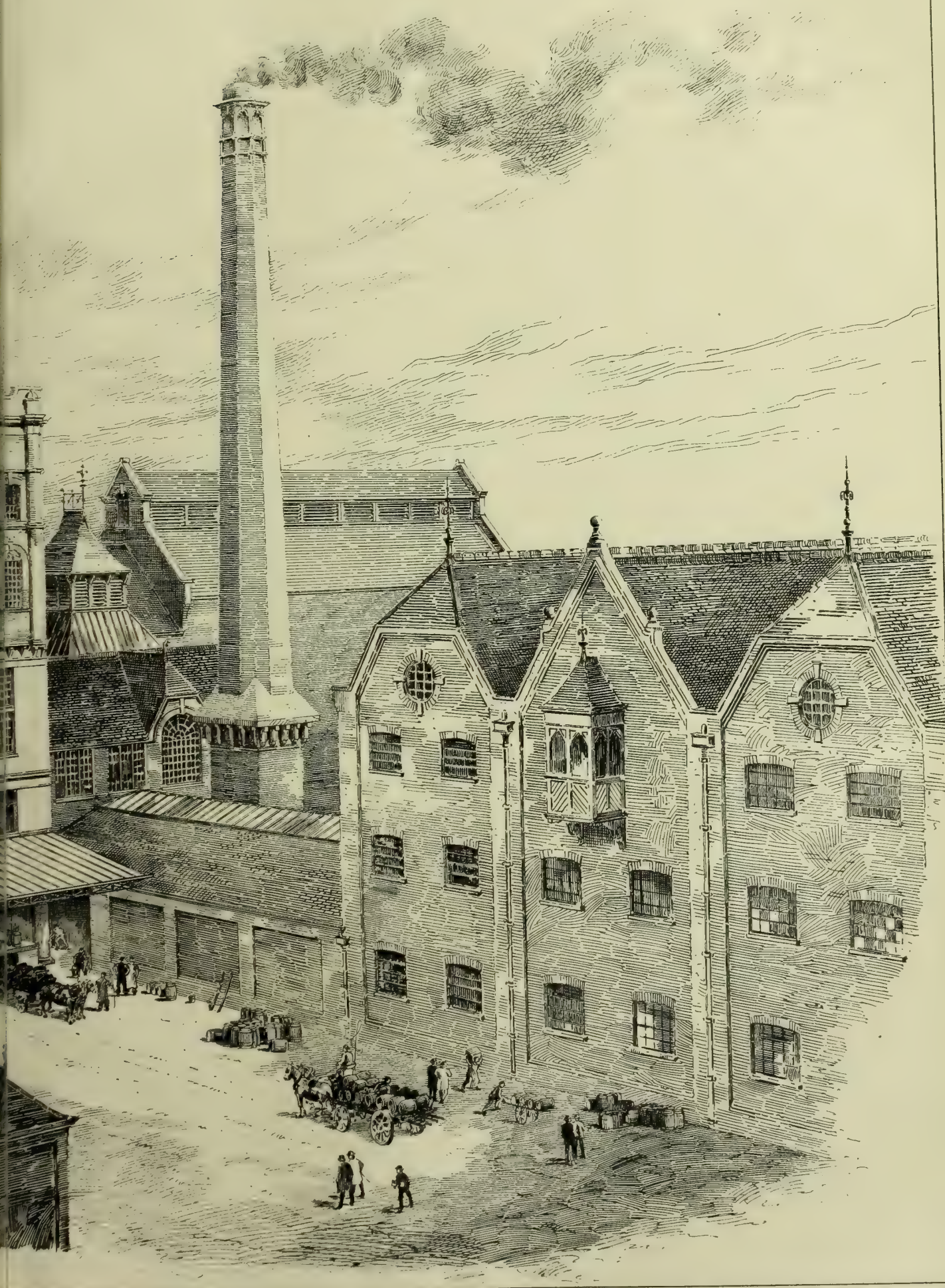
MESS<sup>RS</sup> THORNE'S NEW BREWERY, NINE ELMS, VAUXHALL.

WILLIAM H. DUFFIELD, ARCHITECT.





SEP. 9, 1898.













THE BOLLING PRESS. SEP. 9, 1895.

PROPOSED TECHNICAL & SECONDARY SCHOOL, CHIPPENHAM. SELECTED DESIGN ROBERT E BRINKWORTH, ARCHITECT

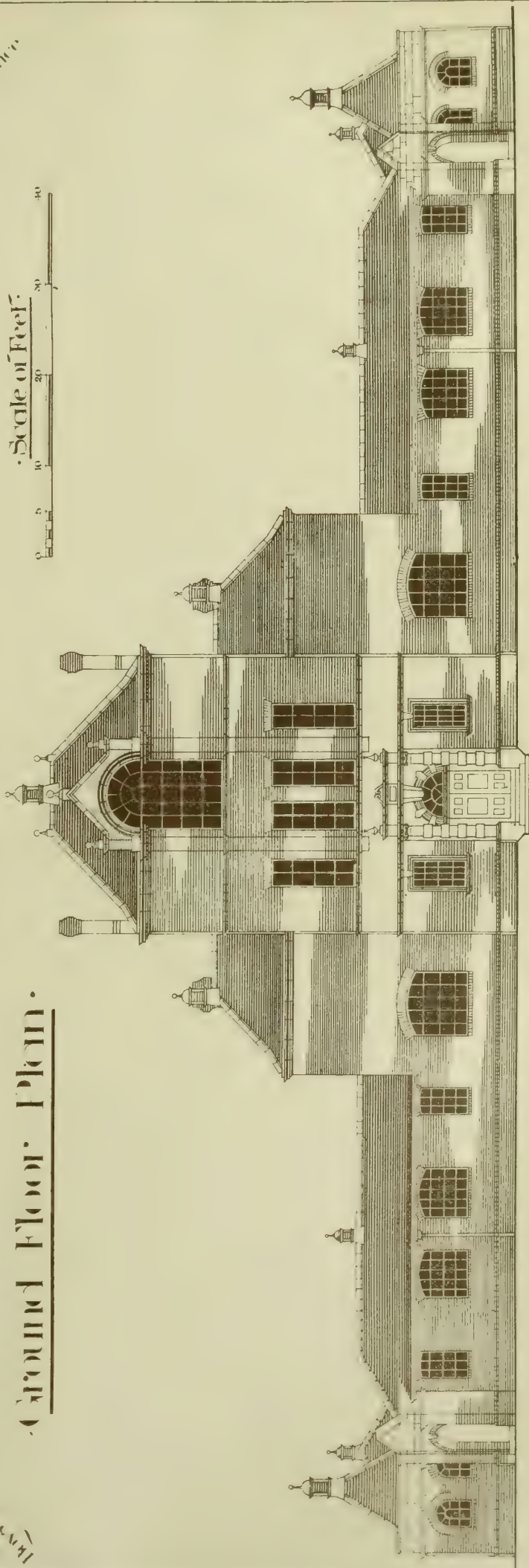
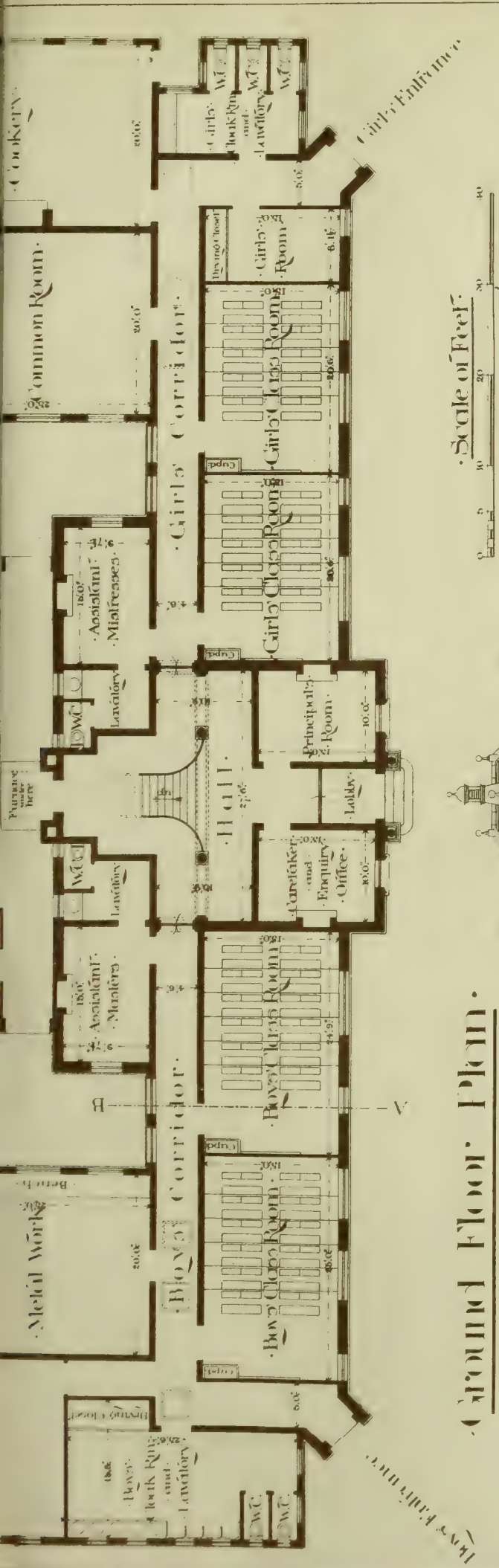


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· Girls ·  
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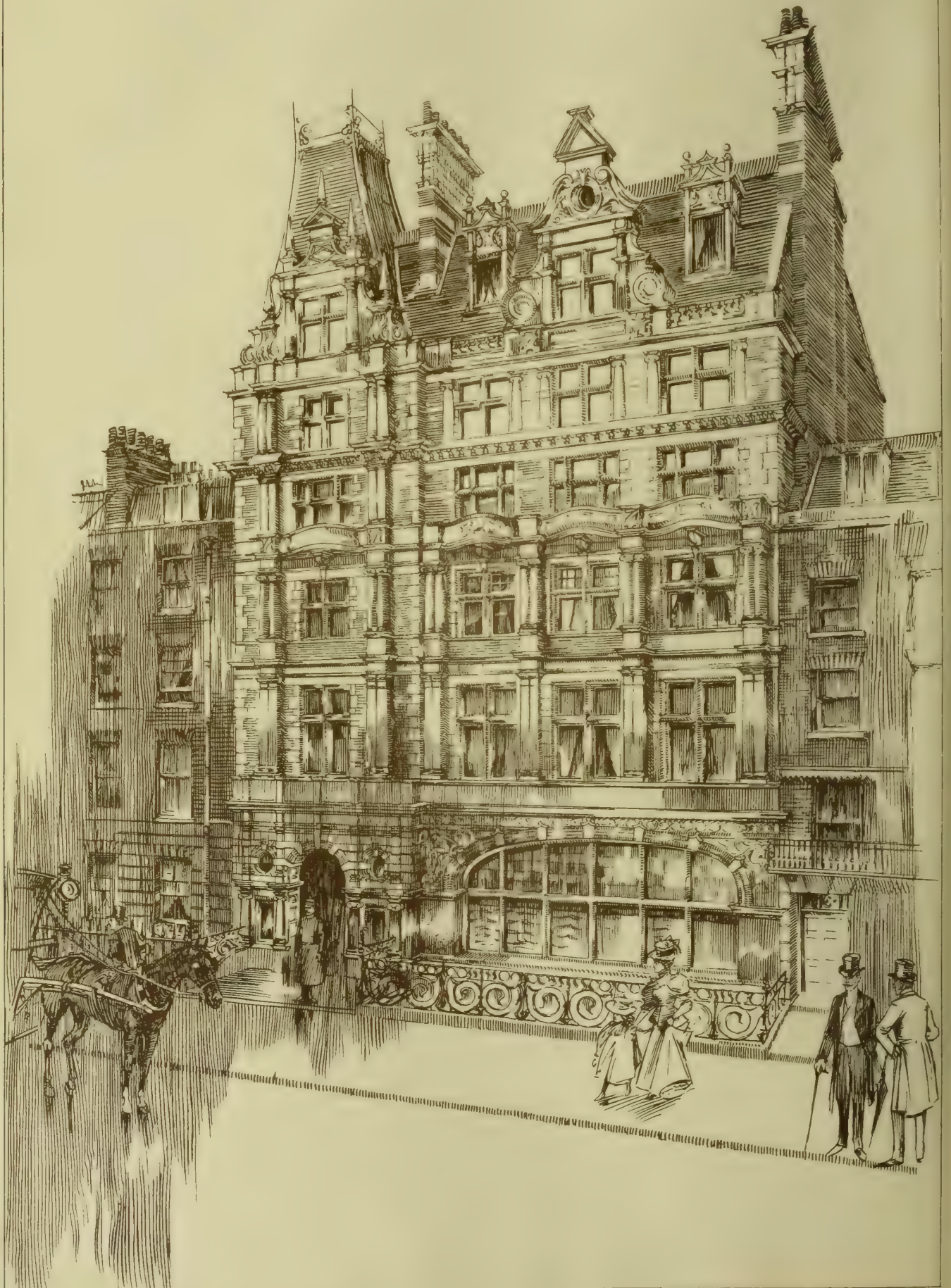




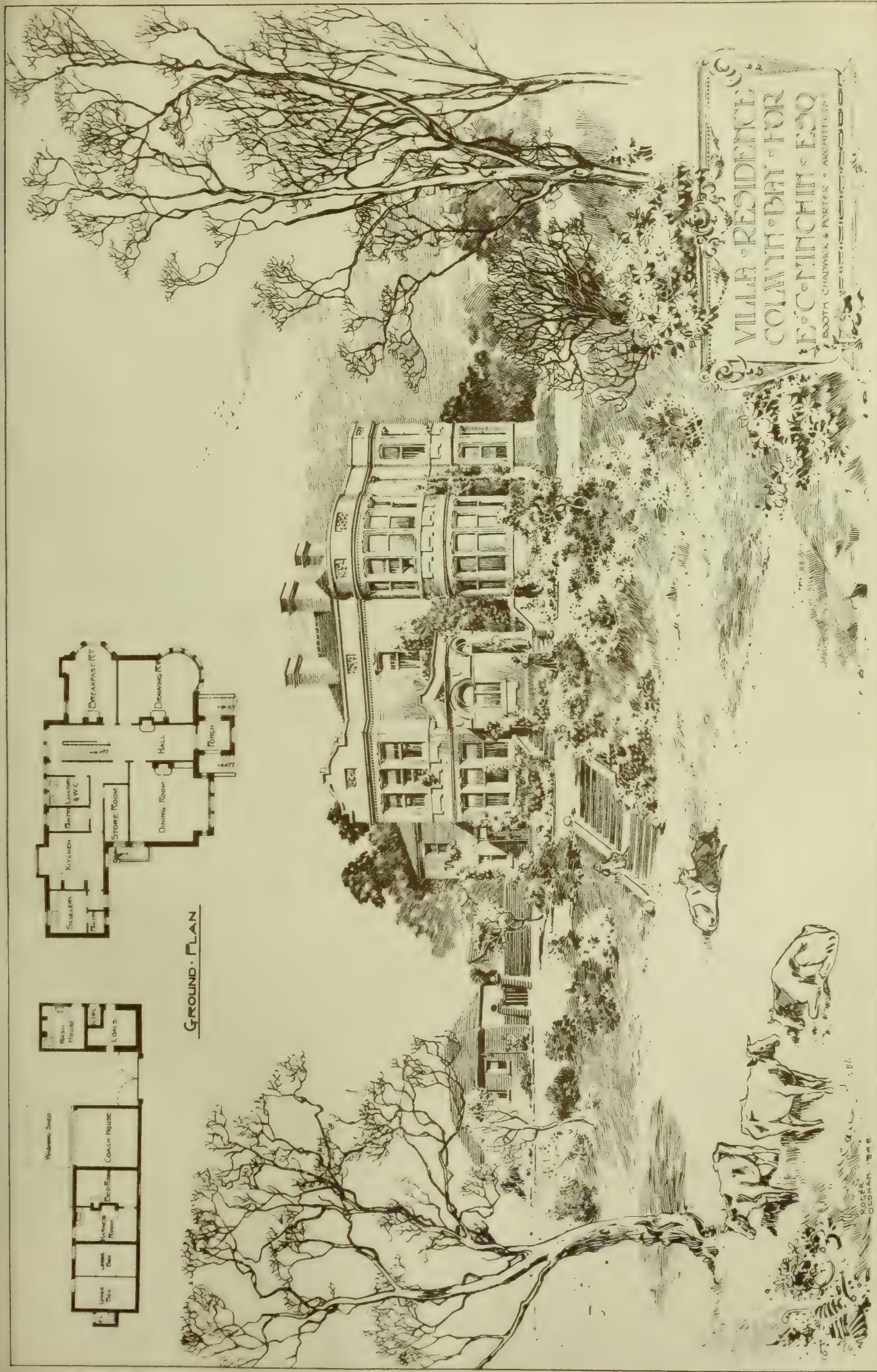




THE NEW 'PREMIER' HOTEL  
DOVER STREET PICCADILLY.  
G.D. MARTIN ARCHITECT.







VILLA RESIDENTE  
 COLWYN BAY FOR  
 F. C. FINCH, ESQ.  
 BOOTH, CHADWICK & PORTER, ARCHT. LINDSAY

GROUND PLAN

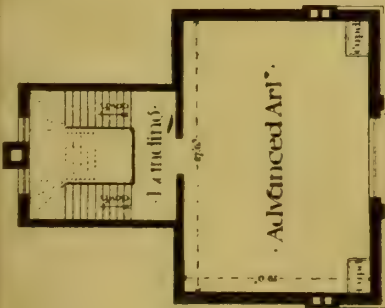


ROGER  
 OLDFAN 1846

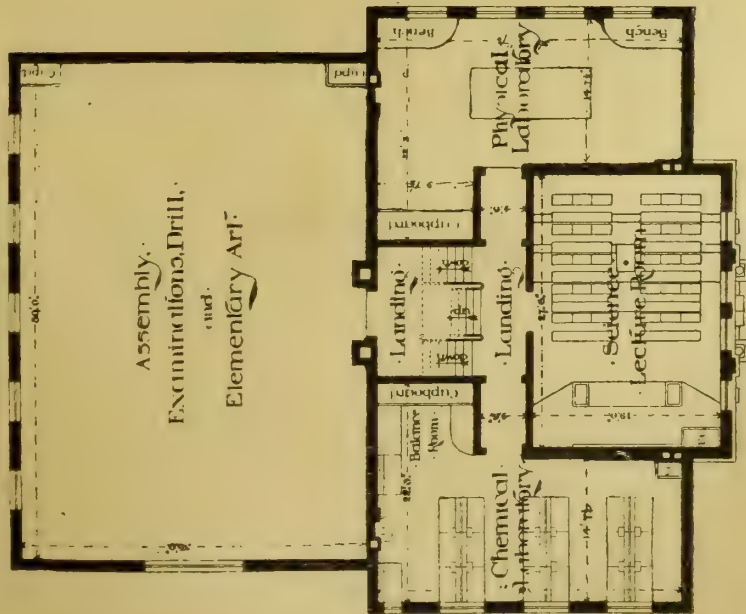




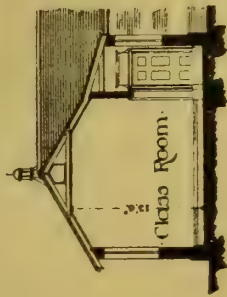




Second Floor Plan.



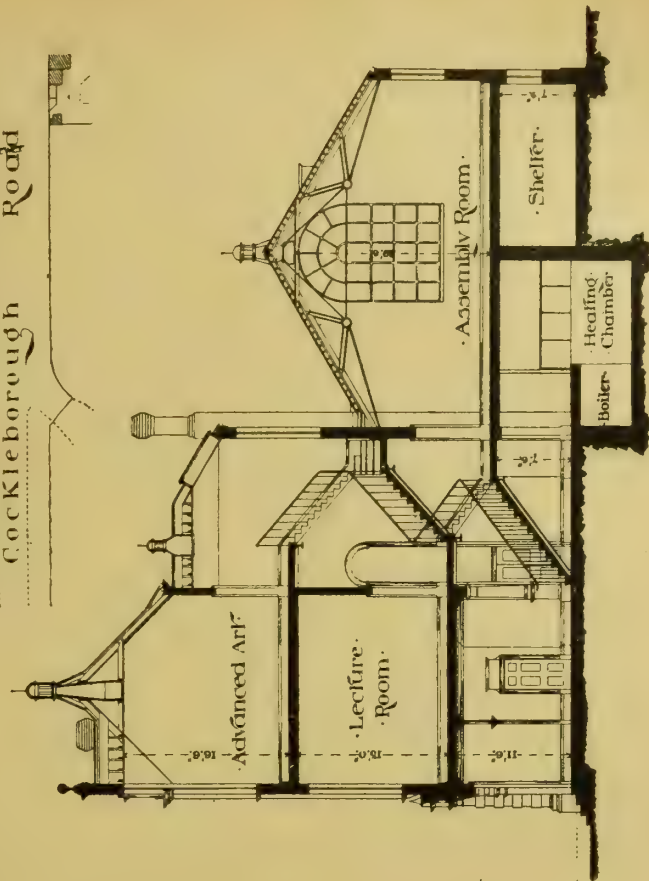
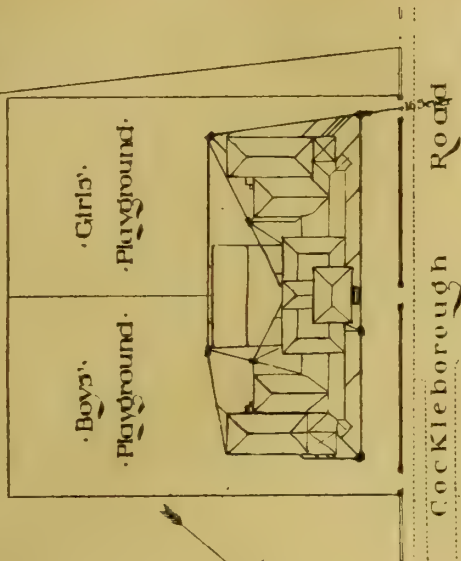
First Floor Plan.



Section on line A - B.

Block Plan.

Scale 1/500.



Transverse Section - I-Iro Centre.

Scale of Feet.



## Correspondence.

PARSONS AS ARCHITECTS.

To the Editor of the BUILDING NEWS.

SIR,—If the Rev. J. W. Rhodes, vicar of Whaplode, to whom reference is made in a note on p. xiii. of your current issue, is the same gentleman who was in partnership with Mr. John Sulman, F.R.I.B.A., more than twenty years ago, his offer of professional services is not quite so inappropriate as it appears at first sight.

The initials are the same, and I know that the gentleman to whom I refer left our profession and joined the Church.—I am, &c.,

HENRY DUNRY.

Craigleith, Kersfield-road,  
Putney Hill, S.W., Sept. 5.

SIR,—Referring to p. xiii. last week, you appear to question the ability of the Rev. J. W. Rhodes, of Whaplode, to design schools, so I would remind you that I worked with him in the A.A. classes a good many years since. He was in partnership with Mr. John Sulman, and afterwards took holy orders.—I am, &c.,

HENRY LOVEGROVE.

## CHIPS.

The Local Government Board have given their sanction to the borrowing of £33,000 by the Salford Corporation for electric lighting purposes. Of the sum named £23,000 is for the establishment of three battery sub-stations, and £10,000 for the land for new generating stations.

A station hotel, costing £4,000, is to be erected by the South-Eastern Railway Company at Whitehall, Crayford, for the accommodation of the men employed at the engine works.

A new hotel is proposed to be erected at Overstrand, Cromer, on the road between Overstrand and Sidesstrand. Mr. Edward Boardman, of Norwich, is the architect.

The towns of Woking and Dorking are now, like most others in Surrey and the home centres, suffering from a water famine, and the local water company has decided to increase its capital by £10,000 to enable it to construct a large reservoir at Clandon, and carry out some other improvements.

At a meeting of the Smethwick Technical Education Board, held on Tuesday, plans were submitted for the erection of new technical schools at Crockett's-lane from four local architects, and these, after consideration, were referred to a sub-committee to select one for adoption by the board.

The Local Government Board have sanctioned the joint reappointment of Dr. G. Wilson as medical officer of health for the rural districts of Crich, Meriden, Rugby, Solihull, Southam, Warwick, Yardley, the urban districts of Kenilworth and Rugby, and the borough of Warwick, at a salary of £1,000 per annum, including personal and travelling expenses.

The opening of a new lecture-hall, erected at the rear of the Hebron Chapel (U.M.F.C.), Bedminster, Bristol, took place on Tuesday. The building, which is of brick with freestone dressings, accommodates about 150. The walls inside are plastered, and the ceiling boarded, while the floor is of wood blocks laid in squares. The internal woodwork is stained and varnished. The hall is furnished with chairs, and the building is about 60ft. by 18ft. Mr. R. Slaughter was the architect, and the builder Mr. W. Foster.

The proceedings at Tokenhouse-yard last week were dull, and no individual transaction of any importance took place, the entire sales of the week only producing a total of £13,025. Even this is considerably in excess of the amount recorded for the corresponding period of 1897, the total then registered being £10,370.

Sir William Harcourt will, on October 26, open the new portion of the University College of Wales at Aberystwyth, erected at a cost of nearly £20,000, half of which was granted by the Government when the right hon. gentleman was Chancellor of the Exchequer.

A preliminary meeting of the A.A. School of Design will be held at 56, Great Marlborough-street, W., on Tuesday, October 11, at 7 p.m., when the president of the Association, Mr. G. H. Fellowes Prynne, will address the students. This meeting is open to all members of the Association and is not limited to students of the School of Design.

The Board of Trade have recently confirmed an order intitled the Pewsey and Salisbury (Devizes Branch) Light Railway Order, 1898, authorising the construction of a light railway in the parish of Pewsey, in the county of Wilts.

## Intercommunication.

## QUESTIONS.

[12036].—**Swimming Baths.**—Will any of your readers tell me of any model public baths that I can inspect, and their position?—T. SUGGESS.

[12037].—**Ribbed Ceilings.**—Can there be formed in some patent material like plaster? I shall be glad to receive particulars of any such, and the mode of fixing the ribs to the plaster.—RESTAURATEUR.

[12038].—**Wood Blocks.**—Is there not some kind of cement or bituminous composition used for laying wood block floors, and what is the name? Would preparation of tar and chalk do? Is pitchpine a better material for flooring than teak?—A. K.

[12039].—**Lead Glazing.**—I have some panels to fill with lead glazing, and shall be glad if someone can give me instructions as to fixing the glass in the lead bars.—IGNORANT.

[12040].—**Seasoning of Wood.**—Would some reader be kind enough to give me references to any microscopical or chemical investigations that have been made on this subject? Also, whether it is known why the addition of certain salts to wood causes it to become non-inflammable.—S. O. N.

[12041].—**Parliamentary Plans.**—Would a reader kindly say whether it is compulsory or only usual for Parliamentary plans to go through the hands of Parliamentary agents for advertising, serving the necessary notices, and depositing plans, &c., or could the whole be undertaken by the civil engineer or surveyor who prepares the plans? Where does the responsibility of the civil engineer who prepares the plans for new works or improvements divide from the responsibility of the Parliamentary agents in properly getting plans passed through Parliament according to Standing Orders?—SURVEYOR.

[12042].—**Cutting Granite, &c.**—I have rigged up a cutting disc, and I find that I can cut through lin. of granite in 32min., using 9-hole emery. Has any reader tried diamond dust, and at what rate did it cut? Using emery is not pleasant; it makes a dreadful noise, and I am anxious to find a better way. My disc is 5in. in diameter, and runs 600 revolutions per minute. Any information will be very acceptable.—LAP.

[12043].—**Bending Wood.**—Will some reader kindly tell me if it is possible to bend wood, say ½in. deal 4in. wide, into half-circles? I want them from 3ft. to 4ft.—WOOD WORKER.

## REPLIES.

[12024].—**Fence between Houses.**—As the fair side of the fence is on your side, it belongs to your neighbour, and consequently all expenses in the shape of repairs fall to him unless there exist agreement otherwise.—L. E.

[12024].—**Fence Between Houses.**—Since the face of fence is towards "Tenant's" garden, the fence evidently belongs to the adjoining owner. "Tenant" should therefore call upon his neighbour to repair it.—H. BUSHBRIDGE.

[12024].—**Fence Between Houses.**—The best plan is to ask your neighbour in writing whether he will undertake to put in new posts, or to pay a proportionate share in the work, which would be fair. As the posts are on his side, the fence presumably belongs to your neighbour; but each tenant has an interest in keeping it in a good state of repair.—G.

[12024].—**Fence Between Houses.**—"Tenant" should ascertain from the lease or conveyance whether the fence in question belongs to one house or is joint property.—H. L.

[12025].—**Sketch Plans.**—If a complete specification was sent with the plans, a charge equal to 2½ per cent. could be made; but "Inexperienced" should be able to show, if necessary, what the amount would be by charging the time devoted to the work.—H. LOVEGROVE.

[12025].—**Church Seats.**—These vary so much; but for an ordinary cheap church or chapel the following might answer:—Seats 3ft. apart centre to centre; allow if possible 20in. for each person. The back of 1½in. framing, head flush and square and stop-chamfered. The seat should be 1½in. wrought and cross-tongued, about 13in. in the clear, and about 15in. above the floor. The back about 17in. high, the top edge moulded. The seat-ends 2in. thick, about 18in. wide, cut and shaped to design.—H. L.

[12025].—**Sketch Plans.**—"Inexperienced" can write to his client and send in his account for making drawings. A charge of 1½ per cent. on the estimate is usual; but "Inexperienced" is the best judge of the trouble and labour. A twelvemonth is a long time to elapse before a client makes up his mind. Few would wait so long.—H. G.

[12026].—**Church Seats.**—It would not be half a bad idea for "A. J. T." to give the different church seats a trial before settling his question, as then he would be in a position to provide seats which would afford a degree of comfort to the occupant that is sadly missing in some churches. For myself, I do not prefer those backs which are too upright.—LOUIS ERWOLD.

[12027].—**Casement Fastener.**—I should advise "Cameo" to go to any ironmonger or manufacturer who makes a speciality of casement fasteners, as he will be able to judge the merits of each for himself.—L. E.

[12027].—**Casement Fastening.**—Several good fasteners are to be procured. Write to any firm of repute, like Messrs. Burt and Potts, York-street, Westminster, or to H. Hope, Lionel-street, Birmingham, or any other firm advertised in the "B.N."—G. H. G.

[12027].—**Casement Fastening.**—I think that the best casement fasteners are those generally in use on the Continent. Why not call at one of the large ironmongery establishments, and make a selection?—H. L.

[12028].—**Proportion of Stairs.**—A 6½in. riser

and a 10in. tread is more suitable than 7in. riser and 10in. tread; but a 11in. tread and 6in. riser, where there is plenty of room for the stairs, will be found to give an easy ascent and descent for those who find it hard work to go upstairs.—L. E.

[12028].—**Proportion of Stairs.**—For a really "easy" stair, an 11½in. or 12in. tread and a 6in. or 6½in. riser will be found efficient.—ALFRED C. KYLE.

[12028].—**Proportion of Stairs.**—A 6½in. riser would be more suitable than 7in. to a 10in. tread, since a very good rule is, that "tread multiplied by rise in inches should equal 66in." It will therefore follow that if the 7in. rise is retained, the tread may be 9½in. A tread and rise of 11in. and 6in. respectively would be more suitable to a stair of superior character.—H. BUSHBRIDGE.

[12028].—**Proportion of Stairs.**—A good proportion of tread to riser may be ascertained as follows:—If the riser, which is generally a fixed quantity, is 7in., an easy tread will be 9in. A 6in. riser should have 11in. tread. If two sets of numbers are put down, one of inches showing the tread, and the other the height of riser descending by half-inches in arithmetical progression, each pair of numbers will make an easy step. The higher the rise, the less the tread. The subject is treated in Newland's "Carpenter and Joiner's Assistant."—G. H. G.

[12028].—**Proportion of Stairs.**—A 10in. tread and a 7in. riser would do for an ordinary house; but an 11in. tread and 6in. riser would be much better for a house of good class.—H. L.

[12029].—**Green Stains on White Facing-Bricks.**—As the green stain is probably due to lichens which have grown on the brick owing to its being damp, it would be advisable to wait and see whether, on the building becoming dry, the growth will disappear or not. Weak acid repeatedly applied will kill the lichens and remove the stains; but it may also help to disintegrate the surface of the bricks. The stains could probably, if resulting from the growth, as suggested, be brushed off when the wall was thoroughly dry.—L. E.

[12029].—**Green Stains on White Facing-Bricks.**—The green discolourations being caused by minute fungoid growths, can be attacked by several acid preparations that are on the market; but probably the most complete cure would be to clean down front and paint three coats Carson's.—ALFRED G. KYLE.

[12030].—**Deodorising Asphalte.**—If possible, I should render the surface with Portland cement and sand at least ½in. thick.—H. L.

[12031].—**Concrete Building.**—There is a book on building in concrete by Mr. T. Potter, and there are a number of works on the subject by Sir A. Blomfield, Mr. Alex. Payne, Mr. Drake, and others in the R.I.B.A. library. A detailed answer to the question would fill a column of the "B.N."—H. L.

[12031].—**Concrete Building.**—An answer to "A Learner's" question will be found in a paper given in the BUILDING NEWS two or three weeks since, describing the mode of construction in a large building in America.—G. H. G.

[12033].—**Green Colour of Copper Roofing.**—The green carbonate is, I think, due rather to the action upon the metal of carbonic acid dissolved in rain-water than to the direct action of the solid carbon contained in smoke from chimneys. In the country this beautiful green is not destroyed by a film of soot, owing to the purity of the atmosphere. The dark colour attained by copper roofs in London must be due either to the film of copper carbonate getting mixed with soot during its formation, or else a preliminary coating of oxide and soot must protect the copper from the chemical action of carbonic acid. The latter seems hardly probable, so that the former is most likely the true explanation of the phenomenon.—H. BUSHBRIDGE.

[12035].—**Measuring Heights, &c.**—Pay a visit to Stanley or other instrument manufacturer, when prices may be had, and also points of usefulness about the instruments themselves.—LOUIS ERWOLD.

[12035].—**Measuring Heights, &c.**—There are several instruments for measuring angles. The theodolite, box sextant, and small telescopes with cross-wires with graduated arcs are used. Send for cost to any optical instrument-maker, like Stanley, of Holborn.—A SURVEYOR.

[12035].—**Measuring Heights, &c.**—I would suggest to T. Simpson that an "inclinometer" would suit his purpose quite well. It is not expensive, and can be carried in the pocket. For anything like accurate survey-work a theodolite would be required, and a great many other accessories; but I am afraid he will find the price rather prohibitive if he merely wishes to use the instrument as a hobby. Any mathematical instrument maker will quote prices. I have not a list beside me at the moment. Theoretically, there is no difficulty in using the instrument; but, like everything else, it requires practice.—W. J. G. F.

The Old North Gate Permanent Memorial at Exeter was inaugurated on Wednesday week. The memorial is in stone, and situated on the near side of the Iron Bridge, between the Crown and Sceptre and the Black Dog hotels. It was erected by Messrs. Easton and Sons, Northernhay-street, Exeter, from the designs of Mr. Jas. Jerman, of that city, and will mark an important historic site. A miniature of the ancient Gateway has been carved into the memorial by Mr. Mears, and there is a suitable inscription.

A public meeting will be held in the Mayor's parlour, Manchester, on Monday, the 19th inst., at which the Lord Mayor of that city will distribute the prizes, certificates, and bronze medal of the Plumbers' Company awarded in connection with the recent exhibition of plumbers' work at Manchester. The programme will include a lecture on "The Registration of Plumbers and Domestic Sanitation," by Dr. Mansel-Howe, of London.



## Building Intelligence.

**BASSETT, SOUTHAMPTON.**—The new church of St. Michael and All Angels at Bassett, near Southampton, and in the parish of North Stoneham, was dedicated by the Bishop of Winchester on Wednesday week. The church has been built of brick with dressed stonework of Monk's Park stone, the roof being covered with grey-green slates. The church is cruciform in plan, the north transept being occupied by the vestries. The nave and chancel form a long parallelogram, divided into six bays (of which four only are built, the two western bays of nave being omitted for the present), covered by a quadripartite vaulted ceiling, formed in concrete, supported by stone ribs. This ceiling is plastered internally, and ornamented by coloured and gilded shields and stars bearing emblems and initials, while the central pierced circular bosses are connected with a ventilating system. The buttresses which resist the thrust of this vaulting are carried up as internal piers, and are pierced with archways to form passage aisles. The width of the nave between the buttresses is 25ft. The full internal length of the church will be about 98ft., that of the portion built being 66ft. The roof is low, owing to exigencies of cost, the internal height being only 27ft. There are five steps to the sanctuary, which is floored with black and white marble, and two more to the altar dais. The central light of the east window is occupied by a representation, in stained glass, of the Enthronement, executed by Messrs. Salisbury Brothers from the architect's design. The font is of Ancaster stone, carved with lilies. The west elevation of the church is of a rough, temporary character. The east elevation is complete, and the chancel gable is surmounted by a stone cross, carved with the crown of thorns and reed and spear. The builders were Messrs. Holloway Brothers, of Battersea, and the architect is Mr. E. Prioleau Warren, of Westminster. The present section of the church will contain a congregation of about 280, while the completed building will hold 430. The cost of the structure, so far, has been £2,570. The special gifts include the site of one acre, the marble paving for the sanctuary, altar plate in gilt, carved stone font, altar, credence table and furniture, litany desk, and carved oak lectern.

**EDINBURGH.**—St. Patrick's Roman Catholic church, which has been closed for about a year, during which time it has undergone extensive structural alterations, was reopened on Sunday. The interior of the church has been entirely changed. The old gallery, which formerly ran in crescent shape round the north, west, and south sides of the church, and which, like the pews in the area, faced the sanctuary, then situated in the eastern portion of the building, has been removed except on the south side; the seats in the area now run east and west; and a new and spacious sanctuary has been constructed at the north end. This sanctuary is really an addition, and has been built out on what was formerly a vacant piece of ground between the church and the adjoining rectory. The church has been repainted throughout, and the sanctuary been elaborately treated. The fluted pillars are heavily gilded on a ground-work of pale green—the colour of the walls—the niche forming the Calvary at the rear of the altar is in green and gold, and the cross above the altar has a background of pale sky-blue. On either side of the sanctuary space has also been found for a side chapel, and six confessionals have been built around the inner walls. The prevailing colours on the ceiling and walls of the church are buff and pale salmon; and, while the ceiling has been treated with stencil work, a number of appropriate emblems adorn the walls. The organ now occupies a place in the gallery at the south end of the church, immediately above the principal entrance. A new block floor has been laid. The church will be heated by hot-water pipes, and lighted throughout by electricity. Irrespective of painting and the electric lighting installation, the alterations will cost something like £1,600. Mr. J. G. Fairley, of Edinburgh, was the architect.—The new day industrial school, St. John's Hill, erected on the site of the Old Free Church Manse of Holyrood, for the Edinburgh School Board, was formally opened on Tuesday. It is certified for 160 children, and has cost £11,600, of which £2,060 represents the outlay on the site, and £8,540 that on the erec-

tion and furnishing of the building. The school has been built from designs by Mr. Wilson, architect, Queen-street, Edinburgh. Its architectural features are Scottish, dormer windows and crow-stepped gables giving character to it. Its corridors and classrooms have been lined throughout with red brick with an enamelled face; the floors and doors are pitch-pine. On the street floor, on the right of the boys' entrance, there are waiting-rooms and bath-rooms. This is duplicated at the east end of the school for girls. The main portion of the ground floor is a recreation hall, screened off in the centre into two portions—one for girls and another for boys. This opens upon a swimming-bath on the south side of the school, which will be used at separate times by the boys and girls. Outside, on the south side, are open concreted courts surrounded by a high wall, forming playgrounds. The classrooms and industrial rooms are on the first and second floors, and on the girls' side are the kitchen, washhouse, and laundry, in which the girls will be taught housework.

**GLASGOW.**—The St. Andrew's halls, which have recently undergone considerable structural alterations and have also been entirely redecorated, were reopened on Saturday. The alterations have been carried out under the superintendence of Mr. Walter Freer, curator of the Corporation Public Halls, and they consist of an improvement in the Kent-road exits, the addition of private connections between the artistes' and orchestra rooms and the platform, and the erection of spacious verandahs in Berkley-street and Kent-road. The incandescent system of electric lighting has also been introduced, as well as the arc lamps, 17 electroliers having been fitted up, each having 17 lights of 32 candle-power. The scheme of redecoration has been carried out by Messrs. J. B. Bennett and Sons. In the colour scheme gold and silver has been freely mingled with reds and browns and blues, over a general grounding of white. The internal architecture of the building is in the Grecian style, and the decorators have kept this in view in fulfilling their work.

**HOLBORN.**—The premises at the corner of Holborn and Leather-lane are being entirely rebuilt on an enlarged scale for Messrs. A. W. Gamage, Limited, outfitters. The new building, which will be faced throughout with Portland stone, will rise to a height of 80ft. above the pavement, and is French Renaissance in style. The frontage towards Holborn is 66ft. in length and towards Leather-lane 141ft., giving a total length of shop windows of over 200ft. The building is being erected in two sections—front and rear. The whole of the ground floor will be used as shop and sale-rooms, whilst the basement will be utilised for warehousing. On the three upper floors the front portion will be devoted to show-rooms and order departments, the rear portion being used as showrooms, counting-house, and private offices, with dining-rooms for the staff. The building will have electric lighting throughout, with generating plant in the basement. There will be several passenger and luggage lifts. By putting in the substructure while supporting the floor of the shop in position, and afterwards buildings the superstructure over the shop, the work of rebuilding is being carried out without interrupting the ordinary course of business of the firm, or even depriving them of the use of shop-window space. The general contract is being carried out by Mr. J. Carmichael, and Messrs. Sage and Co. are fitting up the shop-front, Mr. Rendell, of Farringdon-road, fitting the inside fixtures. The works have been designed by and are being carried out under the supervision of Mr. J. Sawyer, F.R.I.B.A., of 63, Chancery-lane, E.C.

**KRIGHLEY.**—Ten memorial-stones in a new block of buildings being added to Keighley and District Hospital were laid on Saturday afternoon by the Duke of Devonshire and others. At present the hospital only contains beds for 40 patients, which has been found quite inadequate for local requirements. A new block is being added to the building, providing 40 additional beds. The extension comprises administrative ward, kitchen, and operating blocks, all connected with the present hospital by corridors 9ft. wide. The administrative block has on the ground floor a board-room, dispensary, and staff-room, doctors' sitting-room and bedroom, with bath and lavatory accommodation; matron's, nurses', and probationers' sitting-rooms; office, waiting and porters' rooms, and a casualty room. On the

first and second floors are the matron's bedroom, thirty nurses' bedrooms, and a sick-room, with bath and lavatory accommodation. The ward block will be two stories high, and will have accommodation for 44 beds—in two large wards, 70ft. by 27ft., each containing 16 beds; two four-bed wards, 27ft. by 19ft.; and four single bedrooms for special cases, two day-rooms, 21ft. by 17ft. There are also nurses' kitchen, duty-rooms, storerooms, and baths and lavatories. The floors of the wards will be of polished teak. At the south end of the large ward will be a verandah, with iron staircase for escape in case of emergency. The kitchen block at the rear of the administrative ward will have on the ground floor a kitchen 24ft. by 23ft., scullery, nurses' dining-room, servants' hall, sewing-room, and storerooms; on the first floor eight bedrooms (for ten beds), bathroom, &c.; in the basement are three large larders. At the rear of this block is a boiler-house and boiler-chimney. The operating block (between the administrative and ward blocks, and approached by a covered corridor) will have an operating-room 26ft. by 18ft., anaesthetic-room, instrument-room, and storeroom. At the rear of the site, and detached from the other buildings, is the mortuary block. The warming is intended to be on the low-pressure hot-water system, with ventilating radiators. Each block of buildings is provided with a large extracting shaft, into which the foul air from every room is drawn by means of steam coils. The accepted tenders for the building contracts amount to £14,073; this amount is exclusive of warming, terrazzo flooring, and other specialities. The cost of land, £3,000, and fitting and furnishings, £4,000, with smaller items, bring the estimated outlay to £22,000. The architects are Messrs. W. and J. B. Bailey, of Keighley and Bradford, and the contracts have been let to the following:—Masonry, Mr. Michael Booth; joinery, Messrs. Foston and Fortune; plumbing, Mr. Joseph Harrison; plastering, Mr. Joseph King; slating, Mr. Thomas Nelson, Bradford; and painting, Mr. Frank Petty.

**LEEDS.**—The new depot of the sanitary department of the Leeds Corporation in Dock-street was opened on Saturday. The building is intended for the stabling of the corporation horses and sanitary appliances. The frontage to the River Aire is 250ft., of which 210ft. is available for unloading boats, &c. The total area is 11,257 square yards, which was purchased by the corporation for 25s. per yard, and 1,000 square yards has been given up for the widening of Bowman-lane and Kendell-street. The stable accommodation is eight blocks, twenty horses in each block, making a total accommodation for 160 horses, whilst there are four loose boxes and five isolation boxes. The eight blocks of stables constitute four separate buildings, separated from each other on the two sides by paved yards 40ft. in width, and at one end of the yard 30ft. in width. The yard running north and south and dividing the blocks is covered over by provender stores, in which are placed chopping, grinding, and cleaning machinery. The stores are two stories in height, each being 168ft. long and 30ft. wide. The height of the provender stores from ground stores to under side of tie-beam is 38ft. The area of the open yard is 3,040 square yards, the width between each block of stables 40ft., whilst there are car-sheds for 150 carts. Arrangements have been made for the management of the depot offices for officials. The building has been completed by ten different firms of local contractors, from plans by Mr. T. Hemson, the city engineer. The total cost of the buildings has been £30,000.

**PLYMOUTH.**—A south wing, which has just been added to the South Devon and Cornwall Blind Institution, North Hill, was opened by the Earl Morley on Tuesday. It provides a new school-room, 38ft. by 22ft., lofty, and fitted with special desks for the purposes of instruction of the blind. Adjoining it are a matron's room, a cloakroom, lavatory, and other offices, while in the yard to the rear are play-sheds. The floor above has one room 38ft. by 22ft., which is arranged to accommodate twenty females as a dormitory. Bath-rooms and the usual offices adjoin. The wing, which is built in harmony with the rest of the building, is faced on the exterior with Plymouth limestone and Ham Hill stone dressings, and is connected with the older building by an iron bridge. Mr. H. J. Snell, of Plymouth, was the architect.

**WALHAM GREEN.**—The Granville Theatre of Varieties, in the Broadway, Walham Green, will



## LEGAL INTELLIGENCE.

**INFRINGEMENT OF BUILDING BY-LAWS.**—At the Halifax Borough Court, on Aug. 30, John Langley, of Holmfild, was charged with a contravention of the building by-laws. Mr. T. Tylecoat, assistant surveyor, stated that in August and September, 1897, the defendant submitted to the improvement committee of the Corporation plans for the erection of nine houses in Beechwood-avenue, Holmfild. The plans were disapproved because they did not show sufficient height in the attics in proportion to the floor-space. Witness, at the defendant's request, so altered the plans as to comply with the committee's requirements, and they were then passed. In May the defendant visited the place, and found that six houses had been erected according to the rejected plans. The defendant contended that Mr. Tylecoat had "squared the measurements wrong." There was, he said, 1,450c.ft. in each attic. In reply to this, it was shown that the by-law requires an attic roof to be 9ft. high for two-thirds of the area of the floor-space. In the case in question the height was only 8ft. 7in. A penalty of £5 was imposed, if the erections be not altered within fourteen days the defendant to pay a penalty of £1 per day until the alteration is made.

**THE PURCHASE OF SALISBURY PLAIN.**—A Parliamentary paper has been issued giving a tabulated statement of the purchases by the War Department of property on Salisbury Plain. The acreage thus acquired is 22,055, at a cost of £396,576. There are some 42 residences on the property, and 362 cottages. The only instance in which arbitration under the Defence Act of 1842 and the Military Lands Act of 1892 was resorted to was in the case of Sir Michael Hicks-Beach, for whose property at Netheravon, consisting of 7,818 acres, with 15 residences and 136 cottages, a sum of £93,411 was awarded. There are other purchases, which are scheduled as agreed upon, but not completed, and the total area of these is 6,156 acres, and the agreed price £79,582.

**IN RE GEORGE WAIN AND CO.**—A meeting of the creditors of George Wain, builder, 252, Moseley-road, and Seth Elsworth, builder, 79, St. Clement's-road, Birmingham, who have been carrying on business in partnership as George Wain and Co. at Lister-street, Birmingham, was held on the 31st ult. at the Board of Trade Offices, Corporation-street, Birmingham, Mr. Woollett (deputy Official Receiver) presiding. The bankrupts' statement of affairs showed liabilities amounting to £1,903 8s. 2d., of which £1,813 6s. 2d. is expected to rank for dividend. The assets amount to £419 11s. 4d., leaving a deficiency of £1,393 14s. 10d. Bankrupts commenced their partnership in June, 1897, with a capital (consisting of plant and work on hand) amounting to £150. Wain had been in business since 1894, and Elsworth had been his foreman. In the month that they started they contracted to build six houses in Arthur-road and Spring-lane, Erdington, and they lost about £100 on the work. They always had a difficulty in trading owing to their lack of capital. The failure they attributed to losses on contracts and inability to complete houses in course of erection. A meeting of the creditors had been held, at which it was decided not to complete the work on hand. There was no offer of composition, and the case being a summary one, the Official Receiver is trustee.

**ALLEGED WRONGFUL REMOVAL OF BRICKYARD PLANT.**—The Under-Sheriff of Warwickshire (Mr. R. C. Heath) held a court at the shire hall, Warwick, on Tuesday, to assess the damages for the alleged wrongful removal of certain plant, &c., from a brickyard at New Bilton, near Rugby. The plaintiffs were Mr. Arnold Williams, solicitor, and Mr. Benjamin Newstead, both of London; and the defendants were William Stewart Forster and James William Dawson, also of London, trustees of Mrs. West. The plant, &c., was connected with a brickyard originally owned by Mr. J. D. Pinfold. He carried on a successful business for many years, but ultimately got in difficulties. The sheriff took possession of the works, and the plaintiff Williams, with the sanction of the court, purchased the goods seized for £585, and put Pinfold's son in possession of them to act for him. He had never sold the plant or authorised anyone to sell it for him, and he retained a schedule of all he purchased. Pinfold senior ultimately became a bankrupt, and Mr. Newstead was appointed trustee for the creditors. It was in this capacity that he sued the defendants for the property of the bankrupt estate, other than that purchased by the other plaintiff, Williams, and that which was vested in the defendants as mortgagees of the freehold estate. The case was remitted from the Birmingham Assizes for the under-sheriff and a jury to assess damages. Counsel for the plaintiff contended that bricks to the value of £415, and machinery worth £919, had been wrongfully removed and sold by the order of the defendants. The sum of £919 was assessed by Mr. Arthur Briggs, chief engineer to Messrs. Oliver and Co., contractors of the Great Central Railway, in May, 1896. Defendant's counsel said the estate represented by

the defendants lost £5,000 on the mortgage of the property, and the mortgage was foreclosed in 1894. He asserted that the plant was in a ruinous condition, and was sold as old iron. The bricks were broken, and the sum realised for the whole was only a small one. He pointed out that, in addition to the property, for which Williams claimed £919, there were a number of other things, all included in the schedule of the sheriff, from whom he made the purchase for £585. The defendants claimed that under the mortgage deed and the rule of law the brick-kilns and the iron rails in the railway siding belonged to the mortgagee. The under-sheriff said he should admit this claim so far as the kilns, &c., were concerned, but should not include the iron rails if they were merely laid on the surface of the ground, as stated in evidence. Many witnesses were called, and it was shown that the bricks and old machinery were sold to Messrs. Hammond and Young for £58. This sum Mr. Franklin, architect, of Rugby, considered was a fair amount under the circumstances. Hammond admitted that he sold for £96 what he gave £38 for; but he had spent in addition £30 for wages in getting the old iron together. Mr. Beeston, architect and surveyor, of London, said that the machinery was all in a ruinous condition, and much of it had been taken away when he visited the place in 1891. He could not reconcile the estimate of Mr. Briggs with what he saw on the occasion of his visit. The under-sheriff having summed up, the jury assessed the damages due to Mr. Williams at £205, and the amount to which Mr. Newstead, the trustee in bankruptcy, was entitled, at £85.

## CHIPS.

The Carnegie Free Public Library at Wick, was formally opened on Tuesday by Professor Masson. The new library buildings are situated on a site presented by Mr. Usher, of Norton, at Pulteney-town, in front of Sinclair-terrace, and are built from plans by Messrs. Leadbetter and Fairley, architects, Edinburgh. The cost, apart from the site, valued at £500, will be over £4,000, and of this sum £3,000 has been contributed by Mr. Carnegie.

The church of Pitlington, Durham, which has just been restored from plans by Mr. S. W. Hicks, of Newcastle-on-Tyne, was recently visited by the Society of Antiquaries of Newcastle. The removal of the plaster has disclosed several features of interest. It has shown where the ancient walls of the original aisleless church terminated, and the ancient round-headed windows are now seen to have monolith arches like the undoubtedly pre-Norman windows of Jarrow and Monkwearmouth. These windows, and the general proportions of the early building, afford no doubt that the original aisleless church was of what is called the "Anglo-Saxon" style.

Devonport Town Council, at a special meeting held on Tuesday, on the recommendation of the water committee, decided to apply for Parliamentary powers to acquire the undertaking of the Devonport Waterworks Company.

The whole of the business, freehold property, plant, valuable hydraulic stamping, pressing, forging, and flanging machinery, together with the Heslop patent rights and goodwill of the business of the Hydraulic Seamless Pressing Co., Limited, Black Bull-street, Leeds, have been taken over by a well-known firm of engineers and contractors, Graham, Morton, and Co., Limited, London, Mr. Maurice Graham being the managing director.

The will of Mr. Michael Joseph Ellison, of Sheffield, who was agent to the Duke of Norfolk for more than fifty years, and who died on July 12 last, aged eighty-one years, has been proved. The gross value of the whole of the deceased's estate has been entered at £16,779 1s. 9d., and the net value of his personal estate is not stated.

The memorial-stones were laid on Saturday at Beeston, Leeds, of an enlargement of the Primitive Methodist Chapel and the erection of a new school-room. The work is being carried out from designs by Messrs. Howdill and Howdill, architects, Albion-street, Leeds. The chapel at present consists of an oblong room with accommodation for 297 persons. The front is being brought forward to Town-street, and the additional space will give accommodation for 79 persons. The front will be wholly of brick, and will be a simple treatment of 17th-century English Renaissance. The school, two classrooms, heating-chamber, &c., are being added at the back of the chapel. By an arrangement of screens the whole premises can be thrown into one assembly-room in the form of a Greek cross, and as thus arranged accommodation will be provided for 338 persons. The cost of the alterations and extensions will be £570.

At a meeting of Deal Town Council, on Friday, the town clerk stated that the Board of Trade had given the corporation permission to proceed at once with the sea-defence work at North Deal. Operations were commenced on Monday.

he opened on Monday week, the 19th inst. The site is on the north side of the Broadway, Walham Green, with frontages to Jordan-place and Vanston-place, and although small, has been well utilised by Mr. Frank Matcham, the architect. Staircases are found one over the other, saloons and retiring-rooms are placed in positions which do not occupy seating-room, and yet are handy of access, and the manager's offices and dressing-rooms are well lighted and ventilated. The whole of the ground floor will be carpeted and fitted with tip-up chairs. There is no pit, the shilling audience being supplied with a balcony, and over this is a gallery. The holding capacity is calculated at nearly 1,500. The galleries are constructed without columns. The elevation is of red brick and terracotta, the corner being treated with towers and minarets. Over the entrances will be iron and glass shelters, filled with painted glass. The entrances and vestibules are decorated with raised plaster enriched, the ceilings and walls being panelled out in Louis XVI. ornamentation. This decoration is carried along the walls of the open corridor at sides of stalls, and is finished in blue and gold, with figure-paintings in panels, the whole having a most charming effect. The greatest novelty in the building is its decorations. Mr. Matcham has introduced Eburite faience ware for the whole of the interior embellishments. Not only are the walls covered with this material, but also the proscenium front, auditorium, ceiling, gallery, and balcony fronts. It will save a great deal of labour and expense that otherwise would be necessary for the renewal of decorations and keeping clean. The Eburite faience is a special eggshell-glazed material which has been successfully used in other large schemes of decoration by Mr. Alfred Whitehead, of Leeds, the contractor for this work, who has since combined business with the Campbell Tile Co., and who are now carrying it on as "Campbell, Whitehead, and Co., of Leeds and Stoke-on-Trent." The following are the principal firms engaged in the construction and fitting up of the building:—Contractors for foundations, Mr. Charles Wall, Chelsea; contractors for superstructure, Mr. C. Gray Hill, Coventry; electric lighting, Messrs. Lang, Wharton, and Down, London; gasfittings, Messrs. James Stott and Co., London; plumbing, Messrs. Finch and Co., Ltd., London; hot-water heating, Messrs. Oldroyd and Co., Leeds; hydrants, Messrs. Shand, Mason, and Co., London; faience work, Mr. Alfred Whitehead, Leeds; plastic work and painting, Messrs. F. de Jong and Co., London; upholstery, Messrs. H. Lazarus and Son, London; tip-up chairs, Messrs. Fred Harper and Co., London, and Messrs. H. Lazarus and Son, London; curtains, Messrs. A. R. Dean, Ltd., Birmingham; carpets, Messrs. J. Jarvis and Co., Ltd., London; scenery, Mr. Richard Douglass, Islington.

The Liverpool City Council decided on Tuesday that the Mersey Docks and Harbour Board should be notified that the council intended to purchase the George's Dock subject to the board's right to retain part of the property. This is one of the old central docks of Liverpool used by small vessels, and the area is required for improving the river approaches. It has a lineal quay space of over 600 yards.

The urban district council of Teignmouth have adopted plans by Mr. Jones, their surveyor, for an enlargement of the isolation hospital, by which the number of beds will be increased from 3 to 12, and the building will be doubled in size. The estimated outlay is £5,000.

The chancel of the fine Perpendicular church of St. Peter Mancroft has been reopened after restoration, from plans by Messrs. W. Bucknall and G. N. Cowper, architects, of 19, Old Queen-street, Westminster, who completed the restoration of the tower some few years ago. Messrs. J. Downing and Son, of Norwich, were the builders.

The transfer of the business and property of the long-established Old Delabole Slate Company to the new company recently formed was completed on Aug. 30, when Mr. Edward Allen, the liquidator, formally handed over the reins of office to the board of directors of the new company.

The tower at Darwen, built to commemorate the Diamond Jubilee, is approaching completion. It occupies the crown of a hill about £1,000ft. in height, and has cost about £1,000.

The new Palace Theatre in Union-street, Plymouth, built from designs by Messrs. J. T. Wimperis and Arber, of Sackville-street, Piccadilly, W., was formally opened on Monday evening.



## WATER SUPPLY AND SANITARY MATTERS.

**DOUGLAS SEWERAGE QUESTION.**—Some 16 years ago the town council of Douglas, Isle of Man, decided to have a new system of sewerage. Various engineers were consulted and different schemes propounded. Some members of the council had schemes of their own. Several of them were much in favour of drainage by gravitation, but being unable to get an engineer of note to support them the council, two years ago, adopted a high and a low level system, which was to cost £30,000. No sooner had the work commenced than steps were taken to reopen the whole question, and on a further sum of £25,000 being asked for a few months ago the opportunity was seized with alacrity. A new engineer, in the person of Mr. James Mansergh, was called in, and there were hopes in the council that he would say their pet scheme of gravitation was the right one, and that all others were wrong. His report has just been presented. He practically endorses the scheme of the present engineer as the most suitable to Douglas, but with this difference—that it will cost the town considerably more than £55,000.

**THE WELSH WATER SUPPLY FOR BIRMINGHAM.**—A number of the members of the Birmingham Association of Students of the Institution of Civil Engineers, accompanied by the president, Mr. J. C. Vaudrey, M.Inst.C.E., and also by the members of the similar association in Manchester, paid a visit to the Elan Valley on Saturday to inspect the waterworks in progress there. Mr. Mansergh, the engineer, who is also a vice-president of the Institution of Civil Engineers, personally conducted the party by a special train up the valley as far as the top reservoir, and explained all the details of this vast scheme to the students. On the return journey Mr. Mansergh provided luncheon in the offices near the model village, which, with its public buildings, was afterwards visited, under the guidance of the village superintendent. Mr. Gourdi (resident engineer), and other assistants, met the party at the various points of interest.

The Hursley Board of Guardians have appointed a building committee, and have authorised its members to find sites and ascertain the probable cost of a new workhouse and report.

In response to a requisition from the Wallsend Urban District Council to the Local Government Board for permission to borrow about £5,000 for the formation of a new road and quay on the east side of the township, £3,885 for works of public and private street improvements, and £5,000 for the purpose of public works and pleasure grounds, Colonel A. J. Hepper, D.S.O., R.E., conducted an inquiry on Friday at the Urban District Council Chamber, Wallsend.

The Bishop of Lichfield dedicated on Sunday a rood-screen presented to Handsworth Parish Church. The rood-screen is of artistic metal-work, designed by Mr. J. A. Chatwin, the architect of the modern portion of the church. The framework is of iron, with gilt decorations, the figures usually associated with a rood-screen being gilded. Some copper embellishments are also introduced. The makers are Messrs. Thomasson and Co., Birmingham.

The French Art Loan Exhibition at the City Guildhall closed on Wednesday evening. Since the date of its opening, on Monday, June 6, the exhibition had been visited by 207,000 persons. The Art Gallery will remain closed till Monday week in order that the galleries may be cleansed and the permanent collection re-hung.

A vestibule screen of seven bays, and 14th-century Gothic in style, has been placed in the Congregational Church in Wretham-road, Handsworth, to which also a memorial stained-glass window has been added. The window has been designed and painted by Messrs. H. Camm and Co., of Smethwick. The building contractor was Mr. J. E. Moorhouse, of Birchfield. The oak screen has been made by Messrs. Jones and Willis, of Edmund-street, Birmingham. The work was executed from the designs of Mr. John P. Osborne, architect, Colmore-row, Birmingham. The reopening services took place on Sunday.

The Duke of Westminster has just given instructions for the alteration and enlargement of the National Schools at Halkyn, Flintshire, at an estimated cost of upwards of £1,000. At present the buildings are in the shape of a T, but when the projected additions are completed they will form a square, and provide accommodation for a considerably increased number of children. The Duke is also erecting a complete set of new school buildings at Rhesycae—another village on his estate—to replace the present buildings, which are antiquated, dilapidated, and inconvenient. The contractor for both schools is Mr. A. B. Lloyd, builder, Flint, and the architects are Messrs. Douglas and Minshull, Abbey-square, Chester.

## STATUES, MEMORIALS, &c.

**BERLIN.**—In accordance with instructions from the German Emperor, Professor Begas has designed a model of a memorial to Prince Bismarck, to be placed in the new cathedral in Berlin. The model is in pasteline, a new material used by sculptors. It will stand close to one of the inner walls of the cathedral. On it will be a life-size figure of the Prince, and two other figures, one at the head and one at the feet, symbolising Strength and Justice. The monument will be flanked by candelabra, and the material will be white marble.—The design for the great Bismarck monument in front of the Reichstag, by the same artist, is to be altered in some minor details. A youth, sitting absorbed in a book on the right, is to be replaced by a sibyl, and the Germania, with her foot on a tiger, is to have a more effective pose. The figure of the Prince is ready for casting, and will be 19ft. 6in. high. The pedestal is finished, but the smaller figures are not yet made.

**EDINBURGH.**—Three additional niches on the façade of the National Scottish Portrait Gallery, Queen-street, have been filled, to be followed soon by three more. The first of those just placed is James the First of Scotland, called the Poet King. The attitude and accessories suggest the poet, while the robes and sword indicate a knightly personage. The second statue is that of Napier of Merchiston, the inventor of logarithms. The attitude of the figure is also suggestive of deep meditation, and the costume is the picturesque long-sleeved, fur-lined mantle, doublet, and trunk-hose worn by men of learning of his time. Both of these statues are from the studio of Mr. D. W. Stevenson, R.S.A., who followed in the portrait of the king a likeness believed to be contemporary and authentic; while that of Napier was chiefly taken from the painting in the possession of Lord Napier of Ettrick. The third figure is that of Alexander III., an early and heroic defender of Scotland's rights. It is from the studio of Mr. W. Grant Stevenson, R.S.A., and, like the others, is 7ft. in height. The king is represented in the costume of the period, as shown in the State seal, standing firmly on the right leg, with the left advanced. The arms, crossing the body, grasp the sceptre, while the cloak is thrown back over the shoulders. Below the figures the corbels have been carved with appropriate coats of arms, and the Board of Manufactures has been experimenting to see the effect on the building of the names of the personages celebrated being emblazoned in gold on a band underneath them. Colour will also be employed in a like experiment on the coats of arms. The three statues just described have been placed in niches at the east end of the building—Napier in the angle turret, and adjoining him the figure of the poet Dunbar will shortly be erected.

The Britannia Pier, Great Yarmouth, has been purchased by a syndicate of Manchester gentlemen, who intend to practically reconstruct it. The structure will be enlarged and extended seaward, and a concert pavilion erected at the extreme end.

In the midst of the Hampton Park Estate, Swaythling, just outside the boundary of the borough of Southampton and in the parish of South Stoneham, there has just been erected a new voluntary school, which was opened on Wednesday week by the Bishop of Winchester. It accommodates 150 infants in an assembly-hall and classroom, and has been built of red brickwork, with wood-block floors. Mr. H. J. Weston, of Southampton, was the architect, and Messrs. Dyer and Sons, of Bevoys Hill, in the same town, were the contractors.

A mural monument, costing £1,400, is to be placed in St. Giles's Cathedral, Edinburgh, the birthplace of Louis Stevenson, in his honour. There is to be a medallion portrait of the famous novelist on the monument.

The memorial-stone of St. Chad's Mission Church, Owen-road, Graiseley, Wolverhampton, was laid on Saturday afternoon by the Hon. Mrs. Legge, wife of the Bishop of Lichfield. The site, containing 6,000 square yards, has frontage to Owen-road and Lane-street. The mission church will seat 300 worshippers, and will cost about £1,000. It is proposed ultimately to build a church, schools, and a vicarage, at a cost of about £8,000. The present structure is being erected by Mr. T. Skett, from plans prepared by Mr. F. T. Beck.

A large clock, with four illuminated dials and striking the hours, has just been erected in the Market Hall Tower at Towyn, North Wales, by Messrs. John Smith and Sons, Midland Clock Works, Derby.

Foundation-stones of the Homes for Aged Wesleyan Preachers were laid at Fillongley, near Arley, on Saturday. The buildings will be of brick, with half-timbered gables and wooden verandahs. Mr. F. J. Yates, of Birmingham, is the architect, and Mr. Bowen, of Leamington, is the builder. The outlay will be £1,300.

## Our Office Table.

THE Trustees of the National Portrait Gallery have received from the Hon. John Collier a portrait of the late Professor the Right Hon. Thomas H. Huxley, F.R.S., a full-size replica of the well-known portrait painted by Mr. Collier in 1883, and exhibited at the Royal Academy in that year. This portrait has been painted by Mr. Collier especially for presentation to the nation, and in view of this and of Professor Huxley's eminence in the scientific world, the Trustees have willingly suspended their usual rule as to the lapse of ten years from the date of a person's decease.

THE 72nd autumn exhibition of the Royal Birmingham Society of Artists, opened on Saturday last, is remarkable for the paucity of portraits and the excellent display of landscape and figure subjects. The place of honour is given this year to G. F. Watts's "Love and Honour," and on either side of this great work is hung a landscape, "A Placid Stream," by George Summerbee, and "The Evening Song," by Alfred East. Among the figure works are J. H. Bacon's "Peace be to You," the Saviour revealing Himself to a group of modern peasants; "Lady Godiva," "Albine," by the Hon. John Collier; "The Cloister or the World," by Arthur Hacker; and "A Winter's Tale," by W. Logsdail. The landscapes include works by Ernest Waterlow, David Murray, Sir Wyke Bayliss, F. G. Cotman, and Frank Walton; and among the few portraits the well-known representation of "Mr. Walter Crane," by Watts, and Carolus Duran's "Countess of Warwick" stand out conspicuously. The cabinet works, hung, as usual, in the Octagon Room, are above the average, and include examples of T. C. Gotch, J. L. Dollman, Markham Skipworth, and J. H. Henshall.

OWING to the decision of the Manchester Art Committee not to allow the permanent collection at the Art Gallery to be displaced, the sixteenth autumn exhibition in that city, opened on Monday, is more cramped than ever. The pictures hung include E. A. Abbey's large and ambitious "Play Scene from Hamlet," exhibited at the Academy this summer; Sir Wyke Bayliss's characteristic "At the Cathedral Door, Aix-la-Chapelle"; a Cornish churchyard group, "October," by Stanhope Forbes; W. F. Yeames's "Children of the Chapel Royal," and landscapes by H. W. B. Davis, David Murray, J. Brett, J. Farquharson, Thorne Waite, Ernest Parton, and Anderson Hague; portraits by H. Herkomer, Alma Tadema, G. H. Boughton, W. W. Oulless, J. Lavery, and Harrington Mann; and genre subjects by Arthur Hacker, J. R. Reid, and William Stott. The hanging committee have made an innovation by devoting one room entirely to a group of seven landscape painters—namely, the late T. Hope M'Lachlan and Messrs. E. A. Waterlow, A. D. Peppercorn, Aumonier, R. W. Allan, Leslie Thomson, and J. S. Hill. Mr. John Farquharson's picture of Highland scenery in snow-time, "The Weary Waste of Snow" has been purchased by the Manchester Corporation for the Permanent Collection.

THE classes in Architecture and Building Construction, at King's College, Strand, which are conducted by Professor Banister Fletcher, J.P., F.R.I.B.A., assisted by his sons, Messrs. Banister Flight Fletcher and H. Phillips Fletcher, will reopen for the winter term on Tuesday, October 4. The course for matriculated students spreads over three years, and is specially directed to enable the students to pass the R.I.B.A. examinations for the Associateship; but a special course is arranged for architectural pupils who wish to prepare for these examinations in one year. Under a recent alteration of the curriculum, architectural and engineering students work together during the first and second years of the collegiate course, taking not only the lectures, but also engineering and building construction drawing, thus offering the students the advantage of wider knowledge and an acquaintance with practical building construction, upon which may be based the higher study of architectural design. Students have the advantages of the use of the architectural and building construction museum, and of a library of architectural books, and in addition to the certificates, medals, and prizes awarded by the college, the Carpenters' Company offers gold, silver, and bronze medals,



and Mr. Arthur Cates gives a bronze medal to the student standing first in the third year of the college course.

The 51st annual session of the City of London College, White-street, Moorfields, E.C., commences on Wednesday, the 28th inst. The engineering department is, as for many years past, under the direction of Professor Henry Adams, M.Inst.C.E., F.S.I., and courses of lectures are given in Building Construction, Technical Drawing and Drawing Office Practice, Machine Construction and Mechanical Engineering, Valuation, Quantity Surveying, Civil and Sanitary Engineering, and Land and Town Surveying. Mr. Henry Adams is well-known as a lucid and practical lecturer, and as the author of numerous able works on the subjects dealt with in his department.

The disastrous fire of Thursday in last week, by which the Colston Hall at Bristol was destroyed, occurred at a peculiarly inopportune moment, as the hall was being used for the meetings of the Trade Union Congress, and was to have been the central rendezvous for the British Association gatherings of this week and next. The fire occurred in a clothing factory at the back of Cloiston Hall, forming with it and other injured premises a triangular island bounded by three streets, and the damage caused amounted to over £100,000, of which at least three-fifths is represented by the hall. Colston Hall (which has been entirely gutted) was designed by Messrs. Foster and Wood, of Bristol, and opened one-and-thirty years ago; it cost £37,000, and seated 3,000 persons, the dimensions of the main room being 150ft. by 80ft., and that of the small room 92ft. by 36ft. It contained an organ built by Mr. Henry Willis, of London, at a cost of £2,500, and opened in 1870; the semicircular case was constructed from the designs of the architects of the hall, by Messrs. J and J. Foster, Pembroke-street, Bristol. The hall has never paid a dividend to the shareholders, but has been of immense public service to the citizens of Bristol.

It has for years been the desire of the American Institute of Architects to establish its headquarters in the so-called "Octagon House," at Washington, and a five-year lease of the odd little structure has at length been signed at a rental of about a dollar a day, the provisions of the lease providing on the one hand for renewal or for the eventual purchase of the property, and on the other hand for cancellation at stated times during the currency of the original term. In order to provide money for the rent, and also for the repairs so old a building probably needs, and for any alterations that may be needed to adapt the building to its new purposes, the institute for the first time exercises its corporate powers and appears in the market as a borrower of money, to the extent of about \$1,000 sterling. As this year's convention is to be held in Washington, those in attendance will have an opportunity to inspect the building, even if nothing is done to adapt it for this year's meetings. The Octagon House is really a hexagon, and was built about 1800, from designs by a Dr. Thornton, and it is therefore somewhat late in its development of the Colonial style. Its owner, Colonel Taylor, was a lover of horses and giver of lavish entertainments, and wished his new house to be as noted for its elaborateness as he himself was for his hospitality. It will be easy to arrange a meeting-hall in the upper story.

Mr. William Woodward, A.R.I.B.A., in a letter to the daily press, describes the manner he has adopted for pulling down old houses in Regent-street—a method he recently saw being carried out at Nuremberg. "I took," he says, "a main pipe to the top of the old houses, with branches, to each of which was attached an indiarubber hose, with sprinkler at the end. Before the work was pulled down the walls and ceilings were sprinkled with water, and then the debris was likewise sprinkled with water before it was basketed out to the carts in the street. The result was that the usual clouds of dust, with their attendant mischief and annoyance to the public and to shopkeepers, were entirely absent, and the 'wreckers' were at the same time benefited." Mr. Woodward commends the idea to the London County Council, who might, he thinks, well insist upon its adoption in all cases of pulling down old premises in London.

The seventeenth annual congress of the Sanitary Institute will be held at Birmingham from Tuesday, the 27th inst., to Saturday, the 1st Oc-

tober. On the Tuesday the proceedings will be inaugurated by a reception at the Council House, held by the Lord Mayor of the city, to be followed by a public luncheon at the Grand Hotel, and in the afternoon the opening address will be delivered by the President of the Congress, Sir Joseph Fayer. A Health Exhibition in the Bingley Hall will be opened by the Lord Mayor in the evening. On the second Wednesday conferences will be held at the Mason University College, of medical officers of health, municipal and county engineers, and sanitary inspectors, and a fourth one on domestic hygiene, arranged by a committee of ladies. Sectional meetings, for the reading and discussion of papers, will be held on the Thursday and Friday: Section I., "Sanitary Science and Preventive Medicine," will be presided over by Dr. Alfred Hill, medical officer of health for Birmingham; Section II., "Engineering and Architecture," of which Mr. William Henman, F.R.I.B.A., is the president; and Section III., Physics, Chemistry, and Biology," with Dr. G. Sims Woodhead in the chair. A popular lecture will be given on the Friday evening by Dr. Alexander Hill, master of Downing College, Cambridge, and a number of excursions are arranged for the Saturday.

The colouring of the set of six panels on the south end of St. George's Hall, Liverpool, has recently been completed under the direction of Mr. T. Stirling Lee, the sculptor. The preparation with which the marble has been coated is said to deepen slightly in tint as it ages; but it remains permanent, and is not likely to produce the mottled appearance that resulted from the former coating which was removed. The artistic gain in deepening the tone of the sculpture to bring it in harmony with the colour of the building can be negatively proved by the glaring white appearance of the recently-added panels at the north end of the hall. The legend which has now been carved in the stone beneath each panel greatly assists a right understanding of the allegory.

The old west gate at Winchester, which is invested with many memories as a defence and as a prison, has just been purified from all modern abominations, and has been restored to pretty much the condition it was in at the close of the era of archery—viz., the long bow and the cross bow. The structure contains some Norman flintwork, and later alterations in stone of the time of Henry III. and of Edward III. or rather later, and it occupies, beyond all doubt, the site of a Roman gate. The restorations and removals have revealed the great arch in which the portcullis worked, the arrow slits for the archers commanding the western road, and the machicolations in the same direction can now be seen through from the restored parapet, accessible by a flight of steps from the flat roof; and from this point a panorama of town and country can be obtained by visitors. It has been decided by the corporation to open the gateway, which has been furnished with objects of historic local interest, as a museum to the public free of charge, daily, as an experiment, until the 31st October.

The town council of Dewsbury discussed on Tuesday the question of so altering the by-laws as to allow of the erection of back-to-back houses in blocks of four, a committee, after considering the cost in comparison with single through cottages, having reported against such alteration. The report gave rise to a spirited discussion. Mr. Denton moved an amendment referring the minute back to the committee, his object being to get official sanction to the erection of back-to-back houses in blocks of four, with side light and ventilation. His amendment was, we are pleased, in the interests of sanitary progress, to be able to state, rejected by a small majority, and the committee's report was adopted.

The London County Council statistical department has compiled a voluminous return for presentation to the council showing the advantage of a municipal supply of water. This report indicates that there are 64 county boroughs in England and Wales, and of these 43 have a water supply in their own hands. In 32 of these the waterworks were purchased from a company, and the others were originally constructed by the corporation. Of the county boroughs without a municipal water supply only Bootle is supplied by another corporation—that of Liverpool—while the remaining 19 are supplied by water companies, Salford being partially supplied by the city of Manchester. Among the cases given of the advantage of the purchase of waterworks is that of

Manchester. The water company's capital was £799,673, and the corporation has since spent £5,456,373 on waterworks, a total of £6,256,046, on which sum the interest paid averages 3·3 per cent. The charge made to the bulk of the outside authorities for water supply is about 60 per cent. higher than in the city, not taking into account the water rate of 3d. in the pound levied in the city but not without.

A BUILDING TRADES EXCHANGE has been successfully formed at Huddersfield, with Alderman W. H. Jessop, the Mayor, as president, and Alderman F. Calvert and Mr. Abraham Graham as vice-presidents, and a strong committee of local contractors. Premises at 6, Northumberland-street, Huddersfield, have been taken and furnished, and were formally opened to the members on Tuesday last, the Mayor occupying the chair.

At a recent meeting of the Engineers' Club of Philadelphia, Mr. Benjamin Franklin, an active member, presented a paper drawn from his experience in stone road construction. Mr. Franklin considered his subject under three heads—the use of clay or loam as a binder on stone roads, the thickness of stone roads, and the comparative merits of macadam and telford roads. The specifications of the State of New Jersey, the city of Philadelphia, and of many other townships and municipalities permit the use of clay, gravel, and loam for binding purposes. It is also stated that French engineers use in their stone road specifications clay, varying in proportion from 6 per cent. to 20 per cent., and the practice among United States engineers and contractors is so general that even with the insertion of a prohibitory clause in the specifications it is difficult to prevent its use. As a binder, clay possesses two prominent disadvantages; it is a lubricant, reducing friction between stones, and it also absorbs a large percentage of moisture, changing in bulk and consistency under varying conditions of weather and temperature. Used as a surface binder, it quickly makes a road muddy after a storm, causing ruts in spring and dust in summer. The author claimed that he had successfully constructed 4in. and even 3in. macadam roads on clay subsoils, in which he employed sand solely for a foundation, entirely excluding the introduction of sand as a binder.

The launching and voyage of a long-expected caisson from Chepstow across the Severn to Avonmouth Dock, Bristol, were successfully carried out on Saturday. The caisson, which has been built from designs prepared by the engineer to the British Docks, Mr. J. McCurich, by Messrs. E. Finch and Co., Limited, Chepstow, has been nearly twelve months in course of construction. Its length is 75ft. 3in., its breadth 30ft. 2in., and its depth 44ft. 6in., and its launching weight amounted to 630 tons—hull 410, and ballast 220 tons. The hull is built of mild steel, there are five tiers of beams, two stringers, two watertight steel decks, and an upper wood deck, three watertight transverse bulkheads, and two longitudinal watertight bulkheads. Altogether it is divided into 32 compartments, 18 of which are watertight, and 10 are for use as water-ballast tanks, to be used for sinking the caisson into place at the dock entrance. These 10 tanks represent a capacity of 900 tons, and water is admitted through the side of the caisson by 16in. diameter pipes, each department being controlled by a valve specially designed for the purpose. These valves are worked by hydraulic power, but hand-gear is fitted to each.

## THE ARCHITECTURAL ASSOCIATION.

THE COURSES OF LECTURES AND CLASSES COMMENCE ON MONDAY, the 19th of October, at 6.30 p.m., and the STUDY OPENS on TUESDAY, the 11th October, at 6.30 p.m.  
A Pamphlet giving full information may be obtained on application to the Hon. Secs. at 55, Great Marlborough-street, W.  
E. HOWLEY SIM } Hon. Secs.  
G. B. CARVILL }

A colossal granite monument is being made by an Aberdeen firm, to the order of the Transvaal Government, for erection at Pretoria, as a national memorial of the repulse of the Jameson Raid, and the recognition of President Kruger's patriotism and services to the Republic. The monument is of red Peterhead granite, and is inclosed by a substructure of about 80ft. diameter. Access is obtained to the main structure by four broad flights of steps. The monument is octagonal in form, 36ft. across, and the same in height, forming a solid mass of masonry, on the top of which a statue of the President will be placed.



# THE BUILDING NEWS

## AND ENGINEERING JOURNAL.

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### MADE FOR COMPETITION.

THOSE who have engaged in competition contests must have observed how the best men in planning and design are often beaten by expert competitionists whose chief merit is that they know a few tricks of awing, and have also a peculiar style of "slap-dash" in their design which is more than skilful, painstaking work. These winners of competitions would often be able to do better work if they gave more time and study; but the hurry of competition skirmishing has taught them a kind of alertness in their methods that the leisurely artist is unable to contend against. Rough and ready, rather than care and thought, is the watchword of the expert, his supreme effort being to produce a *coup de main*, and to defeat his rivals, not so much by ingenuity and skilfulness as by his tact, by bringing ability to bear on certain points instead of devoting all his energies and labour to the perfecting of his design. We find this very distinctly in plan and details, where strategic skill is seen to the best advantage. The successful competitor knows that a bold stroke is more telling than a thoughtfully elaborated effort, and his chief aim is to be able to grasp what is good in a plan and to leave all detail alone. Since the modern means of adjudicating merit by a professional assessor has been introduced, more ability is shown, and the man who wins a competition is generally—we do not say always—one who has studied his subject and knows the points of a good plan. Any experience in competition designs is convincing on this point. A clear knowledge of requirements or grasp of the conditions is one of the elements of success; a faltering, hesitating plan is no longer admissible. The competing architect must know what he has to do, his plan must be compact, the departments of rooms conveniently disposed, with direct access, and with well-lighted corridors. Even if these points are shown abruptly, they go far to insure success, whereas a confused plan or a wasteful expenditure of area is sure to bring its own condemnation. We do not assert that a clever plan obtains its just reward; but wherever skilled professional advice is sought, it will generally hold its own. Our point here is that its promptness in answering to the instructions will often have more effect than if its author had spent hours in improving and elaborating it. We have often found that the rough-and-ready plan which just hits the requirements is regarded with more favour than one equally good that has the further merit of good detail and refinement. We can only understand this preference by assuming that the rough-and-ready or slap-dash exponent has not entered into too much detail, but has hit off the requirements in a more direct manner. His rival sends a more elaborate and refined plan, in which the author has shown architectural proportions, where the entrance-hall and staircase have been arranged to make an effective interior, where more care and skill have been bestowed on details, like cross walls, piers, and columns, and the beginning flights of stairs, but it obtains a second place. Why? Because these are points which have little hold on the ordinary mind; they leave no impression on the non-critical judge. A well-arranged plan can be accompanied by a poor, often meagre, sense of detail and finish. The entrance-door opens upon

bare dead walls without any degree of privacy, there is no properly designed vestibule, perhaps only a glazed inner door, bare and uncouth in its surroundings; the staircase starts in the most abrupt and commonplace fashion from the side wall without any columnar screen or arcade, with the flights at random lengths to suit the plan, instead of being regulated in their length; there is no attempt to make the corridors other than rough channels between two bare walls with doorways in them of varying heights and widths; there is a workhouse plainness about the whole interior, the cornices are finished at random, stopping abruptly against wood partitions and screens; the joinery is of the commonest, the mouldings and architraves are all to the same patterns, without any finish. It is possible, indeed, for a fairly good plan to be so poorly and meagrely carried out as to make one feel the great disparity there is between plan and architecture. The building is hopelessly spoilt by the slipshod or rough-and-ready finishing it receives. Committees and urban district councils who invite designs for municipal buildings have often been much disappointed with the results. It is true the regulations have been complied with, and the offices of each department are well grouped and located; but there is a roughness and crudeness in the interior. Some rooms are much higher than they need be, the smaller ones are as lofty as those of double or treble the area—and a ludicrous sense of disproportion is felt. A window here is screwed up into one corner of a large office, the doorway is awkwardly situated; and several irregularities have been perpetrated simply through a want of a little revision in the plan. Dead ends of corridors, inadequate lighting, and awkward corners spoil a building otherwise convenient. A few hours spent in revising and improving the plan would save much disappointment and many grumbles at the architect from present and future officials. The Whitehall Government Offices have been much abused ever since their erection, and the late G. E. Street's great building has not escaped criticism from judges and lawyers—yet these were the works of two men who took great pains with their details. Several municipal buildings may be named which seriously belie their original design; everything appears to have suffered a general cutting-down process, and even the exteriors have been denuded of features they were intended to have, and appear thin and bare. These defects arise to a large extent from the rough-and-ready and slap-dash competition plan; the author has not taken the trouble to revise or perfect the arrangements, or the committee gave the architect no opportunity of correcting them. We think that in buildings of this class more attention should be given to interior finish; that competitors should be asked to submit portions of the internal arrangement to a large scale. We know that in some cases this is done, but they form a minority only of works gained in competition.

The ordinary competition drawing is also deficient in detail and refinement. We see a dashing and showy perspective or elevation. The general effect and grouping are pleasing, but when we examine the detail there is much that is coarse and crude; we discover the draughtsman knows little or nothing of correctness in the style of his details; there are features both of Roman or Italian and Gothic character, much of a nondescript description—and such was the impression we formed of one of the successful designs for public offices recently selected for an East-end urban district. The artist is often an adept at shading and of making the most of a tower or a gabled end, but his work will not bear examination. Refined detail and finish are absent altogether—the two things alone which are the evidence of the competent designer. In short, the

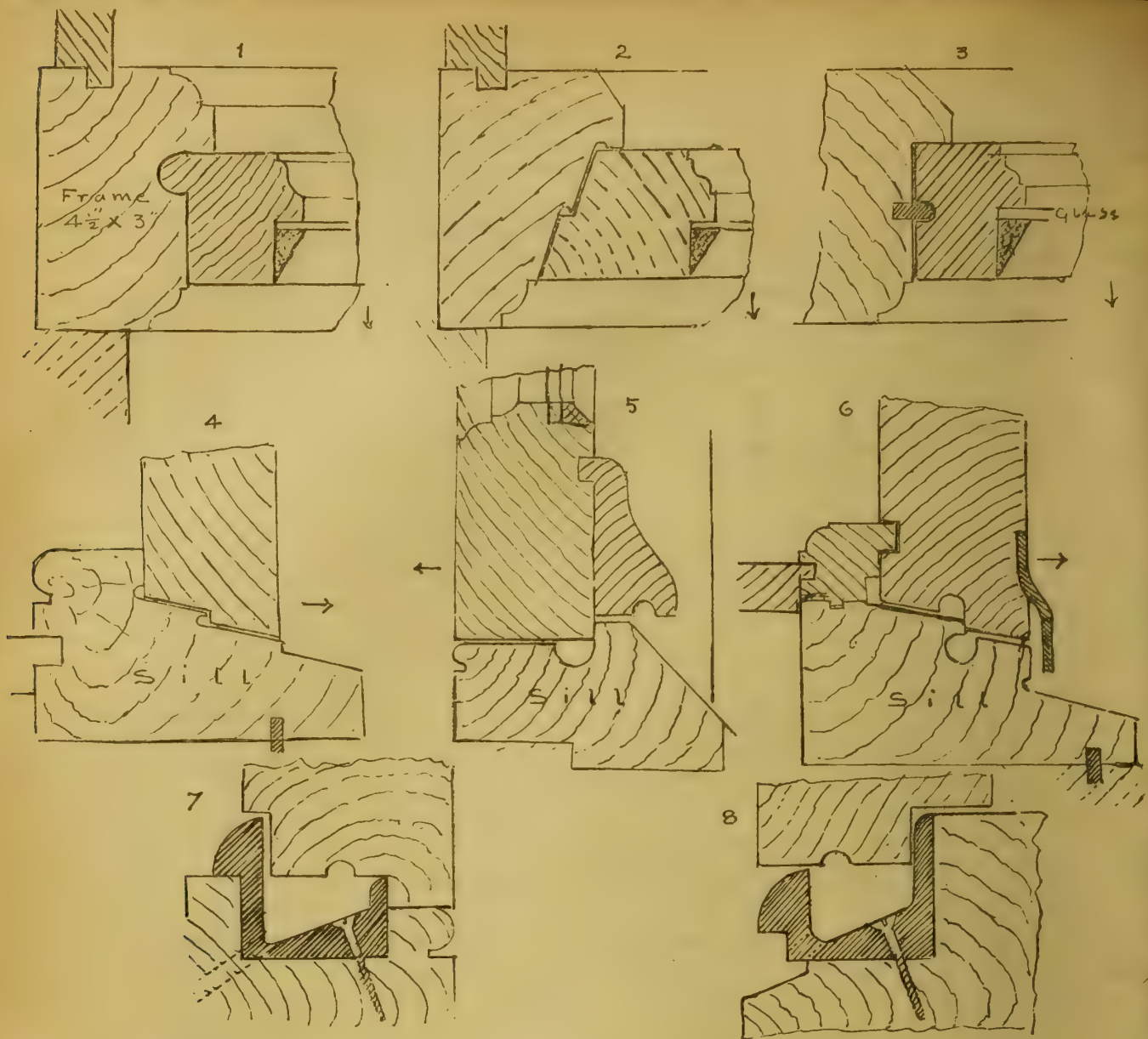
"dash and go" of the modern competition artist appear so inconsistent with careful detail and finish, that we can easily distinguish the difference between the competition-made design and one prepared by a skilful architect who has not been hurried, and who has had no inducement to employ the little tricks and artifices of the competitive expert.

### MUNICIPAL CONTRACTS.

A LETTER in the *Times*, signed by a firm of "contractors," gives voice to a common complaint made by our large building firms against the terms that are sometimes imposed on those tendering for municipal work. The writers of the letter send a verbatim copy of the general conditions attached to a work for one of the largest corporations in the country. These conditions the writers object to as being such that no "firm of free individuals should agree to." The clauses relate to the wages of workmen, hours of labour, underletting of contract, even bookkeeping. We can scarcely imagine the general contractor, whose views on these questions have been formed during many years, will readily agree to these conditions. He has tendered for large works with a free hand to employ his own labour, and to pay his workmen at the lowest rates obtainable, to exact hours of labour that are reasonably long, and to underlet his work with the understanding that the party to whom it is assigned shall abide by the terms under which he has undertaken the contract. But what are the stipulations laid down by the corporation in this case, and sought to be imposed on the contractor? They are as follows:—That the contractor shall pay every workman he employs wages and overtime wages at the rate not less than that recognised in the district where the work, or any part of it, is being done as the standard rate of wages in such workman's trade; the hours of labour are not to be greater "than the hours (other than that union men only be employed) usually observed in the trade of such workmen in such district." But the foregoing conditions are not to apply to any trade during the existence of a general lock-out in such trade, and the corporation are to be sole judges as to whether such a lock-out exists. These conditions may be regarded from two points of view—from that of the local tradesmen and union men, and from the contractor's point. Each has something to say. The workmen of the district in which the corporation are about to undertake work look naturally to the corporation to set a good example to maintain a fair standard rate of wages. As ratepayers of the district, they have a right to be employed at remunerative rates and certain hours of labour. The encouragement of local talent also is desirable in any such work, and another argument is that good and skilful labour can only be obtained by paying for it at standard rates. On the other hand, it can be argued that the contractor undertakes to execute work at a reasonable sum, to undertake all risks, to be liable for all fluctuations in the market value of materials, and to carry out the work in a certain specified time, and therefore he should be allowed to go to whatever market he may choose. He can say, as the corporation claims power to select what tender they liked, so he should be allowed freedom in the amount of wages or the hours of labour of his employés. And as to the results, if it could be shown that buildings erected under these conditions were turned out better, there would be a great argument for them; but, unfortunately, such has not been always the case.

The clauses forbidding underletting of the contract are more generally observed. The condition objected to runs as follows:—





"The contractor shall not transfer, assign, or underlet, directly or indirectly, this contract, or any part of it, share or interest therein, without the written consent of the corporation under the hand of the town clerk, which consent may either be withheld or given subject to such terms as the corporation may determine; and the person to whom such contract, or any part of it, share or interest therein, may be transferred or underlet, shall abide by, perform, observe, fulfil, and keep the stipulations on the part of the contractor." This clause is usual, though it is often impossible for an architect to find out whether any part of the work is sub-let. For ourselves, we do not see any serious objection to the practice, provided the terms of the original contract are faithfully carried out. Another reason may be adduced to favour the practice. The general contractor may not have a competent staff of workmen in every branch, say in the stonemason's or slater's trade; but by sub-letting that portion of the work he is relieved from a large amount of responsible labour. We are aware that the London trade unions discourage under-letting; but the question is, whether their prohibition is for the benefit of the public, and this is by no means proved. Another condition laid down is that the contractor is, to the satisfaction of the council, to provide and keep proper books in which is to be entered the names of, the wages paid to, and the hours observed

by, all workmen employed by him, and shall from time to time, when required by notice, produce the same to the town clerk. The council are also to be empowered, in case of any breach of contract by the contractor or any sub-contractor, to determine the contract, in which case all the provisions of a previous clause are to apply. The clause as to bookkeeping will be resented by many contractors on more than one ground. The ratepayers have an interest in these conditions of contract for large public buildings, and the question may be asked whether the refusal of certain large firms to agree to them is not likely to be prejudicial to economy and efficiency in carrying out the undertakings.

#### MODEL SPECIFICATIONS. — XXX.

##### WINDOW CASEMENTS, OFFICE AND SHOP FITTINGS.

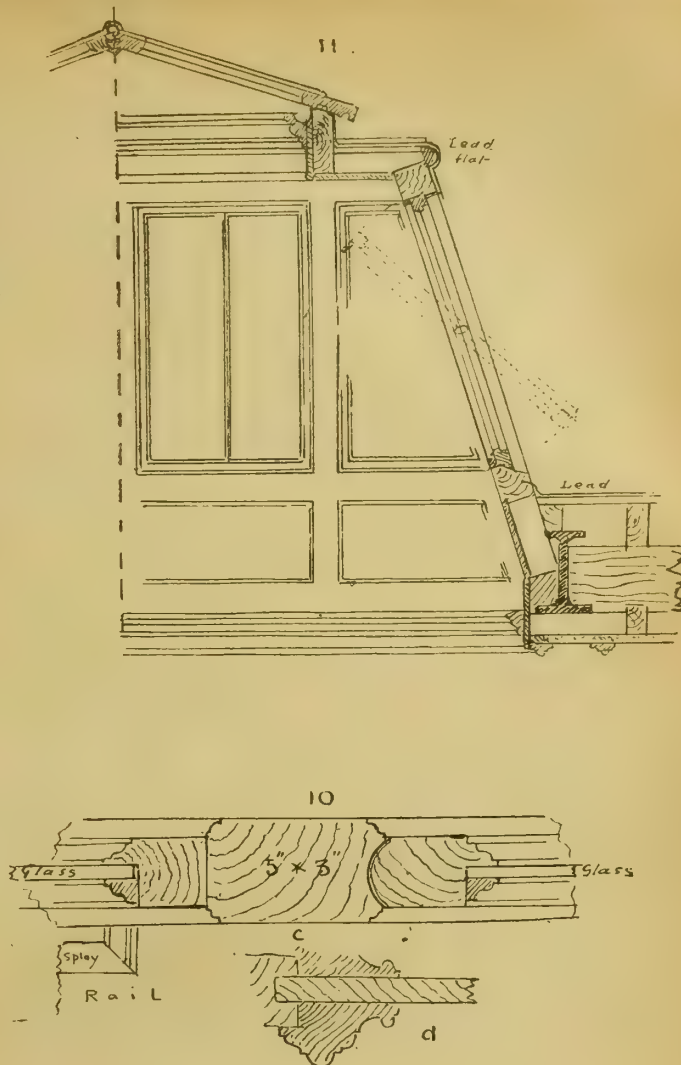
**W**INDOWS offer a great variety of treatment. Sash frames are of many kinds for single or double-hung sashes. Then there are Venetian or three-light windows, two and four-light windows, in which mullions are used; windows circular and octagonal in plan; windows with straight, circular, and segment heads, &c. Some of these we have described. Casements and frames offer a still greater variety of treatment. There are, first, casements opening outwards; second, those opening

inwards—important distinctions; there are also single lights, double lights, and windows of several lights divided by mullions and transoms, and these again vary in form and plan. Then the sashes and frames may be filled with small spaces for ornamental glazing. We give a few sections of casements, which explain themselves. For ordinary casements Fig. 1 shows a good check, as a bead worked in the solid stile fits into corresponding groove in the frame. No. 2 shows a double check or throated rebated frame, also a good form. No. 3 is a metal bar which fits into groove in stile of casement. The sills are no less important; they are, in fact, more liable to let in the rain if not double rebated, water hollowed, or check throated, and the bottom rail ought to be made to fit, and be splayed, throated, and grooved. No. 5 is a form of casement to open inwards; but Nos. 4 and 6 are more effective sections for outward-opening casements. We show two sections of metal water-bar, which make a very watertight joint to ordinary casements, manufactured by James Hill and Co.

The other sketches are for a shop glazed partition of mahogany, with details, and the finishing of a lantern skylight.

97. *Casement Windows.*—The windows to have 4in. by 3in. double ovolo (or moulded) fir frames, mullions, and transoms, with oak double-rebated and tongued sills, and 1½in. (or 2in.) ovolo moulded casements rebated to fit oak sills and mullions, hung with 3in. butts and with fastenings supplied by Young and Marten or James Hill and Co. The sills of all casement and other





windows to have 2in. by  $\frac{1}{2}$ in. double throated beads painted or bedded in white-lead. The transoms to have a throated deal weather moulding rebated on, or formed in, the solid, and the bottom rails of all casements to be throated, and to have a throated weather fillet fixed or tongued to the rail (as per sketch 5) or a metal bar (see section 6); or fix to sills by screws J. Hill and Co.'s registered water-bars in solid brass (see sections 7 and 8). Or—

The casement windows to be made according to the detail drawings, with  $\frac{1}{2}$ in. by 3in. moulded Memel frames and mullions, double check rebated, for casements, double rebated and tongued sills, provided with patent water-bars, and the casements to be 2in. ovolo moulded and rebated, hung with 3in. butts with fastenings approved by architect.

98. *Casements, Superior.*—The openings of principal floors to be filled with 3 $\frac{1}{2}$ in. by 4in. (or 4 $\frac{1}{2}$ in. by 3in.) moulded, beaded (or twice moulded and rebated) frames; 4 $\frac{1}{2}$ in. by 3in. rebated, moulded, and beaded (or four times rebated and twice moulded, &c., mullions); sunk, rebated, weathered, throated, and twice-moulded transom, and 5in. by 3in. (or 6in. by 3 $\frac{1}{2}$ in.), twice sunk, weathered, hollowed, and check-throated and beaded oak sill; grooved for metal tongue, with window board and nosing, and to be fitted with Jas. Hill and Co.'s brass registered water-bars screwed to sill (or a galvanised-iron water fillet or tongue bedded in white-lead). The casements to be 2in. (or 2 $\frac{1}{2}$ in.) moulded and rebated for glass, with beads screwed on with brass screws to fit, twice rebated and grooved hanging stiles. The bottom rails to be twice rebated and grooved 4in. deep; the meeting stiles to be rebated and beaded, and check-grooved (or hook-jointed) with moulded deal stops screwed on. Each casement to be hung with 3in. or 4in. brass butts with gunmetal washers, and each to be fitted with two 6in. brass barrel bolts and casement stay and fastener (or with brass espagnolette fastener, or Archibald Smith and Stevens' casement bolt and fastener). The fanlights to correspond, and to be hung from side (or top or bottom) on 3in. or 4in. brass butts, and have brass fanlight stays and fastener. Glaze the openings with 32oz. stout glass (or approved ornamental leaded lights).

(If small squares are required, state the number in each casement or top part, and describe as moulded and twice rebated; if hung on centres, specify to be hung on brass (or gunmetal) centres, with movable heads, lines over brass pulleys, &c.)

99. *French Casements.*—The principal drawing-room windows to be fitted with 2 $\frac{1}{2}$ in. deal (or wainscot, or Honduras or Spanish mahogany) French casements to open inwards, hung with 4in. brass butts with approved espagnolette fastenings on 5in. by 3in. deal (or wainscot or mahogany) frames, rebated and grooved where shown. The bottom rail of casement to have a moulded weather fillet throated and rebated on, and to be made to fit the sill, which is to be rebated and grooved as shown in sketch 5. Double casements are often used which require a deeper frame, but similar descriptions apply.

100. *Metal Casements.*—Fit openings with wrought iron (steel, or gunmetal) casement to deal wrought frames on rebated joints (describe thickness of metal or maker's name). Or—

The casements to be supplied and fixed by the N.A.P. Window Company, Westminster; or fit the openings with Burt and Potts' wrought-iron (or gun-metal) casements and frames, with fastenings complete. (We shall give sections of these and names of well-known firms under "Smith and Founder.")

101. *Glazed Screens for Offices, &c.*—The corridor partition to be framed according to detail drawings (sketch 9), and to be of wrought framed Honduras (or Spanish mahogany or American walnut), French polished. The upright studs and end studs to be 5in. by 3in. wrought four times, beaded, studded to floor, and hollowed for swing doors mortised to receive middle and frieze rails. The panel framing between the uprights to be glazed in the upper portion, and to be 2in. moulded both sides, the outer corridor side in the solid, with moulded fillets fixed with brass screws inside. The first tier of glazed panels to have heads formed to a curve, as shown, and the second tier to have the upper rail shaped to design in the solid. The lower panels to be bolection moulded on both sides with raised panel. The doors between uprights to have similar lower panels moulded both sides, with diminished stiles and upper rail, prepared for glass with beads screwed

on inside, brass cups, &c.; glazed with  $\frac{1}{2}$ in. best British polished plate-glass in washleather, and to swing in hollow groove of upright, and to have Archibald Smith and Stevens', or Young and Marten's, brass-cased steel spring hinges, p.c. 40s. a pair, and each door to have brass or other handles, and two finger-plates with the words "Push" and "Pull" engraved. The fanlights to be in one or more squares, to correspond with the framing, and to be hung each on a pair of 3 $\frac{1}{2}$ in. brass butts at the bottom, so as to open inwards, with brass fanlight stays and fasteners to be approved (or to be fitted with W. and R. Leggott's patent "Silens" opener or other apparatus approved), or with all lines, cleats, pulleys, &c., complete.

The over-door shown in elevation is to be of the best mahogany, French polished, and to be executed according to the details with curved pediment and volutes, cut out of the solid or put together in two pieces, with dowels, cornice, centre panel, and end consoles (or state a p.c. sum for same).

If the uprights are to have pilasters or three-quarter shafts with caps and bases, describe:—

The face of uprights to be grooved to receive  $\frac{3}{4}$ -round mahogany ornamental-turned or square 3in. shafts (as per detail), tongued on, with moulded cap and base, the same to be mitred and returned at levels of skirting, cornices, &c. Or fix to front of studs, 4in. by 1in. fluted pilasters of mahogany rebated to grooves, with moulded bases, caps, making carved enrichments, as shown in detail.

If boxed out, describe thickness of moulded and fluted front and sides, which are tongued and mitred at angles, and the inner angles blocked and glued together, or the sides of pilaster may be tongued and grooved instead of mitred. Circular columns of any size are built up of four or any number of pieces, fluted or plain circular, and tongued together and blocked. Such columns are often casings to iron columns or stanchions.

102. *Folding Office-Doors.*—Hang doors of office in two halves, of 2in. (or 2 $\frac{1}{2}$ in.) wrought Honduras



or Spanish mahogany, each of two panels, moulded both sides, with diminished stiles and rail, the upper panels prepared for glass, and to have inner beads fixed with brass cups and screws. The upper edge of middle rail to be splayed, and the lower panels belection-moulded. The meeting stiles to have a rebated or hooked joint, beaded each side, and each leaf to be hung on  $\frac{1}{2}$  pair of 5in. brass butts with gunmetal washers, with brass or other approved handles p.c.—each, mortise lock and furniture p.c.—, and two 12in. (or 18in.) brass barrel bolts, &c., complete, on  $\frac{1}{4}$ in. by  $\frac{1}{4}$ in. mahogany frame, rebated and twice beaded, grooved for linings, twice rebated and beaded transom, and moulding tongued to same outside. Or—

103. *Swing Doors*.—If swing doors are employed, instead of having rebated meeting stiles, specify rounded meeting stiles and hollowed frame, and to be hung on brass-cased steel spring hinges (or specify Archibald Smith and Stevens', or some other approved hinges), and each leaf to have a brass handle and two finger plates, brass band, flush bolt, and staples and padlock (if desired).

Glaze the upper panel of doors with best British plate glass  $\frac{1}{4}$ in. thick (or with 16oz. muffled sheet glass, in three or more tints), according to design, in  $\frac{1}{4}$ in. lead cames, bedded in putty and sprigged and secured by  $\frac{1}{8}$ in. saddlebars, two to each panel.

104. *Small Squares*.—Fill in fanlights (or upper sashes of windows) with small squares (state division or number), glazed to match doors, or with leaded lights, according to design, in five (or more) tints, bedded in putty and sprigged with copper.

105. *Shop Front*.—The shop front to be framed according to working drawings, with wrought Honduras mahogany, 6in. by 3in. rebated and beaded (or moulded), frame grooved for linings 5in. by 3in., twice-rebated beaded (or moulded) mullions and transoms, the latter grooved for rebated moulding; 6in. by 3in. rebated, beaded, grooved, and weathered (or moulded) sill, with all necessary loose beads fixed with brass cups and screw guard moulding. The stall-board to be framed according to design, with solid moulded and square panelling of three (or more) panels, tongued and mitred at angles, and rebated to sill, with rebated and moulded capping and 8in. by 1 $\frac{1}{2}$ in. moulded skirting on grounds to clear paving. Fix joists, 4in. by 2in., 12in. apart on uprights (4in. by 4in.) 2ft. or 3ft. apart, braced together, for show-board, which is to be 1in. wrought deal, rebated, or grooved, and tongued, with nosing and hollow moulding under, with 1 $\frac{1}{2}$ in. moulded and square rebated riser, with three or more panels with skirting to match that of shop. Form any doors, if any, under.

The shop-front to be glazed with the best British polished plate  $\frac{1}{4}$ in. thick, bedded in putty and washleather. The upper part above transoms to have small squares with 3in. by 1 $\frac{1}{2}$ in. bars rebated and moulded with loose beads and brass screwed, filled with leaded lights in five or more tints, bedded in putty and sprigged, &c., complete to architect's satisfaction. Or—

Fill in fanlights with 2in. moulded mahogany sashes, secured by loose beads, brass screws, and hung on 3in. brass butts, with stays, &c., glazed with tinted glass approved. (The varieties of shop-fronts are too numerous to describe; their design and fitting up largely depending on the trade carried on, the height of show-board from floor, the space to be glazed, and other considerations, and we shall give other clauses for one or two special cases.)

106. *Lobby*.—The lobby to be formed as shown, with splayed sides, the ceiling to be of moulded and square mahogany panelling 1 $\frac{1}{2}$ in. or 3in. (or with 3in. ribs screwed on to framing), with moulded cornice, skirting, &c.

107. *Cornice and Fascia*.—The cornice and fascia to be formed, according to details, fixed to deal cradling, 4in. by 3in. head and sill, 3in. by 3in. braces and intermediate posts, with all necessary bolts, heads, nuts, &c., secured to bressummers (or iron girders), and form boxing for shutters and gearing, and put 1 $\frac{1}{2}$ in. wrought Honduras mahogany, rebated, moulded fascia, fixed so as to allow access to shutter boxing. Fix deal brackets for moulded cornice, which is not to project more than 18in., and is to be put together according to detail, each piece grooved and rebated together.

103. *Shutters*.—The shutters to be supplied and fixed by Messrs. Francis and Co., or by some other approved maker; or to be of pine laths, iron hinged, running in iron grooves, and revolving on barrel, with all proper steel springs, and gearing fixed behind the fascia and secured to bressummer; or the shutter to be of flat iron or steel laths (or curvilinear), to fall in three widths between deal pilasters, with iron grooves, &c.

## THE BRITISH ASSOCIATION AT BRISTOL.

IN continuation of our report of the proceedings at the Bristol meeting of the British Association, we give abstracts of some of the papers read during this week likely to interest our readers.

### THE PNEUMATIC ANALOGUE AND THE VENTILATION QUESTION.

Mr. W. N. Shaw, F.R.S., explained by means of a model the pneumatic analogy of the potcution-meter, and also alluded to the laws governing the flow of air as affecting the problem of ventilation. The likeness between air-flows and electric currents was demonstrated. One conclusion arrived at was that it was of no use putting elaborate ventilators on the roof unless it was balanced by inlets of air; the inlet must be equivalent to the outlet. Professor Jones, of Cardiff, said the principle disclosed in the paper was of the utmost practical importance. One began to be hopeful that at last there was a chance of our coming upon some scientific principle of ventilation—one which would enable architects in devising a building to provide that it shall be adequately ventilated, instead of leaving that question to be decided after the event. They were much indebted to Mr. Shaw for his experiments. Professor Hele Shaw and Mr. Shaw had had the courage to go beyond anything he had seen in a model system of ventilation. As a matter of fact, the laws of electricity had been carried much further than the laws of currents of air in buildings. The president (Professor W. E. Ayrton) said architects forgot that currents of heated air themselves acted as electro-motor force, and the openings they made were found sometimes to act as outlets, sometimes as inlets, and sometimes as neither one nor the other. Mr. Shaw had explained why that was so.

### TREDGOLD'S THEORY OF WIND PRESSURE.

In his address to the mechanical section Sir J. Wolfe Barry dealt at length with the development of ships and docks during recent years. The cheapening of steam navigation, the improved methods of building and rigging sailing ships, and various economic causes had resulted in a large increase in the average size of ships engaged in over-sea voyages, with a comparative diminution in the number of crews of each description of vessel. It would be a bold man who thought that they had reached finality in the size of ships. He warned his hearers against hasty generalisation, an example of which was to be found in Tredgold's dictum on wind-pressure. That authority had laid down in 1840 that a pressure of 40lb. per square foot should be provided for; reasoning, no doubt, from the fact that such a pressure had in this country been registered on a wind-gauge of a square foot or less in area. As a consequence, he assumed that the same force could be exerted by the wind on areas of any dimensions. Our roofs and bridges, wherever any calculations of wind-pressure were made, were designed for a pressure of 40lb. per square foot of the whole of the exposed surface, and under the alarm caused by the fall of the Tay Bridge, in 1879, the piers of which were not, probably, strong enough to resist a horizontal pressure of one-fifth of such an amount, a further general assumption was made, and the Board of Trade compelled all railway bridges to be constructed to resist a 56lb. pressure. It was difficult to imagine the amount of money which had been wasted in unnecessary provision against wind strains of 56lb. per square foot on large areas in consequence of this hurried generalisation from insufficient data. He knew something of what the provision for 56lb. on the square foot for wind cost at the Tower Bridge, and he did not wish to mention it; but if the public had been told that the dictum of experts arrived at, however hastily, in 1880 was to be set aside in the construction of the bridge all confidence would have been beforehand destroyed in it, and he supposed no committee of Parliament would have passed the Act. He recalled the circumstances for the purpose of bespeaking the utmost caution against our being tempted to lay down laws based on uncertain data. It was much to be wished that the Government would establish a Public Physical Laboratory, at which facts could be arrived at, constants determined, and instruments standardised.

### THE GEOLOGY OF THE BRISTOL DISTRICT

Formed the subject of the address of Mr. W. H. Hudleston, F.R.S., as president of the Geological

Section. He said the city of Bristol lay on the confines of the region where it shaded off north-westwards into the palaeozoics of Wales and north-eastwards into the mesozoics of the midland counties. There were probably few districts which displayed an equal amount of variety within a limited circumference. The carboniferous limestone of the Bristol area had attracted the attention of so many distinguished geologists that its palaeontology and general features were tolerably familiar. Of late years we owed some interesting petrographic details to Mr. Wethered. The varying thickness of the carboniferous limestone and also of the millstone grit in this part of England was noteworthy. If we followed the carboniferous limestone in a south-westerly direction, across the mysterious Bridgwater flats, a change was already noted in the case of the Cannington Park limestone, which was the subject of so much discussion in former years. All further traces of carboniferous rocks failed at this point. After crossing the vale of Taunton, when next we met them in the Bampton district, the culm-measure type, with its peculiar basal limestones, was already in full force. In the new "Index Map" the culm-measures were placed at the base of the carboniferous series—below the carboniferous limestone. Since 1895 a new light had been thrown on the lower culm-measures by the discovery of a well-marked horizon of radiolarian rocks, altering materially our views as to the physical conditions accompanying the deposition of a portion of the culm-measures. The Pennant rock was formerly regarded as millstone grit until Mr. Handel Cosham, in 1884, pointed out the mistake. Nowhere, perhaps, were the effects of the post-carboniferous interval better exhibited than in those parts of the south-west of England where tertiary denudation had removed the mesozoic deposits. Attention was drawn to a peculiarity of the Bristol and Somerset coalfield—the strike of the coal-measures was widely different on either side of a line which was drawn through Mangotsfield to a point north of Bristol. The beds north of this line had for the most part a meridional strike, nearly parallel with the present Cotteswold escarpment; south of this line the strike was mainly east and west, though much curved in the neighbourhood of Radstock and the flanks of the Mendips. This was only part of an extensive change in the direction of flexure, much of which was still hidden under mesozoic rocks. This suggested the probability of finding workable coal east of the proved Somersetshire field. In view of the forthcoming meeting of the British Association at Dover, the question of finding coal to the eastward of Bath became a specially interesting subject for discussion. It was also a matter of some consequence whether the hidden basin or basins belonged to the meridional or to the east and west system of flexures. The latter was most likely to be the cases. The vale of Pewsey had been mentioned as a suitable locality for boring along the line of the recognised axis. But prospectors should bear in mind the warning of Ramsay, that the basins containing coal were but few in comparison with the number of basins throughout the palaeozoic rocks. No doubt the line indicated was more favourably situated for coal exploration than the Eastern Counties; where, for instance, the Coal Boring and Development Company had lately gone into liquidation. In the immediate neighbourhood of Bristol, since some date in the middle tertiary time, the process of earth-sculpture, besides laying bare a considerable amount of palaeozoic rock, had produced both the jurassic and cretaceous escarpments as well as the numerous gorges which add so much to the interest of the scenery. A depression of something like 60ft. appeared to be the most recent change which the geologist had to record in the estuary of the Severn.

### DARTMOOR GRANITE.

Mr. Alexander Somervail dealt with the age and origin of the granite of Dartmoor, and its relations to the adjoining straits; in which he contended that the true age of the Dartmoor granite was referable to an interval or period of time between the lower and upper culm or carboniferous system. He regarded the proofs advanced by De la Bèche and others, up to this interval, as decisive, but thought that there was no evidence to support the post-carboniferous or Permian age of the granite. Professor Lloyd-Morgan described pre-historic antiquities in the neighbourhood of Bristol, the early camps, and megalithic remains of the surrounding country. Of those at Clifton and Stoke-Leigh, just opposite



on the Somersetshire side of the Avon, new and careful plans had been made under his own supervision. And in Stoke-Leigh the "dry-walling" which crowned the inner rampart had been exposed by special excavations. Its character was compared with that described and figured by Mr. Dymond at Worlebury; and the nature of the burnt lime and so-called mortar found in the Clifton and Burgh-walls camps was discussed. Professor Lloyd-Morgan also explained the scheme of construction of the megalithic stone-circles at Stanton Drew.

#### NEW METHOD OF DESCRIBING CYCLOIDAL AND OTHER CURVES.

Professor H. S. Hele-Shaw, LL.D., gave a description of an instrument by which cycloidal and other curves are obtained, a piece of mechanism devised by himself. The essential points were:—1. The employment of auxiliary circles instead of the actual pitch circles of two sheets of cardboard which turn in connection with each other. 2. A method by which the actual axis of rotation for each sheet is dispensed with, virtual axes only being employed. By means of this instrument the describing pen or pencil used to mark out the cycloidal or involute curve can be made to draw the complete curve instead of only a portion of it as obtained by the ordinary methods, while the use of the virtual centres enables circles of any diameter to be employed, since it is no longer necessary to have a fixed centre for the cardboard within the limited range of a drawing board or drawing table. Hence, in this limit, the cycloid itself, in which the circle rolls along a straight line, or an involute curve, when the straight line rolls on a circle, can be obtained, as well as ordinary epicycloidal and hypocycloidal curves, and the methods in which these curves are obtained were illustrated, as well as the rules for the adjustment of the instrument for any required conditions. Since one well-known method of describing an ellipse is by means of a point attached to a circle rolling within another of twice its diameter, it is obvious that this instrument, the essential principle of which is the rolling of two imaginary pitch circles upon each other, can be applied to draw ellipses of any required eccentricity or magnitude. Another feature of the new instrument, which the author believes to be new, enables centres of curvature of two surfaces revolving on each other to be continuously varied. This instrument appeared to offer to those interested in mathematics, and especially to those engaged in teaching the subject, a rapid means of describing rolling curves as well as envelopes.

#### STREAM LINE MOTION WITH VISCOUS FLUIDS.

Professor Hele-Shaw also read a paper on "Stream Line Motion with Viscous Fluids in Two Dimensions and in Three Dimensions." The mathematical calculation of the stream lines of a perfect fluid streaming past an obstacle is a problem of great complexity even in the case of an obstacle of simple shape, and the experimental realisation of the lines of flow has only been successful in a few cases. By using a transparent viscous fluid streaming between two very close parallel plates, and injecting into it at certain points streams of similar fluid coloured by an aniline dye, the author has succeeded in mapping the lines of flow. If an obstacle of any shape be placed in the fluid the coloured streaks curve so as to follow the new stream lines. In this way Professor Hele-Shaw has imitated the lines of force of a magnetic field containing magnetic material of various shapes, the positions of such lines being similar to the hydrodynamic stream lines. By making a wedge-shaped film of fluid three-dimensional cases may be solved. A mathematical communication by Sir George G. Stokes contained a proof that the stream lines of the viscous films used by Professor Hele-Shaw are identical in position with the stream lines of a perfect fluid moving in two dimensions.

#### ELECTRIC POWER IN WORKSHOPS.

In a paper on this subject, Mr. A. Siemens pointed out that the first development in this direction took place in connection with the small line exhibited in Berlin by Dr. Werner Siemens in 1879, and in the present day there is, he considered, little doubt that in the near future horse and steam tramways will disappear everywhere. In overcoming heavy gradients the ultimate triumph of electricity is assured. Although even the heaviest goods train can be drawn by electric-motors, Mr. Siemens pointed out that it would be a fallacy to deduce that it would be advantageous

to replace the steam locomotive on all existing railways by electric-motors, as economical factors have to be considered as well as technical features. Electric transmission is best applied where the demand for power is constant rather than intermittent. The paper next dealt with the losses that must be met in carrying out a system of power transmission by electricity. The first point to consider was that the available mechanical energy had to be converted into electrical energy, and such a transformation involves loss. The ease with which electrical current can be carried, and other advantages, more than counterbalanced this loss, which is not excessive, 84 per cent. of the I.H.P. of a steam-engine being available at the terminals of a dynamo in the form of electrical energy; whilst electric-motors will produce over 90 per cent. of the electrical energy supplied to them in the shape of mechanical power. The art of insulating conductors has improved to an extent that, whereas a short time ago currents of 2,000 volts were considered a limit, there are now a number of successful electric systems employing currents of 10,000 volts pressure. The use of alternate currents, the employment of transformers, permit the use of low-pressure generators and motors, high-pressure currents being used in the conductors, but in this there is the loss of double transformation. The author was of opinion, however, that were a trustworthy alternate current motor invented this system of transmitting power would be the dominating one. Unfortunately alternate current motors refuse to start without being first synchronised by external means, are liable to stop when overloaded, and their speed cannot be varied. A continuous current system is simpler and cheaper at first cost and cheaper in maintenance. The installation of electric power transmission for working the machine tools and other appliances in the works of Siemens Brothers and Co., at Charlton, was next described in detail. The author stated that six years' work has shown that the system is perfectly trustworthy, and that an expected great saving in the cost of attending to the motive-power has been fully realised. The total cost of motive power during 1897 was £9,900, or 2d. per Board of Trade electrical unit, and 1·71d. per brake-horse power per hour exerted by the motors.

#### ELECTRIC TRACTION.

Professor Silvanus P. Thompson read a contribution on "The Economic and Social Effects of Electric Traction." The author studied last year in Toronto the economic and social influences of the change, made in 1893, from a very complete service of horse-tramways to a still more complete electric tram service. There were about 140 miles of tramway in the city, and the whole system was as fully developed as in any American city. Toronto, however, was only an example of what had occurred on a large scale not only in Canada, but in the United States. At Pittsburg, for instance, the electric car had created a veritable transformation. Before its introduction the artisans lived near their places of work in dirty and dingy surroundings, now for the most part they had idyllic homes with gardens in the suburbs. In Boston there were 400 miles of tramways worked by electricity, for which 29,000 horses would be required. The gain to cleanliness was immense. One result of this change in the United States was a great depreciation in the value of horses, of which the horse-breeding farmers bitterly complained. In 1890 there were in Europe and America 5,661 miles of tramway all worked by horses; the number of miles so worked was in 1897 only 970. But Europe was far behind America, and had now only 700 miles of tramways worked by electric power, as against 900 miles in the province of Ontario alone. Eight years ago the horse tramways were 69½ per cent. of the whole, and the electric only 15 per cent. Now the electric tramways were actually 87·6 per cent. of the whole; and the mileage of electricity had risen from 1,262 to 13,765 in the course of the last eight years.

#### THE BELGIAN AND KENTISH COALFIELDS.

Mr. R. Etheridge read a paper on "The Relation and Extension of the Franco-Belgian Coalfield to those of Kent and Somerset." He showed by frequent references to diagrams that the coalfields of Belgium and North France occupied an extended and sinuous line from east to west, ranging through about 150 miles in that line. There was little doubt, he thought, that the Belgian coalfields extended westward to Valenciennes, Condé, and Bethune, and on to Calais,

thence under the Straits of Dover to the now determined coalfields of South-Eastern Kent. Borings were being made at Pluckley, west of Brabourne, and Penshurst, the latter being 25 miles west of Dover and some 1,700ft. deep. The Brabourne trial had passed through 1,875ft. of sedimentary rocks ranging from the Gault to the Lower Lias inclusive; the bore-hole had passed into the red conglomerate of probably old red sandstone, but in all probability the depth would be increased. The Dover bore-hole reached the depth of 2,225ft., having proved eight seams of coal and 5ft. of fuel, the lowest being 4ft. thick. This was thicker than any known seam in the Belgian coalfield.

#### RECTIFICATION OF MUNICIPAL FRONTIERS.

In a paper on this subject, Mr. W. M. Acworth considered certain recent developments in the life of our great towns tending in the long run to an important readjustment of frontier between private and municipal enterprise. Gas and water supply had long been regarded, on the ground of their general necessity, as natural subjects for municipal ownership. Oddly enough, however, it was reserved for a commercial company, the South Metropolitan, to make gas really available in the poorest house by the adoption of the penny-in-the-slot system. But with the rapid advance of rival methods of lighting, petroleum, electricity, and now perhaps acetylene, coal gas was much less a general necessity of life than it was. Simultaneously there has been a rapid advance in the use of coal gas as a source of power. In America they were building gas-engines of 700H.P. and even 1,000H.P. It could hardly be contended that municipal management, with its inevitable rigidity and slowness of method, was better fitted than private enterprise to supply gas-power in competition with power derived from other sources. The supply of water few would deny in the abstract to be a natural subject for public ownership. For all that the question of delimitation of frontier, not between private and municipal ownership, but between the rights of different local authorities, arose in this matter also. But it was not by water that the boundaries of municipal enterprise were likely to be undermined. A House of Commons committee had just reported that competition in telephone service was desirable, and that where the Post Office did not compete with the National Telephone Company, licenses might reasonably be granted to the local authority. Municipal telephones would soon probably be tried on a considerable scale. It was questionable, however, whether it was not being begun too late. Though 95 per cent. of telephone messages were said to be local, this proportion was not likely to last much longer. Electric lighting had from the outset been a mixed service—in the hands here of a company, and there of a municipal corporation, subject to this, that the corporation had always been given the refusal before the company was admitted. But in practice the competition had been of companies *inter se*. Last session, however, saw a change. Two local authorities sought, and one of them obtained, statutory power to compete within their district with companies already in possession of the field: but, seeing that the companies possessed greater elasticity and adaptability of management, and were not hampered by municipal—which were very often non-natural—boundaries, in some cases the competition would probably be ineffective. But this was not all. When the Electric Lighting Act of 1888 was passed, electricity was almost exclusively regarded as a source of light. This was no longer so. A joint committee of the two Houses of Parliament investigated last session the new problem of electric energy in general, and a single company, the General Power Distributing Company, proposed to produce electricity on an enormous scale at the pit's mouth at Warsop, in Nottinghamshire, and thence to distribute it by trunk cables over 2,000 square miles of country, along the roads of 120 different local authorities, including the great corporations of Sheffield and Nottingham, and then to sell it in any quantity, for any purpose, and to all classes of consumers. This particular scheme had not yet been sanctioned by Parliament. Evidently there was here a big question opened, which would not be settled in its detailed application to the different parts of the country for many years to come. The accepted tramway policy of the country was also rapidly being dissolved by electrolytic action. In the whole of Great Britain, with its 40 million inhabitants,



we had about as many miles of tramway as the two cities of Philadelphia and St. Louis; 80 to 90 per cent. of this insignificant mileage was still worked by horses. The rest of the civilised world had long ago adopted electric traction, by which in the United States alone over 15,000 miles of line were now being worked. In London in particular the adoption of overhead electric traction had been absolutely blocked by the action of the County Council, in one case, at least, contrary to the unanimous representation of the local vestry. A House of Commons committee last session gave a decision in the case of the London United Tramways, which practically amounted to notice to the London County Council that they must make up their minds to exercise their veto power less absolutely, or it would be withdrawn from them. With the advent of electric traction, tramways had been extended in other countries, and were even now beginning to be extended in England, far beyond the borders of individual towns. Had Bath and Bristol, for instance, been situated, not in England, but in Massachusetts, they would long ago have been connected by a tramway service, with cars starting every few minutes, running from town-hall to town-hall in three-quarters of an hour or less, at a through fare of certainly not more than 7½d. Now such a service to be efficient must be worked in one hand. Could it be imagined that this hand could well be a joint committee of the counties of Gloucester and Somerset and the corporations of Bath and Bristol? The present tendency for corporations to work their own tramways was likely, therefore, to be counteracted, if not actually overborne, ere long by a tendency to intrust the working of a tramway to commercial undertakers. All tendencies operated towards a readjustment of the boundaries of direct municipal activity, and that this readjustment was likely to be, on the whole, in the direction of extending rather than restricting the public functions allotted within the municipal area to commercial enterprise.

#### THE MAGNETIC AND ELECTROLYTIC ACTION OF ELECTRIC RAILWAYS.

A joint meeting of the sections of Mathematical and Physical Science and of Mechanical Science was held on Tuesday, under the chairmanship of Professor Ayrton, to consider the magnetic and electrolytic effects of electric railways. Professor Rücker gave an account of disturbances of a magnetic instrument produced by the City and South London Electric Railway at distances of half a mile, two and three-quarter miles, and three and a half miles respectively. In every case the disturbance was such as to render any records of the motion of the magnet absolutely valueless. Again, at Greenwich the vertical force and earth-current records had been rendered useless from similar causes. The disturbances due to two electric tramways running at right angles at Toronto showed that the chief trouble was experienced from earth currents due to imperfect insulation of the electric conductors. The progress of electric railways could not be stopped, and the only plan was to meet the difficulties and avoid them wherever possible. So far this had been done in a friendly manner in this country. It was most important that the return circuits of the electric systems should be insulated so as to avoid earth currents. To get rid of effects of magnetic induction it had been suggested that the distance between the outward and return conductors should not be greater than one one-hundredth of the distance from the conductors to the observatory. This suggestion had been adopted at Kew Observatory, where the railway and the observatory were 1,100 yards apart, the result being that the fifth place of decimals was only just affected by the railway. The conditions had been adopted in the Parliamentary Bills relating to electric railways, and it was open to consideration to what distance the conditions were to be insisted on, having regard to the fact that the newer electric railways did not create such serious disturbances as the older ones.—Dr. Eschenhagen described the action of earth currents on the Potsdam Observatory, and stated that the difficulties could be removed by the use of a complete metallic circuit for the currents used on the railway.—Mr. W. H. Preece said that magnetic observatories had existed for centuries, and were bound to be protected, while other applications of electricity, such as telegraphs and telephones, had existed so long that they had become vested interests. Disturbances arose from earth currents, magnetic induction, moving masses of magnetic material,

and leakage. On the City and South London Railway the trouble from the last-named cause was very considerable, and on some occasions had produced a potential difference of 10 volts on the lines through the General Post Office. The immediate source of disturbance was bad insulation of the third rail, and all the trouble could be remedied by simple ordinary practical precautions.—Professor Fleming called attention to the electrolytic corrosion of gas and water pipes by the earth-currents from electric railways and tramways. He stated that in the case of street railways with an uninsulated return-circuit, no amount of bonding of the rails would entirely prevent earth-currents, which might be gathered by gas or water pipes. The danger of corrosion of such pipes would generally be greatest when they extended for some distance parallel with the rails, and the current must pass from the pipe into the surrounding soil. In rapidity of destruction a new clean pipe must possibly succumb even sooner than an old one protected by a dense coating of oxide, but when actual perforation of the pipe did not occur there might be an ageing action which shortened its life.—Professor S. P. Thompson pointed out that by the use of alternating currents all disturbances could be entirely obliterated, whether magnetic or electrolytic. Even with continuous currents, if the third rail were on or below ground and between the other two, the trouble from both magnetic and chemical effect was very slight.

#### STANDARDS OF PURITY FOR SEWAGE EFFLUENTS.

Dr. S. Rideal, in a paper on this subject, pointed out that the majority of these standards are arbitrary and artificial. But a calculation of the proportion of nitrogen in its oxidised forms which are harmless, and its unoxidised forms, which are odorous and sometimes deleterious, would denote the extent to which the sample had been purified. The number obtained is termed the "percentage of purification," and ranges from nothing in raw sewage to 97.6 for a deep well in chalk. Moreover, with the aid of bacteria, the oxygen combined with nitrogen, that is in the form of nitrates and nitrites, is capable of supplementing the free dissolved oxygen in the destruction of the organic matter. From these considerations a formula is deduced embodying all the natural data for the conditions of discharge of an effluent into a stream, including the flow and aeration of the latter, the volume of oxygen required, and the available oxygen of the effluent, the result being a factor of safety which must never be below unity. He concluded that an effluent which has been properly prepared and is in an active state of wholesome bacterial change under the above conditions of free and potential oxygen, is clear and nearly free from odour, and may be safely discharged into any river of moderate volume.

#### PROPOSED SHIP CANAL FOR BIRMINGHAM.

Mr. E. D. Marten, the engineer to the Severn Commissioners, described "Schemes for the Improvement of the Waterway between the Bristol Channel and the Birmingham District." He reviewed the whole of the schemes which have been proposed for the improvement of the waterway to the industrial centre of the Midlands. He claimed that any scheme if adopted would cause a reduction in the cost of transport far outweighing any possible burden which would be imposed on the rates if the local authorities should guarantee the needful expenditure. Without such guarantee nothing will be done. The trunk waterway of the system consisted of the tidal Severn estuary for 20 miles from the Bristol Avon to Sharpness Docks, thence 16 miles of the Gloucester and Berkeley Ship Canal and of the canalised River Severn for 42 miles from Gloucester to Stourport. This was connected with the Birmingham district by narrow canals, accommodating horse-hauled boats of only 25 to 35 tons. On the Severn steam towage was maintained, and vessels carrying 150 tons navigate it; but it was capable of accommodating much larger craft. The schemes proposed consisted generally of improvement in existing canals between the Severn and Birmingham. One scheme, proposed by Mr. G. W. Keeling, involved a cost of £600,000. The Worcester and Birmingham Canal would be increased in width from 30ft. to 66ft., and its depth from 4½ft. to 9ft. The locks would be made large enough to pass two vessels each 100ft. long and 18ft. beam. A group of thirty-six locks would be replaced by an incline. Mr. Marten proposed a scheme estimated at £360,000, by which the

Staffordshire and Worcester Canal would be improved, the width being brought to 60ft. and the depth to 7ft. Inclines would be substituted for groups of locks. Vessels up to 1,000 tons register now traded between Gloucester and the Continental ports, the navigable depth of the Ship Canal being 15ft. The Severn for thirty miles from Gloucester to Worcester had a minimum depth of 10ft. There were, however, three fixed bridges, which would have to be converted into opening bridges.

#### SUBTERRANEAN TELEGRAPH CABLE BETWEEN BIRMINGHAM AND LONDON.

THE work of laying a subterranean telegraph cable between Birmingham and London was commenced 18 months ago, and will be carried through within the next twelvemonth. The *Birmingham Post* gives some particulars of this great underground cable, by far the longest in the country, for the longest underground telegraph lines now in use do not extend to more than 30 to 35 miles. The length of the line will be about 105 miles, the route traversed between St. Martin's-le-Grand and the General Post Office, Birmingham, being through Cricklewood, Hendon, Edgware, Watford, Hemel Hempstead, Leighton Buzzard, and Fenny Stratford, thence by the Old Watling-street road to Weedon, branching off through Southam, Leamington, and Warwick, and passing by way of Hockley Heath and the Stratford road to the large building at the top of New-street. The old and inadequate plan of protecting a cable was to cover the copper wires with guttapercha, and inclose the whole in a wooden box of triangular shape. The London-Birmingham cable will consist of 76 copper wires, each with a separate wrapping of brown paper in place of the guttapercha. Thus packed, the wires fit loosely into a lead tube of 2½in. diameter, and this in turn is drawn into 3in. iron piping laid about 2½ft. below the surface of the ground. The wires and their lead casing are made up in lengths of 150 yards, and drawn into the iron tube with a crab-winch. At the point of connection each wire in one cable is attached to the corresponding wire in the next length. The junction is effected by placing a small copper tube over the ends of the two wires to be connected, so that they meet in the centre of the tube. The tube and wires are then soldered together. The greatest precautions are taken that the cable shall be entirely free from damp. Before leaving the manufactory it is baked for 24 hours in an oven maintained at a heat of about 350°. But there is always a danger that in the process of laying slight moisture may find an entrance at the extremities, even from the hands of the men engaged in soldering. Accordingly, charcoal braziers are brought into requisition, and exposed parts of the cable which the men may have handled are baked for four, five, or six hours until it is proved by the use of a small mirror that no moisture remains. Then a plumber proceeds to seal up the lead casing. A sleeve of lead is soldered over the junction, but by way of making assurance doubly sure a small oblong aperture is reserved in this sleeve, by means of which any moisture may escape during a further process of roasting by charcoal braziers applied outside the lead before finally closing the joint. At intervals of five miles the wires are brought to the surface and passed through a testing chamber presenting an appearance externally not unlike a pillar-box. These give access to the wires either collectively or separately, so that faults may be more readily located and repaired. The chambers are fitted with apparatus for pumping chemically-treated dry air into the cable to neutralise the effect of any mishap to the lead casing. These examining chambers will only be opened in the event of some defect demanding attention. Minute precautions are taken to overcome the danger of the chambers being themselves a means of admitting moisture to the cable, and when it is found necessary to open them braziers will be brought into use. It is stated that the paper wrapping in which the wires are inclosed insure infinitely better insulation than the guttapercha envelope, and all the details of the scheme have been submitted to searching technical and practical tests which warrant the confidence of the authorities in the final result. It is predicted that the London-Birmingham cable will be the forerunner of many such lines of long-distance telegraphs on the various arterial routes throughout the country. The growing volume of the telegraphic work



between London and Birmingham rendered it necessary to enlarge the means of communication, and the new cable is to supplement, and not to supplant, the existing service. It may be found desirable to utilise the present open-wire system to a great extent for telephone purposes, transferring the telegraphic work to the underground cable. The precaution is taken to construct the new cable on the twin-wire principle, so that the 76 single telegraph wires can be converted into 38 metallic telephone circuits. The gangs of workmen who are engaged in laying the cable have now approached to within 30 miles of Birmingham, having reached Southam. For a distance of about 45 miles from London the work has been actually completed, and the next link, reaching from Fenny Stratford to Leamington, is now being added; six gangs, numbering about 30 men each, being employed on detached sections. The third and last link in the chain—that from Leamington to Birmingham—will soon be in hand.

#### DOOR FURNITURE.

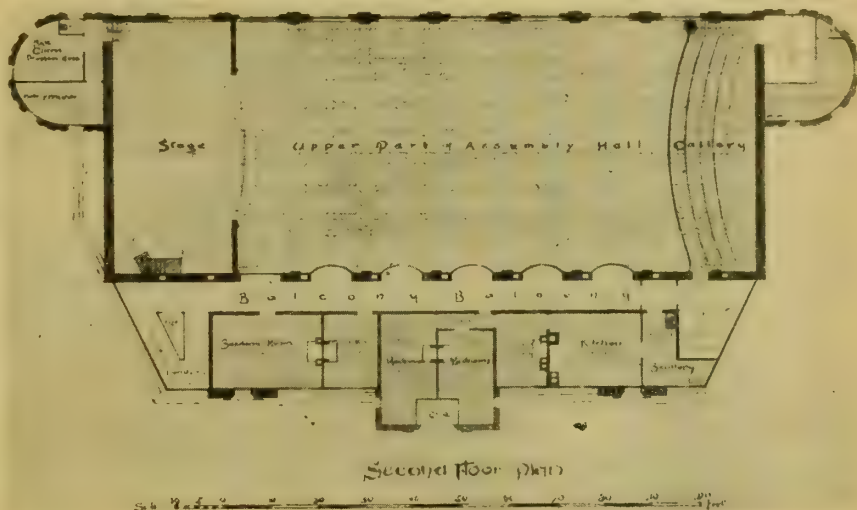
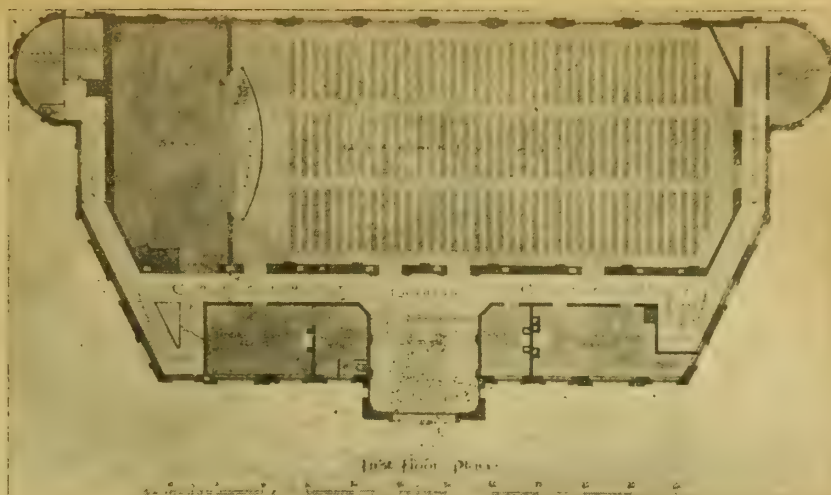
**I**N order not to strain the door when fitting a mortise-lock, the workman should make his mortise large enough to admit of the lock entering without much pressure, for a lock forced in place with difficulty is sure to affect the door, either by bulging the stile or warping the door. After the door is fitted and hung, it should be taken down in order to have the mortise made and lock put in place.

In fitting the door, the edge of the lock stile should be slightly bevelled, and the space left for clearance between the stile and casing may be about  $\frac{1}{8}$  in. if the work is to be painted. If to be stained and varnished, or varnished alone, then a little less space may do. On the hinge stile the space may be about the same. If the rebates are bevelled,  $\frac{1}{8}$  in. is space enough to leave all round. On all doors 7ft. high and over there should be three hinges, and these should be perfectly in line with the jamb and with each other, a condition that will tend to hold the door to its correct work and prevent it from getting out of shape. In the adjustment of these hinges, much can be done towards overcoming any spring or warp in the door if an expert hanger has the matter in hand. In all cases where possible, it is best to make use of loose joint butts, if the joints are well fitted, so that little or no lost motion is noticeable. Bronze butts with steel cores are the best, but, of course, are costly. Good steel butts answer very well, and last for ages if properly set and well fastened. Screws on the jamb wing of the hinge should be long enough to pass through a  $1\frac{1}{2}$  in. jamb into the timber behind, in order to make a firm and lasting piece of work. It is well to grease the knuckle of the hinge with a little hard mutton tallow and wipe off clean. Do not use oil under any circumstances, as it will eventually show on the edge of floor or jamb.

In placing keeper on jamb, if there is any play in the length of mortise, be sure to divide the difference, so that should the door sag on the one hand the bolt will have ample room to work, or should the floor drop a trifle on the lock side of the door there will be a space left at the top of the keeper to take in the bolt. It is not good practice to have the keeper too close to the shoulder of the rebate, as the stile will always be pressed tightly against the shoulder of the rebate when closed, and this will have a tendency to spring the lock stile and cause it to bend over from the jamb, top and bottom.

In spacing off for butts the rule is: For a 7ft. door, to gain for the lower hinge 10in. from bottom of door to bottom of hinge, and 9in. from top of door to top of top hinge. The middle hinge should be half-way between the two end hinges. In entrance-doors this rule may be a little departed from, as the middle hinge may be placed the length of itself nearer the lower hinge. Heavy doors used for entrance should be provided with hinges with heavy spindles or cores, as light spindles soon cut away, causing the door to sag and strike the opposite jamb, or lap over its fellow door, if double doors. The bottom edges of outside doors should always be planed off, so that the outer edge will be "slightly proud." This will prevent water dripping inside. — *Scientific American*, Building Edition.

The Wolverhampton Town Council have agreed to raise the salary of Mr. Jahn, the head master of the school of art, to £325 a year.



#### PROPOSED TOWN HALL, TAUNTON.

**T**HIS design was recently submitted, by Mr. R. Knill Freeman, architect, Bolton, in a limited competition for this work, and the proposed arrangements of the several departments, as required by the conditions, are clearly shown on the plan, &c. The ground-floor provides for a spacious market with entrances at each end, and for ten shops, if required, on the south side, special attention having been paid to the lighting and ventilation. Three entrances and staircases are provided, viz., one at each end of building and the main entrance hall and grand staircase, the latter being placed in the centre of the north façade. On the left of the hall, on the ground floor, is placed the Guildhall, with separate entrance, lavatory, and w.c., a suite of offices in connection with this department also being provided in basement conveniently approached. Lavatory and other accommodation is also provided in basement. On the right of the hall are placed the refreshment-room and offices as required. The assembly hall, to seat 1,000, 108ft. by 52ft., is placed on the first floor, and is arranged to be used for theatricals when required. Ample entrances and exits are provided, and at one end is placed a large stage with wings, 52ft. by 25ft., and other necessary arrangements for theatricals, also actors and actresses' dressing-rooms. At the opposite end of the assembly-room is placed a gallery, while on the north side a balcony is provided with ornamental bays between the arcading, and a ceiling light going the full length. On the first floor are also provided ladies' cloak and retiring rooms, supper and ante-rooms; and other accommodation, the gentlemen's cloak and retiring rooms being placed on a mezzanine floor, approached from the staircase landing. The main landing to the grand staircase is arranged to serve as a foyer and refreshment buffet. A property lift, in connection with the stage, is provided, and other lifts where required. On the second floor are provided smoking and card rooms, caretakers'

rooms, kitchens, &c., in addition to the gallery and balcony previously mentioned, and all conveniently approached. The style adopted for the building is Late English Renaissance, and the materials proposed to be used for the exterior were red bricks, with stone dressings, the roofs to be tiled.

#### UNDERGROUND RAILWAY STRUCTURES.

**A**N interesting article on "The Underground Railways of London," by Mr. Frederick E. Cooper, appears in this month's number of "The Engineering Magazine," and the author has brought together a few facts and figures of interest. Most of our readers are well acquainted with the mode of construction adopted in these underground structures. The author begins by referring to the extension of the London and North-Western Railway to Euston-square from the original terminus at Chalk Farm, as the first example of underground railway construction. The crossing over Regent's Canal by a bow-string type of bridge, 50ft. span, of cast-iron, with wrought-iron tension bars two to each girder  $3\frac{1}{2}$  in. diameter, the open cuttings and retaining walls are mentioned. Several photo-illustrations are given of the Metropolitan and District Railways, the Notting Hill retaining walls, covered-way girders at Westminster, the progress of the work along the Embankment, Farringdon-street, &c., all taken from photographs. The City and South London Railway (electric) is mentioned in this connection, and a few illustrations are given of the Central London Railway, with its 21ft. tunnel and shield. The Central London Railway now in progress was authorised in 1892, and will be six miles in length with fourteen stations, from the western terminus at Shepherd's Bush *via* below Bayswater-road, Oxford-street, Holborn, and Cheap-side, to the Bank; it will also have an extension to Liverpool-street. These tunnels are in pairs,



side by side, and are 11ft. 6in. internal diameter, constructed on a similar principle to the City and South London Railway. "The station enlargements are also circular, 21ft. in diameter, and allows a platform 32ft. long 11ft. wide, lined with iron plates. West of the Marble Arch there is but one lift shaft, 30ft. in diameter, at each station. At each intermediate station on the remainder of the line there are two lift shafts 23ft. in diameter; at the Bank there are five lifts of a diameter of 20ft." Each station has a stairway shaft 18ft. diameter, with ascending and descending flights. The tunnels and stations are nearly all completed—those, at least, west of Farringdon-street. The tunnels are driven below the surface of the London clay. At Shepherd's Bush and Westbourne Stations the distance down from road level is about 55ft.; at Notting Hill Station the depth is 100ft. The generating plant will be at Shepherd's Bush, and will equal 5,000 volts distributed along the line, where it will be transformed down to 500 volts before being used. The author also speaks of the Waterloo and City Railway, now in working order, the tunnels of which are 12ft. diameter; these have inclined footways instead of lifts to each terminus; the railway runs beneath the District Railway, along Queen Victoria-street, and below the low-level sewer. The length is  $1\frac{1}{2}$  miles, 1,000ft. of which is below the Thames.

#### SCOTTISH SANITARY CONGRESS AT ROTHESAY.

THE 24th annual congress of the Sanitary Association of Scotland was held on Wednesday, Thursday, and Friday in last week at Rothesay. The proceedings opened with the annual business meeting, Mr. Gilbert Thomson, Glasgow, presiding.

Mr. George Middleton, of Glasgow, secretary of the association, submitted the annual report, in which it was stated that during the year over 100 new members had been admitted, the roll showing 241 members, being a net increase over last year of over 80. The number of local authorities supporting the association was 73. Last year 50 local authorities were represented, and the year before 33. The treasurer's statement also showed a satisfactory state of matters. The balance in hand last year was £9 3s. 3d., and that had been increased this year to £162 2s.

The reports were adopted.

Bailie Dechan, Hawick, invited the association to hold their next congress in Hawick, and this was unanimously accepted.

The following office-bearers were appointed for the ensuing year: Honorary president, the Marquis of Bute, K.T.; president, A. K. Chalmers, M.D., D.P.H., medical officer of health, Glasgow; vice-presidents—William W. Kelso, sanitary inspector, Paisley, and Dr. A. Campbell Munro, medical officer of health, Renfrewshire; secretary and treasurer, George Middleton, M.A., LL.B., writer, Glasgow; president-elect, William W. Kelso, Paisley.

On Thursday, when Lord Bute, the honorary president, welcomed the delegates, Dr. A. K. Chalmers, Glasgow, delivered the presidential address, and papers were read by Dr. Andrew Hall, Rothesay, and Dr. Neil-Carmichael, Glasgow, and in the evening the annual dinner of the association was held.

#### FALL OF A THEATRE CEILING: A LESSON AND A WARNING.

By J. FORD MACKENZIE. (Author of "The Pleasures of House Building, Jerrywise and Otherwise.")

THE accident last Friday from the falling of a portion of the plaster ceiling upon the heads of several persons in the pit, during a performance of "The White Blackbird" before a large audience at the Broadway Theatre, Deptford, arouses the attention of the public to the alarming risk frequenters of newly-built theatres have sometimes to encounter. There is, nowadays, such extreme haste in the construction of these buildings that everything is sacrificed to speed. Even architects who design these erections have to get out their designs, prepare all the plans, working drawings, and specifications with such a rush, that they are hardly permitted bare time to think. And how can they always, in their hurry, hit upon which material is the very

best in every respect for the safety of the hundreds and thousands of confiding mortals who, unaware of any danger, trust themselves to their mercy, and sit for hours at the risk frequently of precious life and limb? The heavy old-fashioned system of plaster-decoration may have been considered the proper thing when nothing better was known; but there is no excuse now for the use of decorations of that description.

What is required in a modern public hall or theatre is a decorative material that is at once perfectly fire-resisting, while at the same time capable of being produced in beautifully elaborate and chaste bas-relief designs. The latter desideratum may be found in some of the modern paper-pulp enrichments which are in the market, and known under a variety of more or less unpronounceable names; but for the purpose of theatre decorations they all lack the former quality, which is, without doubt, an essentially necessary feature where public safety has to be considered.

One good point in these pulp decorations is their extreme lightness. If properly put up, they have no more tendency to fall than has an ordinary sheet of wall-paper, and if they did drop down they would simply flutter away and injure no one. From many such considerations, architects are beginning to grasp the fact that some decoration with all the good points of the light paper-pulp materials, and with the added qualification of being at the same time—like the historical salamander—thoroughly fire-resisting, is the proper thing, and indeed the only thing for wall and ceiling decoration that should be permitted to be used in any theatre or public hall. Without desiring to advertise any one particular decorative material, we cannot resist calling the attention of all interested in the preservation and decoration of buildings of public resort and entertainment to the perfectly fireproof decorations manufactured from pure asbestos fibre pulp, under the name of "Salamander," by the United Asbestos Company, Limited. This decoration has been over and over again subjected to the most severe of fire tests, and has come out every time scathless, like its ancient prototype.

The London County Council and other governing authorities should see that no ceilings are constructed likely to drop down, sooner or later, upon the heads of an unwitting audience, as this one has just done at Deptford. This accident, which might have produced more serious and perhaps fatal results, should be a red-flag warning to theatre builders and owners, and to architects alike. The next similar accident may be still more startling and more disastrous. Nor have we yet forgotten the sad lesson of the Paris fire a year ago.

#### "BESTO" GLASS.

WE have received a specimen of a new kind of glass that is now being manufactured in the United States and Canada. This product consists of a semi-transparent glass, or indeed of any kind of white, coloured, transparent, or opaque glass, in the substance of which wire covered with asbestos is imbedded in the form of netting, with a  $\frac{3}{16}$ in. mesh. The specimen sent to us is about  $\frac{1}{4}$ in. in thickness, but the glass is made as much as an inch or more thick to suit particular purposes. The sheets are made in certain sizes, the largest now manufactured being 36in. in width by 10ft. in length, though this is not the limit. The "Besto" glass is made with various kinds of surface, grained, fluted, flowered, or in any pattern desired, and, we understand, one kind, smooth on face and having "prismatic ribs" on the other, is in great favour in the States. The piece we have has a sort of rough or hammered surface quite transparent, and is admirably adapted for skylights, roofs, partitions, doors, or any purpose for which great strength is required.

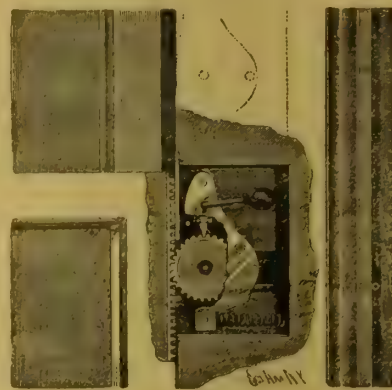
The advantages claimed for the "Besto" glass are important to architects and others. The material is to a great extent a protection against fire by confining the outbreak to the room or building. It is well known that the breaking of glass in windows, skylights, and partitions by the heat is a serious hindrance to the firemen, causes the rapid spread of the fire to other rooms and buildings; a fact corroborated by the recent disastrous fire in the City. The "Besto" glass, with its wire and asbestos netting, holds together the cracked pieces, and prevents them from falling, thus arresting the passage of fire and

smoke. Another great advantage is that it is a protection against accidental injury by the falling of any broken glass, and for the roofs of store-rooms, rooms lighted by skylights, any accidental breakage would be unattended by serious risk. In the United States the railway authorities fully appreciate the value of "Besto" glass on this account, and are extensively using it for glass roofs. And, lastly, as a protection against burglars and window breaking, for to effect an entrance, not only must the glass be broken, but the embedded wire netting cut, a work that would take some time, as each strand would have to be sawn through separately. For area, basement, stallboard lights, the "Besto prism plate" is of much value, and also for inclosing electric arc and other lights. Full particulars of this product can be obtained by application to the "Besto" Glass Company, 41, Eastcheap, E.C.

#### WINDOW RAISING AND LOCKING DEVICE.

A SIMPLE mechanism for raising and locking a window sash has been patented in the United States by the inventor, Frans Bruno, of 78, Herkimer-street, Brooklyn, N.Y. It consists of a spring-motor that will be automatically wound or, as will be seen, set by a downward movement of the sash, the usual weights being discarded.

The device comprises a rack on the window-sash, which rack is engaged by a spring-operated



gear-wheel mounted in a frame. The gear-wheel is held in engagement with the rack by means of the spring shown. When it is desired to increase the tension of the spring, the shaft of the gear-wheel is rotated in one direction, a dog preventing the backward movement of the wheel. When it is desired to decrease the tension of the spring, the frame in which the gear-wheel is mounted is swung aside on the pivot on which it is hung, so that the teeth of the wheel are disengaged from the rack; in this position the dog is lifted and the tension of the spring lowered to the required degree. A holding and locking device for the gear-wheel is provided, consisting of a slide-pin operated by a removable key, as shown in the illustration. As indicated in the figure, raising and lowering devices are arranged one on each side of the window.

When it is desired to raise the sash, the holding pins are moved out of engagement with the gear-wheel by means of the key. When the gear-wheels are thus released, the springs operate to rotate the wheels, the movement being communicated to the window-sash by means of the racks. By permitting the holding pins to fall back into engagement with the teeth of the wheels, the sash may be locked in any desired position. It is evident that when moved downwardly the sash, by means of the racks, will operate the gear-wheel to wind up the spring and place the mechanism in adjustment for raising the window again.

The Middlesbrough Corporation Electric Lighting order has now received the Royal assent, and the committee, in consultation with Mr. Hammond, electrical engineer to the Corporation, have decided that the station be erected on land belonging to the gas committee at the corner of Snowdon-road and Washington-street. Mr. Hammond has been instructed to prepare specification and estimates for lighting the compulsory area.



## BOOKS RECEIVED.

*The Cathedral Church of Wells* (London: George Bell and Sons, York-street, Covent Garden).—The thirteenth volume issued in the admirable little illustrated monographs now being published under the title of *Bell's Cathedral Series*, and edited by Messrs. Gleeson White and E. F. Strange, is written by the Rev. PERCY DEARMER, M.A., and deals with Wells, "the best example," as Edward A. Freeman asserted, "to be found in the whole world of a secular church with its subordinate buildings." While acknowledging his indebtedness to Professor Freeman for his model "History of the Cathedral Church of Wells," Mr. Dearmer points out that since that little book was written, 28 years ago, much fresh material has been discovered, and the theories then held as to the building of the edifice have been in a great measure disproved, the statement of the new discoveries being largely due to Canon C. M. Church. In this connection the author of the book before us emphasises the fact that on entering the church by the western door one is looking on Reginald de Bohun's work, and not, as Willis and Freeman believed, on that of Jocelin; for, although the western bays of the nave were completed by Jocelin, the operations were carried out in accordance with Reginald's original plan. To Jocelin (1218-42), the accounts show, has always been rightly attributed the honour of erecting the present magnificent west front, which he joined on to Reginald's unfinished nave by building the three western bays in strict accordance with the Earlier style. Mr. Dearmer traces in detail the subsequent development of the building as we see it, the rebuilding under Dean Thomas Bytton, of the roof and piers of the transepts and eastern part of nave which had been damaged by the fall, in 1248, of the vault of the central tower owing to an earthquake, and the addition, 1292-1319, of the chapter-house to the undercroft (the staircase from the north transept to the chapter-house being a little earlier), the completion of the central tower in 1321, the Lady chapel finished in 1326, and the reconstruction of the choir in 1329-63 by Dean Ralph of Shrewsbury, who added three new bays to the old presbytery of Reginald. The finishing touches were given to the cathedral when Bishop Harewell, who died in 1386, gave two-thirds of the cost of the south-western tower, and when the executors of Bishop Bubwith (ob. 1424) completed the companion tower at the north-west. The modern works comprise the restoration of the nave, transepts, and Lady chapel, commenced in 1842 by the late Benjamin Ferrey; the restoration of the choir by the late Anthony Salvin (1848-54), when, says Mr. Dearmer, "the Mediaeval stalls were destroyed and replaced by work of indescribable imbecility"; the repairs of the west front by Ferrey began in 1868, and, among still more recent works, the Lady chapel has been furnished and the east end repaired. As the author remarks, "The best motto at the present day is *Festina lente*, and the safest rule to be progressive in all enrichment by removable furniture, and conservative, very conservative, in all structural alteration." The book contains 46 full-page illustrations, chiefly process-block reproductions of photographs by Dawkes and Partridge and T. W. Phillips, whosoever the details of carvings are from drawings by Mr. H. P. Clifford.—*Machine Drawing*, by THOMAS JONES, of Manchester, and T. GILBERT JONES, of Swansea (London and Manchester: John Heywood), is intended for the use of engineering students in science and technical schools and colleges. It is being published in limp cloth quartos, Book II., Part I., now to hand, treating upon machine tools, and coloured drawings and descriptions, 25 in all, of drilling, planing, stroke slotting and stroke shaping machines, and of forms of gearing, all taken from actual work constructed at the present time by expert engineers and tool-makers in Manchester. All the drawings are fully dimensioned, and each detail is, it is claimed, an example of the best device known for accomplishing the particular purpose for which it is used. Calculations of the feeds of the driving and feed gears of the various machines are given, and in the slotting and shaping machines the varying velocities of the tool in the cutting and return strokes are shown graphically. The work promises, when completed, to be the best and most modern one of its class.—A new edition, the fifteenth, has just been issued of *Hurst's Architectural Surveyors' Handbook* (London: E. and F. N. Spon).—The author explains in the

preface that the present revision is the result of a practice extending over more than 40 years, most of which was in the service of the War Department, and embraced nearly every branch of the engineers' and surveyors' profession. Some of the formulæ given are original, and most of them have been frequently tested in practice; but Mr. Hurst warns the student that very few systematic experiments have been made to assist in forming a true theory of construction, and therefore the profession has still to rely on formulæ, mostly empirical, which will produce results shown by experiments to be at least safe to adopt. In calculating the strength of roofs, for example, undue importance is generally attached to the effects of wind on the members of a truss.—*The Future Water Supply of Birmingham* (London: Simpkin Marshall and Co.)—Mr. THOMAS BARCLAY's handbook on this subject has now reached a third edition; it is a substantial cloth-bound volume of 240 pages, descriptive of the Elan Valley water scheme now being carried out from the plans of Mr. James Mansergh, and is illustrated with a coloured map, chart, and numerous process blocks.

## OHIPS.

A railway viaduct, the most gigantic hitherto attempted in India, has been sanctioned, which will span the Gahtik gorge on the Mandalay-Kunlun line at a height of 300ft.; the width of the valley is about 2,000ft.

Sir Thomas Boughey opened on Monday a new parish hall, which has been built in connection with Nantwich Parish Church. It has been built by public subscription, at a cost of over £3,000, upon a site given by the late rector.

At St. Mary's Hall, Strensall, Yorks, on Thursday in last week, Lieut. Col. Albert C. Smith, R.E., Local Government Board inspector, held an inquiry regarding the application of the Flaxton Rural District Council to borrow £250 for the improvement of a main road in the township of Strensall.

A new Roman Catholic Church at Annbank mining village, near Ayr, was opened on Saturday by the bishop of the diocese. The church has accommodation for about 400, and cost £1,600.

Tenders have been invited for the first series of the works proposed to be carried out in connection with the Metropolitan Railway for Paris.

A disastrous fire occurred on Sunday at New Westminster, British Columbia. The damage is estimated at \$500,000. About half of it is covered by insurance. The business portion of the town has been reduced to ruins, and the residential quarter has been partly destroyed.

Sir John Jackson, the contractor who is carrying out important works for the Government at Devonport and Gibraltar Docks, is making satisfactory progress towards recovery from his recent accident. While travelling through Spain on Thursday in last week, Sir John was severely bitten about the hands by mosquitoes. To allay the pain, he wore woollen gloves saturated with a solution of alcohol. The patient happened to strike a match, and immediately his hands were enveloped in flames, which inflicted considerable injuries. The train was stopped, and Sir John was taken back to Madrid, where the doctor of the British Embassy rendered the necessary aid.

Up to the present the expenditure by the Corporation of Newport, Mon., on the new Wentwood waterworks undertaking has been £125,817 10s. 2d. The waterworks committee report that the works are progressing satisfactorily.

The Mayoress of Grimsby has formerly opened the 29 provident homes for fishermen, which have been erected in Doughty-road, Grimsby, in commemoration of her Majesty's Diamond Jubilee.

The corner-stones of a new Constitutional club at Farsley were laid on Saturday. The building, with the furnishings, will cost about £2,500. Mr. G. C. Gamble, Bradford, is the architect, and the style adopted is Norman, with a tower over the entrance. On the ground floor there will be an entrance-hall, a reading-room, and assembly-room (10yds. by 11yds.), an ante-room, and two lock-up shops. The first floor will contain a billiard-room for four tables, a smoke-room, and secretary's office. The basement will be utilised for a kitchen, two bath-rooms, heating apparatus, and a stone cellar.

The new Municipal Buildings at Oban were formally opened on Friday by Lord Strathcona and Mount Royal.

The ceremony of unveiling the fountain erected by the inhabitants of Ballater in commemoration of the Diamond Jubilee of the Queen, and of the fiftieth anniversary of her coming to reside at Balmoral, was performed by Mr. A. H. Farquharson, of Invercauld, lord of the manor.

## Building Intelligence.

APSLEY END.—A massive chimney has been erected at Messrs. Dickinson and Co.'s works at Apsley Mills. A concrete foundation was laid some twenty years ago under the superintendence of Mr. L. Stephenson; to that has recently been added another layer of concrete to the ground level, and upon that basis the structure is built. The base of the chimney to the height of 12ft. is an irregular octagon, the circular form commencing off a layer of concrete and cement blocks 9in. thick. Yellow stock bricks were used throughout, with the exception of two courses of blue bricks each 10ft., whilst the 50ft. and 100ft. altitudes are marked by four courses of blue bricks, the total height from ground level to the top of the shaft being 121ft. Galvanised iron climbing steps are built in at intervals of 12in., with two rows around the top, and an iron ladder on to the head. The diameter at the top of the shaft is 5ft. 6in. The weight of the chimney-head is upwards of 7 tons, diameter 11ft., the weight of the chimney exceeding 300 tons. A lightning conductor, in the form of a flat copper band 1in. wide, was affixed by three steeple-jacks in the employ of Mr. Gold, London. The contractor for the building of the chimney was Mr. Charles Beeston, builder, of Hemel Hempstead. The chimney was built from outside scaffolding to a height of about 70ft., and then finished from the inside. A similar chimney is now being built at Nash Mills by Mr. Beeston, who has also to build a new boiler-house at Apsley Mills, the concrete foundations for which are now being laid down under the supervision of Mr. W. Stephenson.

BEXLEY.—In the course of a few days the London County Council will open a small portion of the Heath Lunatic Asylum at Bexley, which will cost over £400,000, and will provide accommodation, when completed, for about 2,000 patients. About 200 patients will be taken in at present, and they will be accommodated in what will afterwards be the female epileptic block. The plan of the main building is designed on the continuous principle, combined with villas. The principal entrance is in the centre of the north side of the building, and this block provides committee-room, accommodation for medical officers, clerical staff, &c. In the centre building to the south of the entrance block are the steward's stores, kitchen, recreation-hall, dispensary, and rooms for principal officers. Flanking the administrative offices on each side are the blocks for nurses and attendants, and in the rear places have been reserved for those patients who are able to work, in close proximity to the laundry and workshops. Skirting the whole of the administrative blocks, in the form of a semi-circle, are the general wards, the female patients being on the west and the males on the east. The main building will accommodate 1,854 patients, and in addition there are to be one villa for 35 farm workers on the male side, two villas each for 35 women, and a special hospital villa for 50 women. A chapel, isolation hospital, mortuary &c., are also provided for in the grounds. The old mansion-house was originally intended for the medical superintendent's residence, but the plans have since been altered. The house will be adapted for another villa, and accommodation provided for the superintendent elsewhere. The asylum will be lighted throughout by electricity, and wells are being sunk for a supply of water. The asylum has been designed by Mr. G. T. Hine, F.R.I.B.A., of Westminster. The foundations were dug out by the Council's Works Department, and the building work has been intrusted to Mr. Lovatt. The Council made a grant of £350,000 for the erection of the asylum, exclusive of the cost of land and furnishing; but this sum will, in all probability, be exceeded. It is expected that the whole asylum will be completed in the month of June, 1899.

BLYTH.—New building premises for Messrs. Hodgkin, Barnett, Pearse, and Co., in Bridge-street, were opened on Monday. The building has a frontage of 44ft., and is three stories in height, being 60ft. from cornice to pavement. It has been constructed of brick, with a front of polished stone, moulded and carved. The main entrance has columns on either side, and are surmounted by a moulded cornice. The first-floor windows are ornamented by moulded architraves with mounted pediment heads; and those on the second floor by moulded architraves with



keystone heads. A moulded and carved cornice extends across the building immediately above the second-floor windows. The public offices are fitted with American walnut, French polished. The public portion of room is 25ft. long and 10ft. 6in. wide. The walls are covered with American walnut dado, 6ft. high, and above that with adamant plaster in a peacock-blue colouring. The ceiling is divided into 16 panels by rib moulds. To the left is situated the manager's private office. The clerks' department is separated from view by a walnut screen with a range of embossed glass sliding panels. The manager's apartments are on the first and second floors. The building has been erected by Mr. Henry Bower, contractor, of Blyth, and the various sub-contracts have been carried out by the following firms: Messrs. Geary, Walker, and Co., London (mosaic flooring); Messrs. Thomas Hunter and Co., Newcastle (wood blocking); Messrs. Robson and Co., Newcastle (walnut fittings); Messrs. Sanderson and Co., Blyth (plumbing); Mr. George Aynsley, Blyth (painting and decorating); and Messrs. Erskine and Sanderson, Blyth (plastering). The architects were Messrs. Armstrong and Knowles, Grainger-street, Newcastle, and the contract has been carried out under the personal supervision of Mr. W. H. Knowles, with Mr. H. J. Slipper, of Newcastle, as clerk of works.

**THE GENERAL POST OFFICE.**—The Postal Department has decided to expend £200,000 on a scheme which makes provision for dealing more efficiently with the increasing postal and telegraph work in the Metropolis, and under which better accommodation will be provided for the staff. Three new buildings will be erected at once. The east block of St. Martin's-le-Grand will be demolished with the exception of the outward walls, and within a new structure will be erected suited to modern requirements. While the work is in progress a portion of the business will be transferred to the Mount Pleasant offices in Clerkenwell, to which a new wing is being added. These parts of the scheme will cost £150,000. The Department has purchased the business premises of Messrs. Barnard and Sons, manufacturing silversmiths, Angel-street and King William-street, which will at once be demolished, and a new building erected on the site, which will provide dining and cloak-room accommodation for the staff of 3,000 telegraph clerks at St. Martin's-le-Grand. The sum of £50,000 will be spent on this undertaking. As soon as a site can be obtained, it is proposed to build a new post and telegraph office in the East Strand, where business has developed so rapidly in recent years. The present building has been taken on a short lease from the Duke of Norfolk; but the shop property (including the post-office) extending from Surrey-street to Norfolk-street will have to come down shortly, when the leases expire.

**MULGRAVE.**—New class-rooms are being erected at Mulgrave Castle, Whitby (in connection with the school), the residence of the Marquess of Normanby, Canon of Windsor. The works have been carried out by the estate workmen, under the superintendence of Mr. J. William Cocking, architect, of Huddersfield. Several new bungalows and residences have also been built at the beautiful seaside village of Sandsend, also on his lordship's estate, where leases are now being granted for terms of 99 years. Mr. J. W. Cocking has been authorised to lay out the sites by the rev. marquis.

**MANCHESTER.**—The new Municipal Technical School in Whitworth-street is approaching completion, and is now roof high. It occupies an area of 6,600 square yards, with frontages to Whitworth-street, Sackville-street, and Granby-row. The cost of the building, exclusive of equipment and land, will not fall far short of £140,000. The style is that of the French Renaissance of Francis I., and the exterior is in Accrington brick and terracotta. The principal entrance, built around with grey Dalbeattie granite and terracotta, is flanked by work after designs by Mr. Walter Crane "of the union of science, art, and industry." The building with its equipment will probably be completed within another two years, or in five years from the date of beginning. The basement will be used for workshops and laboratories of various kinds. The museum will be on the ground floor. The administrative offices, laboratories for physics, lecture-rooms, and textile workshops will also find room on this floor. The space on the

remaining three floors has been allotted to various departments, and provision is made for an astronomical and meteorological observatory at the extreme north-east corner of the building.

#### CHIPS.

At the last meeting of the City Council of Manchester, the resignation was received of Mr. Gibbons, chief architect in the city surveyor's department, and for 22 years past a member of the staff.

The Liverpool School Board have instituted a limited competition of local architects for new schools to be built in Lawrence-road and Bowler-street. Ten firms of architects have been invited, five for each group of buildings, and the clerk to the school board will act as adjudicator on the designs submitted.

On Saturday afternoon, new waterworks for the supply of Dyce, Bucksburn, Bankhead, and Stoneywood were formally opened by the members of the Aberdeen District Committee. The source of the supply is a spring near Parkhill House, and other two springs have been acquired with a view to future requirements. A supply of 20 gallons per day is now proposed to every one of the five thousand inhabitants.

The Great Central Company, whose London terminus in Marylebone-road approaches completion, find that additional space is needed for the purpose of their goods traffic, now in partial operation. Hence in the next session of Parliament they purpose seeking power to acquire, in order to extend their accommodation, property including 417 houses of a total rateable value of £8,728.

A Local Government Board inquiry is to be held at Scarborough on Monday, September 26th, with respect to the application of the corporation for permission to borrow £33,575 for the purchase of the St. Nicholas House estate, which place it is intended to lay out as a park, the house being used a town-hall.

At the parish church, Falmouth, the organ was reopened on the 7th inst., after having been rebuilt and enlarged by Messrs. Hele and Co., of Plymouth. Eighteen years ago the instrument was built by the same firm.

The Limerick City Council have appointed Mr. J. H. Teague as waterworks engineer, in succession to his late father, at a salary of £250 a year.

At the last meeting of Bristol Sanitary Committee on Monday, the new scheme for the drainage of Bristol was considered, prepared by Mr. W. Santo Crimp, of the firm of Messrs. Taylor and Santo Crimp, of Westminster. The estimated cost of the outfall works at Avonmouth and Dumball, recommended in the report, is £379,700.

The building of the north quay wall at Ayr has just been completed by the contractors, Messrs. Kennedy and Co., for the harbour trustees.

Mr. H. Mence, of St. Alban's, has been elected surveyor to the rural district council of St. Alban's, from among six candidates.

The quinquennial festival of the Royal Albert Asylum, Lancaster, will be held at the asylum on Wednesday, September 28. The Earl of Darby will lay the foundation-stone of the extension for 100 additional young imbecile inmates who may be epileptic, crippled, or feeble; and the Countess of Bective will open the Storey Home for forty feeble-minded girls, which has been erected by Sir Thomas Storey.

The plans and works committee of the Edinburgh Town Council, have opened tenders for the Portobello public baths, and it has transpired that the cost will be at least £30,000.

The Local Government Board has sanctioned the borrowing by the corporation of Haywood of £8,000 for gasworks purposes. Of this amount £1,500 is required for land, £2,000 for prospective new mains, £3,000 for stoves and prepayment meters, £500 for a coke-breaking machine, and £900 is being spent in new buildings for stores, &c.

At Devonport, on Friday, Alderman James formally handed over to the mayor and corporation, on behalf of the townspeople, his gift of a clock and chimes, which has been placed in the tower of the new technical schools. The foundation-stone of the building was laid on Jubilee Day last year, and although operations will not be completed until December, some of the classrooms will be ready for occupation this month, when the new session commences. Mr. H. J. Snell, of Plymouth, is the architect, Mr. T. May the contractor, and Mr. J. S. Warren the clerk of works.

The first International Congress on Public Art will meet at Brussels from Saturday the 24th till Wednesday the 28th. The programme will have three divisions: Public Art, from the standpoint of law and regulations, from the social standpoint, and from the technical standpoint.

#### PROFESSIONAL AND TRADE SOCIETIES.

**AUCTIONEERS' INSTITUTE.**—The annual provincial meeting of the Auctioneers' Institute of the United Kingdom was held at Brighton on Thursday and Friday in last week, under the presidency of Mr. Edward Dobson, of Bradford. The Mayor, Sir John Blaker, in welcoming the members at the Royal Pavilion, said the institute was at once a benefit to the profession and to the public. It was most desirable, in view of the great interests involved, that an auctioneer should have some reasonable qualification in law for the position he occupied, since it was a serious public danger for a man who had failed in some other walk in life to open a showy office and blossom out suddenly as auctioneer and valuer. The secretary reported the institute membership 936. The financial statement showed a balance of £500, and 50 new members were elected. The members visited, on Friday, some of the works of the Brighton Corporation. They first viewed the lower suite of rooms of the pavilion, and then proceeded to the corporation electricity generating station, where they were received by the manager, Mr. Bright, and inspected the generating plant. The party next visited the municipal technical schools, and were conducted over the building by the principal, Dr. Draper. Luncheon was served at the Hôtel Métropole, and the party was afterwards conveyed to Goldstone for an inspection of the corporation waterworks, where the nature of the water supply was explained by the manager, Mr. Johnston. A visit was also paid to the aquarium. In the evening there was a reception and banquet at the pavilion. Mr. E. Dobson (President) occupied the chair, and acknowledged the toast of the evening, which was proposed by the Mayor of Brighton.

**BRICKMASTERS' EMPLOYERS' LIABILITY ASSOCIATION, LIMITED.**—The first and statutory meeting of this association was held at Cannon-street Hotel on August 30. Mr. G. E. Wragge, of Messrs. Eastwood and Co., Ltd., in the chair. The report of the directors was read as follows, stating the association had been duly registered as a company, limited by guarantee, and was now fairly established. All the principal stock-brick makers in Kent, Essex, and Middlesex had become members, and other classes had been opened for insurance against risks in flint-getting, barge building, machine and red brick-making, as well as a class for lime, cement, and brick merchants, at rates calculated to cover their risks. The amount of wages upon which insurance had been effected with the association was now £336,000, and was being increased week by week. A draft of special rules, or by-laws, for observance by members had been framed, and was now engaging the attention of the board. When approved, copies would be forwarded to members. Members were requested to give immediate notice to the secretary in the event of an accident occurring to any of their workpeople. A call had been made to meet the expenses of establishment and to provide a balance in hand. In accordance with the articles, the directors retired, but they offered themselves for re-election. It was resolved that the report be received and adopted. It was further resolved that Messrs. Robert L. Curtis, Charles Cremer, George H. Dean, Edward William Goodenough, Alfred J. Knight, Henry Packham, Algernon Rutter, John Willson, and George Edward Wragge be re-elected directors of the association. Messrs. D. Wills, J. R. Featherby, and Rosher were nominated as the audit committee.

**DEVON AND EXETER ARCHITECTURAL SOCIETY.**—Some of the members of this society made an excursion to Launceston on Saturday, where they were entertained by the ex-president, Mr. James Hine, of Plymouth (who is also the ex-president of the Devonshire Association). After luncheon at the White Hart Hotel the ruins of the Priory were inspected under the guidance of Mr. Otto B. Peter, by whose directions excavations were made in 1893, when the foundations of the old buildings were uncovered; they included, when complete, a church about 260ft. in length. The priory was of the Austin Canons, founded in 1170 by Bishop Robert Warelwast. A fine Norman doorway now forms an entrance to the White Hart Hotel. The parish church of St. Mary Magdalen, erected in 1524-40, was visited. Built of granite, it is characteristic of the period when artistic construction had given place to surface decoration, its outer walls being almost covered with carved panels, and it is a great



contrast to the exceeding plainness of many of the country churches. The old Castle also received attention. Situated on a high mound, its ruins are very prominent, and the walls of immense thickness. Its history is also interesting, being recorded in Domesday Book. In 1645 it was held for Charles I. by Sir Richard Grenville, and some eleven years later George Fox, the founder of the Quakers, was imprisoned here for what would now be termed tract distributing.

### CHIPS.

The Roman Catholic Church of St. Cuthbert, at Wighton, built 1835-47, from designs by Bonosi, was reopened last week by the Bishop of Galloway, after undergoing restoration.

The partnership hitherto subsisting between T. Ambler and G. F. Bowman, architects and surveyors, Leeds, under the style of Amble and Bowman, has been dissolved.

The Greek Government has prepared a Bill for the establishment of an "Antiquities-Gendarmerie." The special function of this new police will be the guardianship of the national Greek antiquities in the interest of the Greek people, including places where no excavations are at present in progress. Every man admitted to this corps is to possess a certain degree of necessary culture, in order that he may understand what is confided to his observation and protection.

The Northampton Town Council held a special meeting last week, at which the Public Library and Museum Committees reported that Sir Henry Dryden, Bart., had written offering his great and valuable collection of drawings, papers, views, &c., to the borough. The committee reported that they now gratefully accepted Sir Henry Dryden's kind offer, and pledged themselves to provide such accommodation as would meet the requirements laid down in Sir Henry's letter. The town council confirmed the action of the committee, and congratulations were offered on the fact that the borough is to become the permanent repository of such a priceless collection.

Two new hotels are about to be built at Southwold. One, to be called the Marlborough, will be built on the North Cliff, and will contain 32 bedrooms; Mr. Pells, of Beccles, is the architect, and the cost is £7,000, without furniture. The second hotel will be situated near the railway station, and will cost about £2,000; Mr. T. Key is the architect for this, and also for a south wing to be added to the Cliff Hotel in the same town.

Mr. W. Loveday, for many years district surveyor under the Mile End Old Town Vestry, has been elected surveyor and inspector of nuisances to the urban district council of South Hornsey, in succession to Mr. W. Jameson, who has obtained a similar appointment at Whitechapel. There were 74 candidates for the vacant post at South Hornsey.

Professor W. H. Corfield has, we regret to learn, sustained a fracture of one of the metacarpal bones of the left hand by a blow from a golf ball.

On Friday, Mr. E. A. Sandford Fawcett, A.M.I.C.E., held an inquiry at Leiston, East Suffolk, on behalf of the Local Government Board, at the Works Hall committee-room, Leiston, with regard to a complaint made to the board that the urban district council of Leiston-cum-Sizewell had made default in providing their district with sufficient sewers and with a supply of water.

The East London Water Company has begun to make a connection with the Grand Junction. It will be necessary to lay a main  $1\frac{1}{2}$  miles in length and 24in. in diameter, and this work will take at least two months. It has not been announced when the proposed connection with the Kent Company and with the Southwark and Vauxhall Company through the Blackwall tunnel and the Tower subway will be made.

The Holborn Board of Guardians have decided to spend an estimated sum of £4,000 in new drainage, baths, and lavatories at the Highgate Infirmary.

Additions are about to be made to the workhouse at Lichfield, including tramps' wards. Mr. Woodroffe is the architect, and the estimated outlay is about £7,000.

The Truro Rural District Council have agreed to ask the Local Government Board to sanction the borrowing of £5,000 for the purpose of carrying out a scheme for supplying St. Agnes with water.

Mr. Charles Parsons, architect and surveyor, of Burnley, died last week, aged 37 years. For the past eight years he had been a valued member of the Burnley Corporation, and was at the time of his death chairman of the gas committee.

Mr. F. H. Tulloch, M.Inst.C.E., conducted an inquiry, on the 8th inst., into the application of the Burley-in-Wharfedale Urban District Council for sanction to borrow £200 for works of water supply, and £150 for gasworks purposes.

### COMPETITIONS.

GLASGOW INTERNATIONAL EXHIBITION.—A meeting of the Buildings Committee of the Glasgow International Exhibition, 1901, was held on Monday in the Fine Art Institute, Sauchiehall-street, Glasgow, for the purpose of considering the sub-committee's report on the competitive designs. The recommendations were:—(1) £250, "Winter Palace," by Mr. James Miller, 223, West George-street; (2) £150, "Ablins," by Mr. A. M. Paterson, 136, Wellington-street; and (3) "Fin de Siècle," by Mr. John A. Campbell, 44, West George-street. The three premiated designs become the property of the Executive Council of the exhibition, and the successful architect is to be paid a commission of 3 per cent. on the cost of the buildings, including the premium. The committee unanimously approved of the sub-committee's recommendations, and the designs, which are hung in the Fine Art Galleries, will be opened to the public to-day (Friday). The buildings will be erected in Kelvingrove Park, which is also the site of the Art Galleries to be opened the same year. The style chosen by Mr. Miller in his accepted design is Spanish Renaissance, which harmonises well with the galleries, besides lending itself to the brightness and gaiety of colour essential to an exhibition building. One striking departure made by the architect is that he has entirely dispensed with the system of courts which has been adopted in most exhibitions in Great Britain. Instead of the building being cut up into numerous apartments, the whole structure practically forms a large open space, in the centre of which runs the grand avenue 700ft. long by 60ft. wide, having an arched roof 60ft. high. This avenue is not in any way separated from the side wings, thus forming an unbroken area and allowing the exhibits to be arranged in any way desired. The leading feature in Mr. Miller's design is the great dome with four towers rising to a height of about 180ft. above the level of the park. Surrounding the dome is a high balcony 400ft. in circumference and 25ft. wide. This is designed to form a promenade at a height of 80ft. from the ground. In three of the great towers there are spacious staircases leading to this balcony, and in the fourth tower there will be a passenger lift capable of raising 50 persons at a time. The main entrance will face the University, and here a colonnade 200ft. long will stretch across the centre of the main façade, forming a piazza 200ft. long by about 80ft. wide. A prominent point in the design is the suggested retention of the central portion of the main building as a permanent winter palace, to accommodate 10,000 people. The Grand Hall, which is designed in the Venetian style, forms a huge amphitheatre, having a diameter of 143ft., and a domed roof rising in the centre to a height of 80ft. Promenades about 400ft. long are provided both on the ground floor and at the gallery. The platform is 50ft. wide by 40ft. deep. There are six staircases leading to the gallery, and a similar number of exits to the ground floor. The entire building could be cleared in a few minutes. The entire structure will be of steel, thus rendering the building practically fireproof. Externally the buildings will be faced with stucco, which will be a finished smooth service and painted white, the balustradings, windows, and other ornamental portions being painted a soft green, and the roof red. The machinery section is apart from the main building, and covers an area of five acres.

HARROGATE.—The question of the inadequate accommodation now afforded at the old sulphur well has frequently been discussed by the town council, and at their meeting on Monday that body passed without comment the following recommendation by the wells and baths committee:—"That advertisements be inserted inviting competitive designs for a new Royal Pump Room, and that £50, £30, and £20 be offered for first, second, and third prizes; also that competitive designs be invited for alterations to the present building to increase the accommodation, and £30, £20, and £10 be offered as prizes."

HEARST UNIVERSITY, CALIFORNIA.—The international committee charged with the examination of the designs sent in for the Phoebe A. Hearst Architectural Plan for the University of California has sent out from Antwerp, in three languages, the announcement that a decision must not be expected until October. The drawings are being hung at Antwerp in one of the fireproof warehouses belonging to the city.

In addition to the security thus afforded, the drawings are also covered by insurance.

PLYMOUTH.—The competitive designs for the Old Town-street and Tavistock-road improvement, for which a premium of £250 is offered by the corporation, have to be delivered to the borough surveyor by Saturday in next week, the 24th inst. Owing to the differences which arose with respect to some of the conditions imposed by the town authorities, it is understood that none of the local architects will be represented in the competition.

At Burslem, the Wedgwood Institute and the school board have jointly appointed Mr. Thorogood as art director at an annual salary of £250.

The St. Pancras Vestry has voted £1,000 towards the cost of acquiring the Golder's Hill Estate, which it is proposed to add to Hampstead Heath for the public use.

A company is being floated to carry out an important project at Rhosllaneirug, which is situated midway between Ruabon and Wrexham, and has a population of about 12,000 people. The proposal will include the erection of a large tower, similar to that at New Brighton and other places, a marine lake, together with public baths, &c. The site selected is a spacious piece of land called the "Wern," from which an excellent view can be obtained of the country for miles round.

At the 68th half-yearly meeting of the Surrey Commercial Dock Company the chairman reported that progress was being made with the remainder of the dock extension works, for which the company entered into a contract with Messrs. S. Pearson and Co. (Limited) in the early part of the year, and which were being carried out under the supervision and control of Sir J. Wolfe Barry. He congratulated the shareholders on the fact that there were now nearly 900,000 pieces more of timber in the dock than at this time last year.

An item of half a million marks will be included in the next German Budget for the restoration of the Electoral Palace at Mayence.

At a meeting of the Deadlake Joint Committee of the Plymouth Devonport, and Stonehouse Councils, it has been decided to ask for the sanction of the Local Government Board to borrow some £19,000 in order to proceed with the scheme, and this sum covers all the further expense contemplated, including £3,228 8s. 8d. required for the extension of the culverts, for which Mr. C. L. Duke's tender was accepted. Some £7,000 has already been spent in the purchase and filling-up of the site, and the total cost will therefore reach about £26,000. It was decided to drop the unsavoury name of Deadlake and adopt that of Victoria Park.

Mr. Geo. Horsfall, contractor, Heckmondwike, died on Monday, after a brief illness. Amongst other contracts undertaken by his firm was the Heckmondwike higher board school, which was formally opened the previous week.

Mr. W. Wiltshire, senior partner in the firm of Wiltshire and Son, builders, of Sevenoaks, died last week while on a visit to Llandudno. Mr. Wiltshire, who was 71 years of age, had built the Baptist Chapel, Constitutional Club, St. John's Road Schools, Walthamstow Hall, and many other buildings in Sevenoaks.

Lothian-road United Presbyterian Church, Edinburgh, which for some time past has been in the hands of the decorators, was reopened for worship on Sunday. The construction of the building admitted but a comparatively simple scheme of decoration, and this has been carried out by Messrs. Dobe and Son, George-street, Edinburgh, at a cost of £630.

Foundation-stones of the new schools, and additions to Forder Wesleyan Chapel, Saltash, Cornwall, were laid on the 8th inst. by several members of the congregation. The chapel is to be enlarged, reseated, and renovated, and Sunday-schools attached. Mr. Edgar M. Leest, of Saltash and Devonport, is the architect, and Messrs. Taylor and Muten, of Saltash, are the contractors for the work, the estimated cost of which is £1,312.

The long-expected sanction of the Local Government Board to the proposed loan of £36,000 for the erection of the new town-hall at Colchester has now been granted, with the exception of £1,424, the estimated cost of the portion of the new structure to be used as a police-station. The mayor, Alderman J. N. Paxman, will lay the stone of the new building on the day of the annual oyster feast in October. The architect is Mr. John Belcher, F.R.I.B.A., of London, whose design was selected in competition. The Mayor has promised to bear the cost, £2,000, of the tower and its chimneys. Sir Weetman Pearson, M.P. for the borough, will give an organ for the assembly-room, and other gifts of stained glass windows, paintings, and statuary have been made by leading tradesmen.



## Correspondence.

### ADVERTISING ARCHITECTS.

To the Editor of the BUILDING NEWS.

SIR,—I am inclosing you a leaf taken from the Birmingham Local Time Table :—

ARCHITECT, SURVEYOR, and ESTATE AGENT,  
Birmingham.  
Plans Prepared at Moderate Charges.  
Field Boards Erected Free. Rents Collected.

Does this kind of thing often happen?—I am, &c.,  
FRED SWAINE, C.E.  
Curragh Camp, Co. Kildare., Sept. 8.

[There is no legal restriction against architects advertising, of course; but it is very unusual, and, at any rate, among Members of the Royal Institute of British Architects, is not allowable. In America and Australasia some architects advertise; but men of reputation there avoid such methods.—ED. "B.N."]

### RIDGE TILES ON SLATE ROOFS.

SIR,—I should be glad if you will allow me to correct an error in your letterpress of Sept. 2, wherein you attributed to me the heinous offence of using red ridge tiles on green slate and stone slate roofs. This is not one of my sins, and I am glad of the opportunity of saying how much it offends me when I come across it, as, alas! I too often do. My ridges and hips on slate roofs are always lead.—I am, &c.,  
C. J. A. VOYSEY.  
6, Carlton Hill, N.W., Sept. 13.

A new high altar of Seaton stone, Devon marble, and alabaster has recently been completed at the R.C. church of the Sacred Heart at Minehead. The altar is of Gothic design, carved out of white Seaton stone into pinnacles and crochets, and niches containing adoring angels. The frontal of the altar is occupied by a stone *alto-relievo* of Da Vinci's "Last Supper." The tabernacle is of alabaster, and the door of beaten brass studded with carbuncles.

On Thursday in last week, Mr. E. A. Sanford Fawcett, A.M.I.C.E., one of the inspectors of the Local Government Board, attended at the town-hall, Ipswich, to hold an inquiry into an application by the town council for sanction to borrow £4,400 for the erection of a new central fire-station in Bond-street, St. Helens, £4,000 for storm-water overflow and other works of sewerage, £3,070 for works of street improvement in Foundry-lane and Friar's-street and wood pavement renewal, £600 for market pig-pens, and £450 for purposes of new lodge, public walks, and pleasure grounds at Christ Church Park. Mr. W. Bantoft, town clerk, and Mr. E. Buckham, borough surveyor, explained the proposals. It was stated that the fire brigade station was in progress, the tender of Messrs. T. Parkinson and Son, of Ipswich, having been accepted for the work at £3,850.

A meeting of the Colwyn Bay Pier and Pavilion Company was held on Friday, when Messrs. Mangnall and Littlewood, architects, Manchester, submitted plans of the pavilion and the first section of the pier. The secretary reported that the order had passed through the Parliamentary stages. He was instructed to send plans to the Board of Trade, and also the next meeting of the Colwyn Bay Urban District Council for approval, and to prepare a prospectus to be issued forthwith. It is intended to open the pavilion next Whitsuntide.

The Pozzi memorial pulpit at St. John's Roman Catholic Church, Rochdale, was blessed by the Bishop of Salford last week. It was designed by the late Mr. James Sinnott (who was accidentally drowned at Eastbourne last month), of the firm of Sinnott, Sinnott, and Powell, of Liverpool and Manchester, and was made in Italy by J. Alberti, of Manchester and Carrara. The pulpit, which is of marble, is octagonal in shape, with a green marble base and dove sub-base. The body is of Breccia and Carrara marble, with green shafts and white capitals and bases, white steps, and two handrails of Breccia marble. In the centre is a carved panel symbolical of the Holy Ghost; on the left side is a panel with tiara and keys; and on the panel to the right is an inscription.

The new academy at Elmbank, Kilmarnock, was practically opened on Monday, although building operations are far from finished. The new school has a frontage of 108ft., and the total height to the top of the observatory tower is 86ft. The ground and second floors have accommodation for 863 pupils, and on the third floor are classrooms for cooking, chemical laboratory, &c. There are 22 classrooms, and among the accessories are a workshop, gymnasium, and swimming-baths.

## Intercommunication.

### QUESTIONS.

[12044.]—**Book-keeping Under Contracts.**—Is it usual in contracts to insert a clause to the effect that the contractor is to provide and keep proper books in which the names of workmen, wages, and hours of labour are put down? That he is to produce the said books when called upon to do so? Do not think many contractors would submit to a condition of this sort.—A. B.

[12045.]—**Glass for Skylights.**—I want to specify a strong, semi-transparent glass suitable for the skylight of a large room, that will be strong while allowing the light to pass through, and shall be pleased if any reader will inform me of the best for such a purpose?—TOP LIGHT.

[12048.]—**Shutters.**—I shall be obliged to any of your readers if they will inform me if there are any advantages in using ordinary lifting or movable shutters for shops. They appear cumbersome and awkward compared with the revolving iron shutters. Are they considered safer? Any experience as to the use of both kinds and the mode of fixing will be esteemed by—A. J.

[12047.]—**Church Seats.**—Thanks to "H. L." for his answer. One more question: Should the back be made to slope? I see in many new churches they do, and no doubt a sloped back is more comfortable. I think a flat book-rest better than the old-fashioned sloped ledge, and is this best placed about level with seat?—A. J. T.

[12048.]—**Intercepting Manhole.**—I want to build a small manhole in the backyard of house, where the drains pass through. Is there any improved and moderately-priced trap?—BUILDER.

### REPLIES.

[12029.]—**Green Stains on White-Faced Bricks.**—Clean down thoroughly with scrubbing-brush and water, mixed with 8oz of spirits of salt to 1gal. of water.—REGENT'S PARK.

[12031.]—**Concrete Building.**—I expect you will find the two octavo (small) volumes on "Concrete and Its Uses in Building," by Thomas Potter, to be had at the Hampshire Observer Co., Limited, Winchester, 1891, as handy volumes as any, 470 pages.—REGENT'S PARK.

[12033.]—**Green Colour of Copper Roofing.**—I thank Mr. Busbridge for his reply; but it does not explain why the top 10ft. of the copper lightning-conductor band of a high steam furnace chimney, where the band is subject to most smoke and soot, is of a beautiful green, and the remaining 90ft. below the top, where the chimney smoke does not reach, is quite black and sooty. The whole length of band from top to bottom was fixed at one time. The phenomenon may be observed on any high chimney where a flat copper band is used as a conductor.—W. R.

[12035.]—**Measuring Heights and Distances.**—In "Austrie on Land Surveying," of some 250 pages, and W. Galbraith's "Additions on Trigonometrical Surveying, Levelling, &c.," published by Wm. Blackwood and Sons, 1842, you will get a mass of best information on the subject, such as application to determination of heights of level and distance by reciprocal observations independent of triangulation, description and use of instruments, of angles, &c. In Stanley's "Surveying," Great Turnstile, W.C., speaking of sextants, alludes to box-sextants (Jones), takes angles within 130° on surface of land to within a single minute of arc; illustration given and parts described. With supplementary are it takes angles up to 220°, and illustration and description of parts given and theory. Then Franklin's improvement up to 240°, &c.; over 500 pages in book altogether.—REVENT'S PARK.

[12036.]—**Swimming-Baths.**—There are some baths belonging to the parish of Deptford, situated in the New Cross-road, which are well designed and planned, and would be an excellent example for T. Shonedy to inspect.—LOUIS ERWOLD.

[12036.]—**Swimming-Baths.**—Three of the best baths recently erected are Coronet-street, Shoreditch (Messrs. Spalding and Cross); Kennington-road, S.E.; and Essex-road, N., Islington (both by Mr. A. H. Tiltman).—H. LOVEGROVE.

[12 37.]—**Ribbed Ceilings.**—These can be made in fibrous plaster, and fixed by screwing to the joists.—L. E.

[12037.]—**Ribbed Ceilings.**—Ribs on ceilings can be formed in certain sorts of plaster. Fibrous plaster is cast or moulded in slabs, and can be fixed on ordinary plaster ceilings. Apply to George Jackson and Sons, Rathbone-place. Wood ribs or mouldings can be used; these are generally fixed to the joists.—G. H. G.

[12037.]—**Ribbed Ceilings.**—If "Restaurateur" would apply to some of the fibrous-plaster firms advertised in BUILDING NEWS "Directory," they would answer his inquiry.—PLASTER.

[12038.]—**Wood Blocks.**—A preparation of the chalk would not do. You had better get Lowe's system of wood-block flooring laid down, or some equally good system. You will find this more satisfactory than fixing wood blocks yourself.—PRACTICAL.

[12038.]—**Wood Blocks.**—These are generally laid with "mastic," that being Stockholm tar prepared in some way. Pitch-pine blocks would not be so liable to splinter as teak blocks.—L. E.

[12039.]—**Lead Glazing.**—The bars of lead called "cames" are cut to fit the patterns; the glass is laid in, and the joints are soldered together.—L. E.

[12040.]—**Seasoning of Wood.**—I have not seen any "microscopical" investigations into the seasoning of woods; but would very much like to know if there have been any carried out. I tried to find out microscopically how to prevent excessive shrinkage in wood, as I wished to preserve several horizontal sections of English-grown woods entire. I have not up to the present succeeded in stopping cracks or shakes in whole timbers,

even of small diameter and length, except by halving or quartering.—LOUIS ERWOLD.

[12043.]—**Bending Wood.**—The wood can be bent by steaming or other methods. Newland's "Carpenter's and Joiner's Assistant" gives approved methods. Consult this, if possible, as to describe all the process would take up too much space.—L. E.

### CHIPS.

A new board-room is about to be built at Chester-le-Street, for the board of guardians. Messrs. Cowe are the architects, and the estimated cost is £2,000.

This week a start has been made with the construction of the Paisley and Barrhead Railway, authorised by Parliament fully a year ago. Mr. John Watt, Glasgow, has taken the contract for the line from Paisley St. James to Glenfield.

Mr. James Tate, of Pickering, for many years district surveyor to the local highway board, and more recently and until his death holding the same position under the Pickering Rural District Council, died suddenly on Friday, aged 72 years.

On Tuesday in last week, Mr. Charles P. Cotton, C.E., Chief Engineering Inspector of the Local Government Board, held an inquiry in the board-room of Coleraine Workhouse concerning the application of the Coleraine Rural Sanitary Authority for a supplemental loan of £1,600 for Portewart and sewerage works. Mr. W. J. Given, C.E., the engineer of the works, explained the plans.

A contract for effecting the alterations at Hever Castle, Kent, on behalf of Captain Seabright, who has taken it upon a long lease, has been taken by Mr. Charles Day, of Cowden, who has already commenced operations, the contract being for something like £4,000.

Lieut.-Colonel Albert C. Smith, R.E., an inspector from the Local Government Board, held an inquiry at the town-hall, Selby, on Friday, in relation to the application of the Selby Urban District Council for sanction to borrow £8,400 for gasworks extensions. Mr. W. J. Mott, engineer and gas manager, explained the plans, and stated that the new gas-holder would have a capacity of 196,000c.ft.

The city council of Durham resolved at their last meeting to take initial steps towards improving the banks of the River Wear. They agreed to invite tenders for carrying out the small portion of the work between Framwellgate Bridge and the site of the proposed shire school, in accordance with plans prepared by Mr. Jones, C.E.

About eighteen months ago the sawmill works in Arbroath belonging to Mr. Charles Brown were destroyed by fire. A company has now been registered under the name of Charles Brown and Company (Limited), with a capital of £50,000, for carrying on the sawmill and timber trade in the town on a large scale. Extensive works are being erected on a spacious site between Lady Loan and the sea adjoining the west side of the harbour, Mr. James Scott being the architect. A siding from the harbour branch of the railway has been introduced into the company's yards.

At the meeting of the Tamworth Rural District Council, on Saturday, a letter was read from the Local Government Board sanctioning the proposed scheme of water supply for Kingsbury parish. The council instructed their surveyor, Mr. H. J. Clarson, to proceed with the work at once. The scheme, which will involve an expenditure of about £4,000, is greatly needed to supply the wants of the mining districts in that parish.

Dr. G. Seaton Buchanan, one of the Local Government Board inspectors, held an inquiry at the Guildhall, Canterbury, last week, into the application of the town council to borrow an additional £3,000 for the Infectious Diseases Hospital.

Mr. John Preston, builder, of South Brent, returned home on Friday evening and went to his workshop, where he had left a bottle of cider. Another bottle, very similar, contained spirits of salts, which he took in mistake. He succumbed to the effects of poison on Saturday evening. Deceased was about 60 years of age, and leaves a wife and grown up family.

The foundation-stones of a new Baptist chapel, to be erected by the members of Yates-street Chapel, which has now become inadequate, were laid on Monday in St. Thomas-street, Aston Manor. The new structure will be built of red brick, with stone dressings. The chapel measures 65ft. by 40ft., and will accommodate 400 persons. The building will be heated on the low-pressure hot-water system.

On Monday morning workmen commenced the destruction of an historical block, opposite Lambeth Palace, known for many years as Bunyan's-place, and in old times as the Archbishop of Canterbury's Court, for the purpose of improving the southern approach to Lambeth Bridge, which before long will be rebuilt by the London County Council.



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POLICE STATION, STOKE-ON-TRENT.—DESIGN FOR TOWN HALL, HEATON CHAPEL.—DESIGN FOR FIRE SCREEN.—	
DESIGN FOR TOWN HALL, TAUNTON.—INFANT SCHOOL, MILE THORN, HALIFAX.	

## Our Illustrations.

## SANTA SOPHIA, CONSTANTINOPLE.

THIS capital drawing of this, the greatest of Christian temples, was made by Mr. A. E. Henderson when he held the Owen Jones Travelling Studentship for 1897. Small sections and comparatively poor woodcut or photographic views of Santa Sophia may be found in the various Histories of Architecture available in the ordinary way to the English student; but no such illustration as that which we are to-day enabled to publish has been hitherto given of it in any architectural journal, and Mr. Henderson is to be commended for making so careful a study of such a big subject. The church of Santa Sophia is almost as familiar, and yet very different from, our own cathedrals. It remains the greatest glory of the panoptical treatment, with its vast dome, lighted by forty small windows, which seems "suspended as by a chain from heaven." This cupola, measured on the diagonal, is 150ft. in diameter, and the fenestration just referred to occurs immediately above the cornice crowning its pendentives, which, by dividing the lower part into narrow piers, increases the feeling of its being supported by its own buoyancy. The semi-domes and minor domes, rising in succession one above the other towards the floating hemisphere in the centre, combine to produce not only the noblest conception of its kind extant, but the most daring design which, up to that time at any rate, had been constructed. Clothed in the richest materials of mosaic and incrustated with marbles of varied colour, its vaultings are resplendent with gold and figure work so magnificently ornate that it would seem to more than justify its imperial founder's exultation as expressed in his famous exclamation: "Glory be to God, who hath thought me worthy to accomplish so great a work; I have vanquished thee, O Solomon!" St. Sophia is the *facile princeps* of the pendentive domical principle. It was built by the order of Justinian A.D. 532-537. Anthemius of Tralles and Isidorus of Miletus were the architects of the building. The exteriors of the domes are visible from the outside, and as seen in the accompanying view, no wooden roofs are employed, the concrete vaulting being incased with polished metal. The Mohammedan minarets are, of course, additions, and, while they add to picturesque outline of the great group, they are out of accord with the general design of this the masterpiece of Christian basilicae.

## ST. LUKE'S, ENFIELD.

THE church of St. Luke's, Enfield, consists of nave, south chancel, with Lady-chapel on the north and a chapel on the south side, from which

the vestries are reached. The organ-chamber is under the choir vestry. The church is situated about one mile from Enfield station, and is in a prominent position, being on the top of a winding hill called Clay Hill. The church will be built of red brick, with Bath stone dressings. The foundation-stone will be laid on St. Luke's day. The present drawing was exhibited in the Royal Academy of this year. The architects are Messrs. James Books and Son, Wellington-street, Strand. The church accommodates 795.

## FOUNTAINS ABBEY.

THIS sheet of illustrations was reproduced from some measured drawings by Mr. E. Woodhouse of Fountains Abbey, and represent part of the Early English extension of that famous church. The Norman portion illustrated forms the entrance to the chapter-house, which was entered from the cloister. The church originally consisted of presbytery and nave, with transepts and side aisles. The additions were a new presbytery and a chapel to the east called the "Nine Altars." A large Perpendicular window and an upper gallery were added towards the close of the 15th century, when the tower also was rebuilt. The walls and detail are still in a good state of preservation, and have decayed very little since the abbey was suppressed.

## NEW POLICE STATION, STOKE-ON-TRENT.

THIS is a new police-station recently erected at Stoke-on-Trent, for the Staffordshire Standing Joint Committee. The design was selected in a limited competition. The building is constructed of brickwork with Hollington stone dressings, and Staffordshire pressed tiles on the roofs. The various rooms, cells, and passages are lined with glazed bricks, and the floors are mainly concreted and covered with wood blocks. The police-station comprises a charge-room, tramp-office, superintendent's office with day-room, kitchen, &c., and six cells; and on the upper floor are provided the men's dormitories, bath-room, &c. Adjoining the station is the superintendent's house, in which good accommodation is provided, and a police drill-yard in the rear. The contract was £5,134. The builder is Mr. Chas. Cope, of Tunstall. Mr. Dixon has acted as clerk of works, the architects being Messrs. Wood and Hutchings, of Tunstall and Burslem.

## HEATON CHAPEL TOWN HALL.

THIS design, by Messrs. T. W. Hooley and F. W. Mee, of Manchester, was submitted in a recent limited competition, and aims at an endeavour to produce a suitable building picturesquely treated in a simple way at a comparatively small cost, as the outlay was limited to £4,000.

## NATIONAL GOLD MEDAL DESIGN FOR A FIRE SCREEN.

THIS fire-screen is an attempt at an effective combination of a number of different materials. The structural woodwork is of plain oiled oak, inclosing three panels—the centre one of copper, with a quaint legend from Chaucer in repoussé at the base, the two outer ones of bass wood stained dark green, with ornaments in plain polished gesso and gold. The two shaped folding leaves revolving on wrought-iron rods are of copper, each with a quaintly-placed repoussé boss. The handle is of wrought iron, covered—for greater comfort in lifting the screen, which will be rather heavy—in leather, secured by five copper rivets driven right through. The design is by Mr. George Montague Ellwood, to whom a National Gold Medal was awarded at South Kensington.

## PROPOSED TOWN HALL, TAUNTON.

(For description and plans, see p. 385.)

## INFANTS' SCHOOL AT MILE THORN, HALIFAX.

THIS design was placed first in a recent competition, and are now being submitted to the Education Department. Additional accommodation being required in the adjoining Queen's-road School, the infants will be transferred to the new one, and the space utilised for the senior scholars. The following are some advantages claimed for the accompanying plans:—(1) By placing the buildings in the position shown upon block plan, isolation is obtained from existing buildings and any which may hereafter be erected by utilising the intended and existing streets, and at the same time developing the land available for disposal. (2) Extensions for 100 more infants,

and a first and second standard school can be made without any structural alterations or pulling down of first portion. (3) Entrances are provided from both Crabtree-street on the west, and Arundel-street on the east, so that elder children attending Queen's-road School will be able to accompany the younger ones to school. (4) Easy and ample exits from every portion of school in case of panic. (5) Playgrounds are practically level, fronting to the south, and in the most sheltered, airy, and sunny portion of site. (6) The digging and filling-up is equally balanced, therefore no carting away will be required. (7) More playground area is provided than required by the code, and 1,867sq. yd. of land is left for disposal on the westerly side; and if the first and second standard school should not be required, the land upon northerly side could also be disposed of without prejudice to the infants' school. (8) The manual instruction is provided in a detached building in close proximity to the existing Queen's-road School, and which may be used as a centre for other schools. The joiners' shop and cooking kitchen are well lighted from each side, and have separate entrances, cloak-rooms, and w.c.'s. (9) Each room is well lighted, the proportion of window area being greatly in excess of any of the existing schools. (10) The teachers' rooms are in such positions as command the entrances, cloakrooms, and playground. Externally the buildings will be of wall stones which are known as "pitched sneckers." Mr. Joseph F. Walsh is the architect.

## CHIPS.

A proposal is being mooted in the United States journals to erect at Washington a Valhalla or Temple of Fame, wherein the ashes of the nation's departed good and great may rest.

The Plymouth Corporation, after a heated discussion, decided, on Tuesday, to offer £6,000 to the Prudential Insurance Company for sufficient land, forming part of the Globe Hotel, to widen George-street to a width of 47ft. and Bedford-street to 40ft., for which £3 per foot was asked on behalf of the company, the quantity of land being 2,282ft. It was stated that the Prudential Company had paid £40,000 for the entire site, and proposed to erect thereon buildings estimated to cost £60,000. It was announced that the Board of Trade had sanctioned the sewer outfall works comprised in Mr. Mansergh's main drainage scheme.

A fatal accident occurred last week at Messrs. Morrell and Mouillet's new theatre at Southampton, the victim of which was a carpenter named Albert Wood, residing at Saxon-road, Freemantle, aged 25, who lost his life in an attempt to save a fellow workman named Comer, who was falling from some scaffolding.

The restored organ at Glenorchy Church, Exmouth, was reopened on Wednesday week. The organ, which originally cost £850, was by Bevington and Son, of London. It has undergone restoration by Messrs. Hele and Co., of Plymouth, at a cost, together with the chamber, of £450. It is a two-manual instrument with ornamental front pipes nearly 20ft. high.

The East Riding Antiquarian Society, who have just elected Lord Hawkesbury as president, paid a visit on Tuesday in last week to Old Malton Priory and Kirkham Abbey, under the guidance of Mr. W. H. St. John Hope, F.S.A.

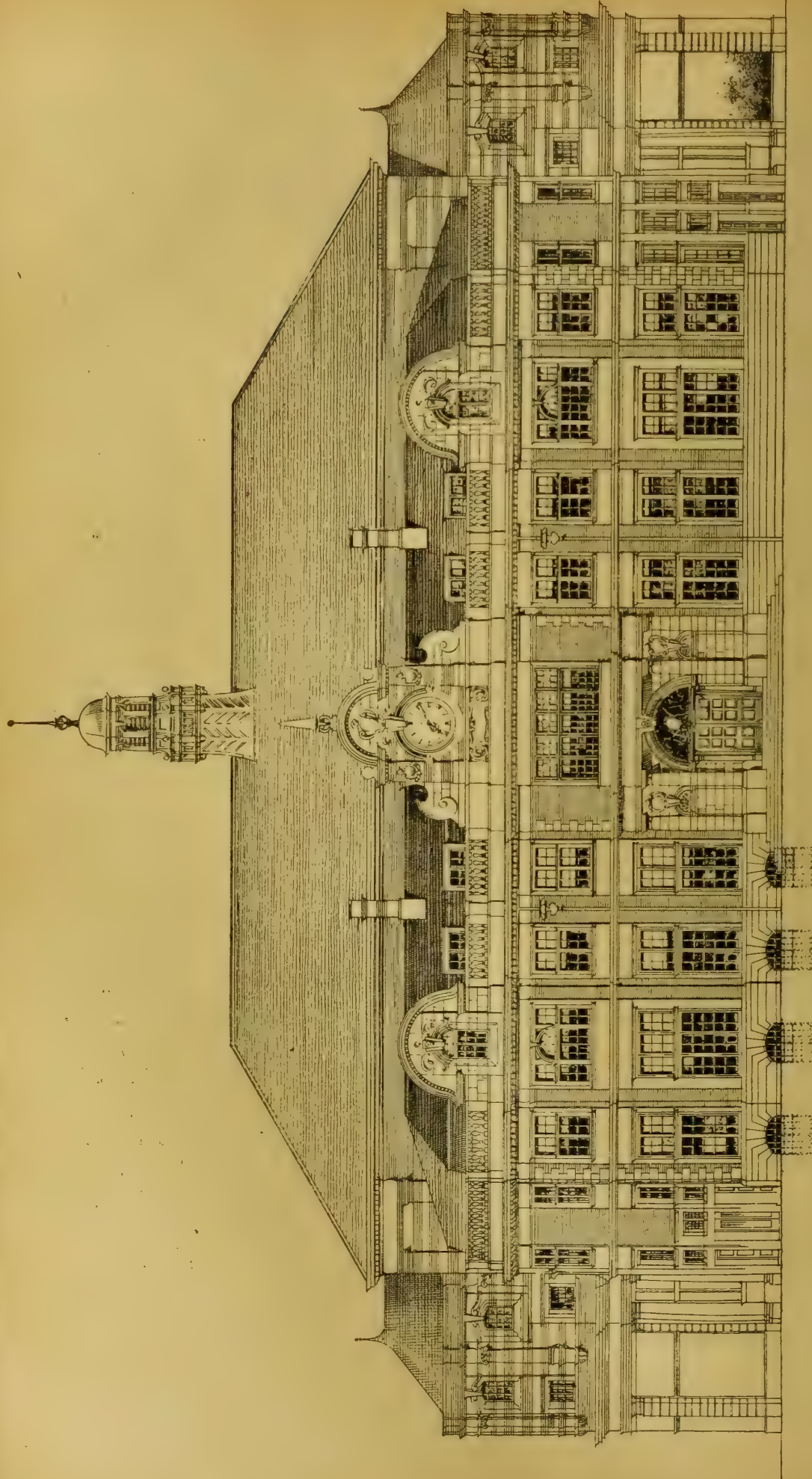
A new hotel is being erected at Radstock from the designs of Mr. T. Martin, and special attention is being given to the ventilation, which will be carried out on the Boyle system.

An inquiry was held at the town-hall, Calne, on Monday afternoon, relative to an application by the town council to the Local Government Board for permission to borrow £695 for the improvement of certain main-road footpaths, and £575 for the construction of works for the purpose of obtaining water for sewer-flushing and street-watering.

The School Board for Gloucester recently invited competitive plans for a new school from local architects, and appointed an assessor, who awarded the premium to Mr. Dunn. When the assessor's report was submitted to the board, the chairman questioned the wisdom of the award, and suggested that another adjudicator might have come to a different conclusion; but the board, by a substantial majority, very properly endorsed the assessor's award, and appointed Mr. Dunn as architect.

The Rev. E. Sidney Savage, rector of Hexham, is appealing for funds to repair and restore the historic Abbey Church. As he remarks, its three Roman altars, its Saxon crypt and Frithstool, its rood-screen, and other possessions of Pagan Rome, and Saxon and Medieval Christianity are of exceptional value and interest.





North Elevation











SANTA SOPHIA.

DRAWN BY /





AGIA SOPHIA.

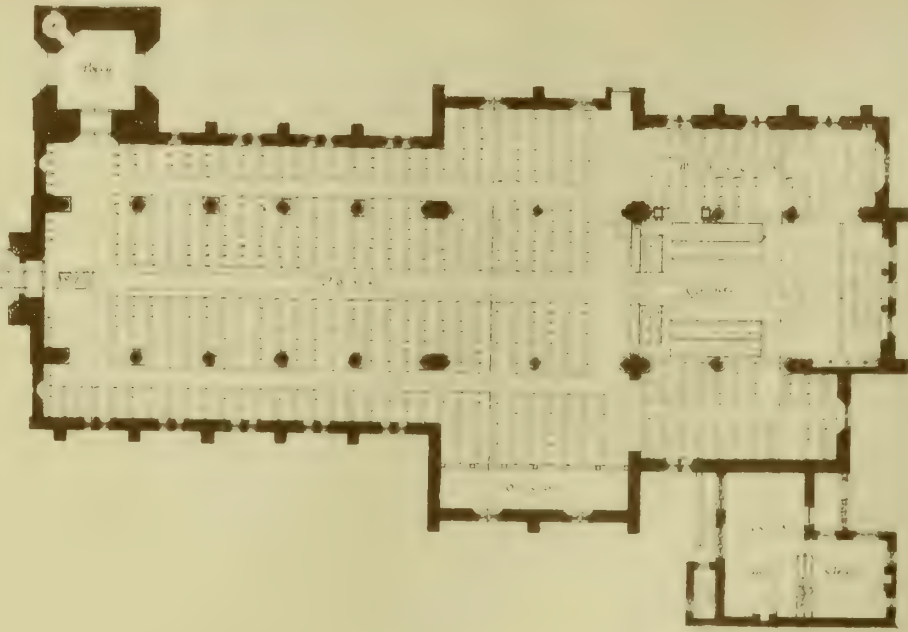












C. W. E. d. x  
1898



S. LUKE'S ENFIELD. N. NORTH EAST VIEW

JAMES BROOKS & SON, ARCHITECTS





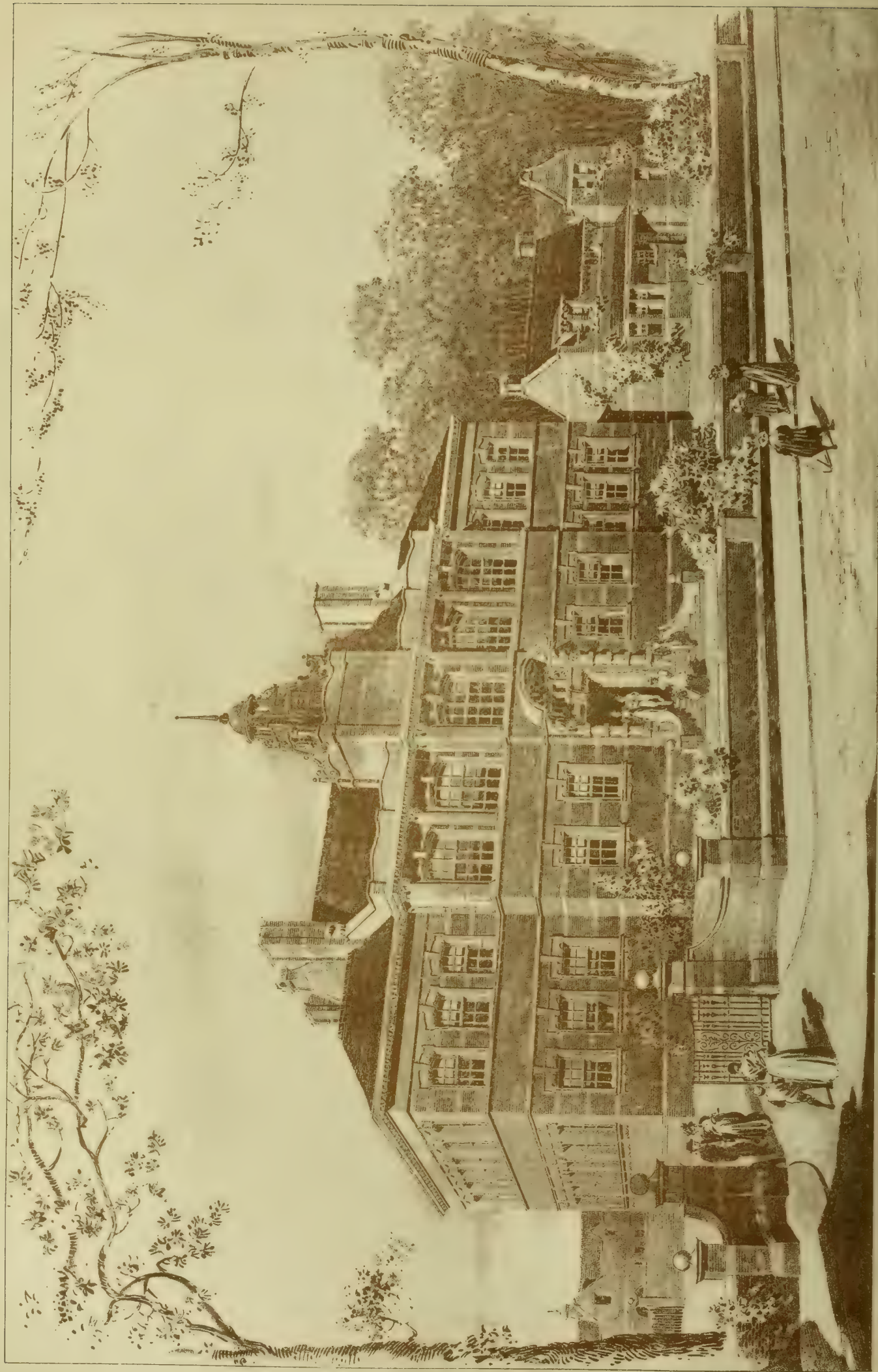








THE BUILDING DEWS SEP. 16, 1893.



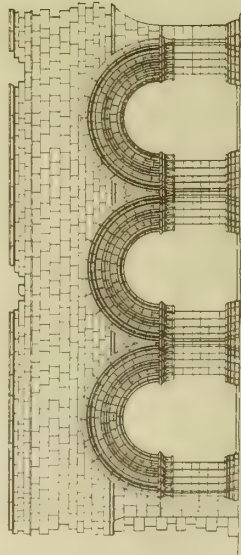
HEATON CHAPEL TOWN HALL. DESIGNED BY J W HOOLEY & F W MFF ARCHITECTS



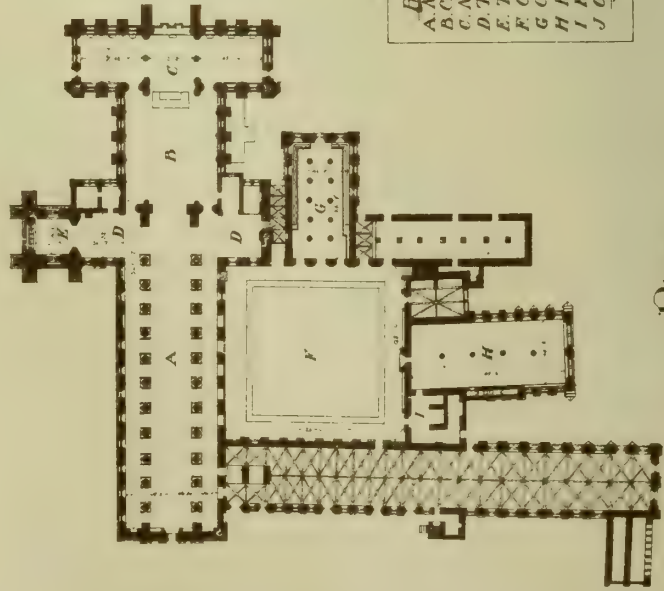




FOUNTAINS ABBEY.  
YORKSHIRE.  
Chapel of the Nine Altars.

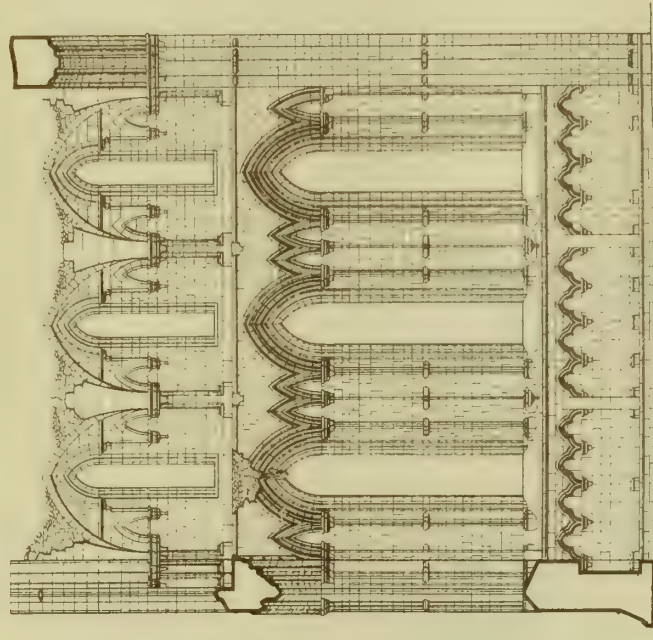


Entrance to Chapter House.



Plan.

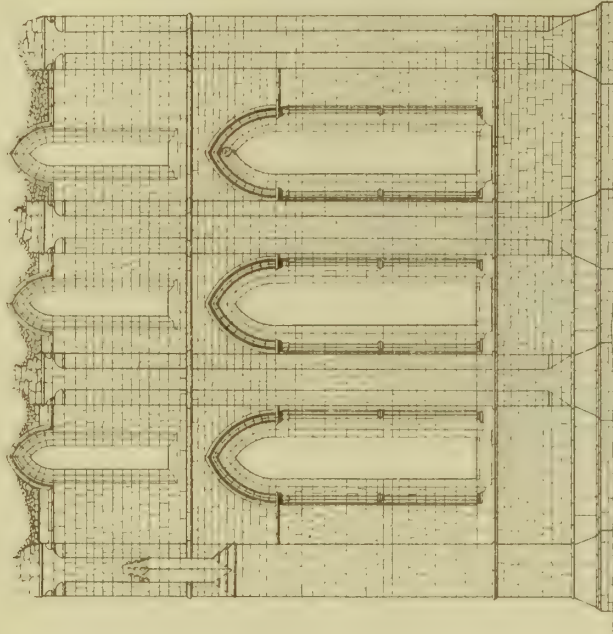
Scale for Plan.



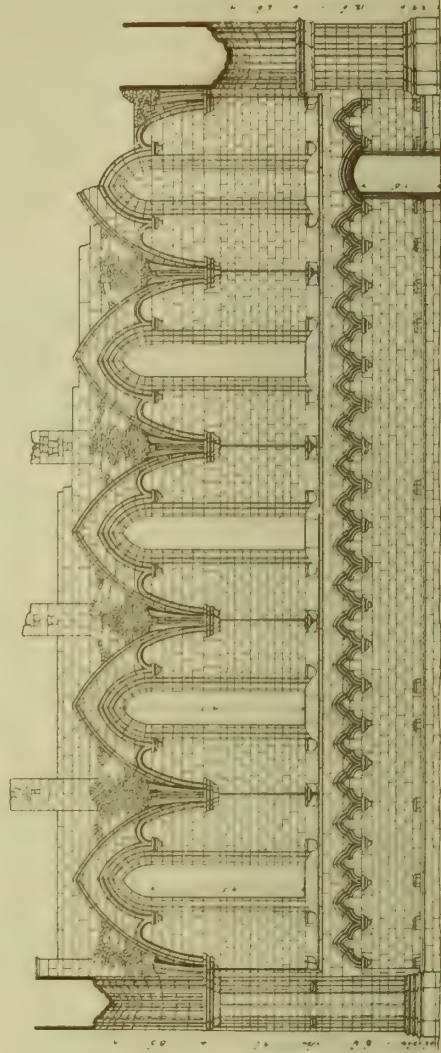
Elevation of Interior.



- REFERENCE—  
A. NAVE.  
B. CHOIR.  
C. NINE ALTARS.  
D. TRANSEPT.  
E. TOWER.  
F. CLOISTER COURT.  
G. CHAPTER HOUSE.  
H. REFECTORY.  
I. KITCHEN.  
J. CELLARIUM.



Elevation of Exterior.

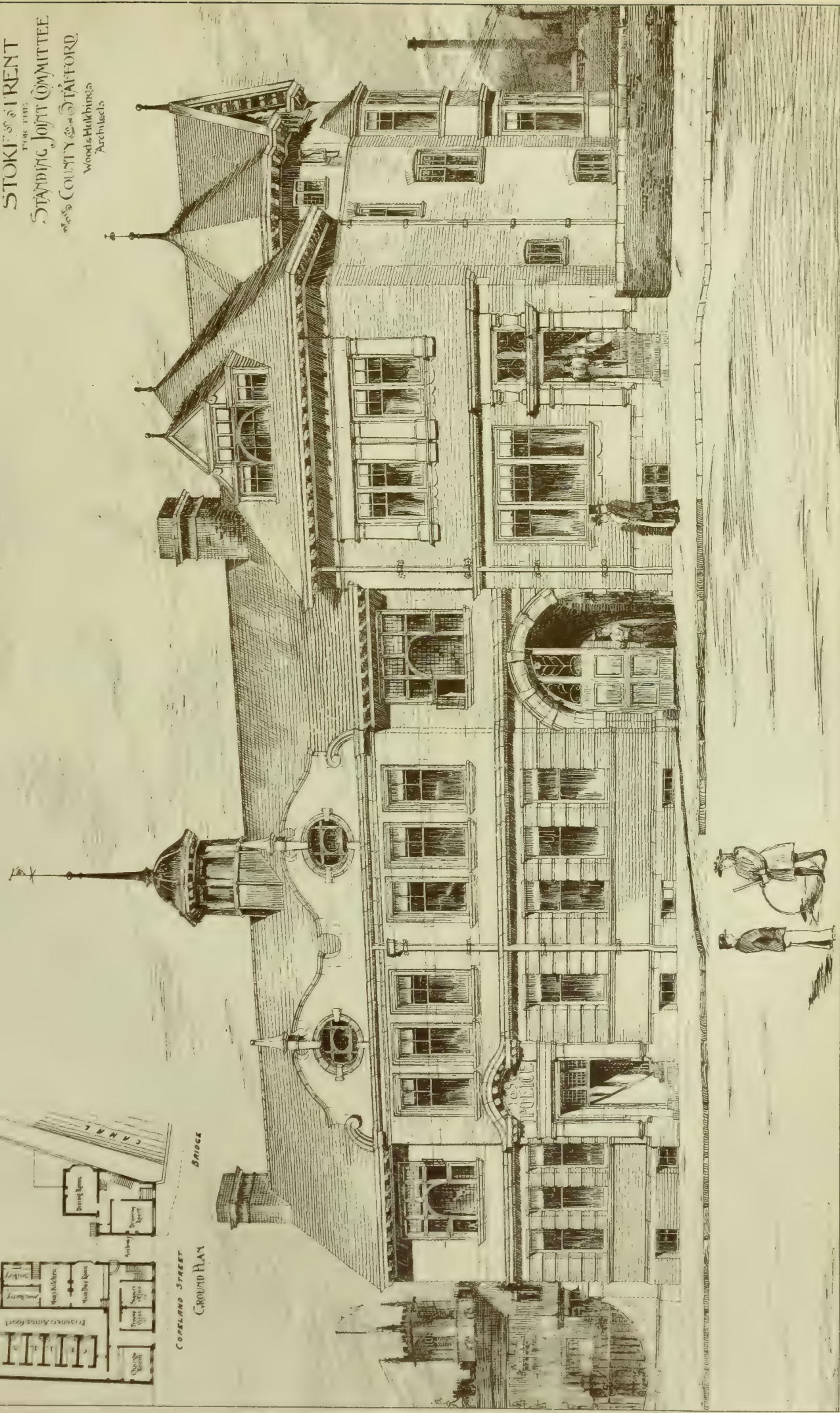
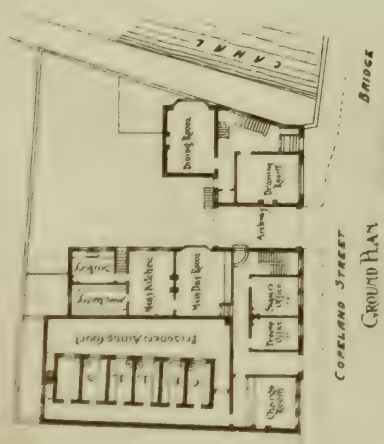


South side of Choir.

MEASURED AND DRAWN BY  
LANCELOT WOODHOUSE  
KIRKBY LONSDALE



New Police Station  
STOKES STREET  
FOR THE  
STANDING JOINT COMMITTEE  
OF THE COUNTY OF STAFFORD  
Wood & Hukings  
Architects





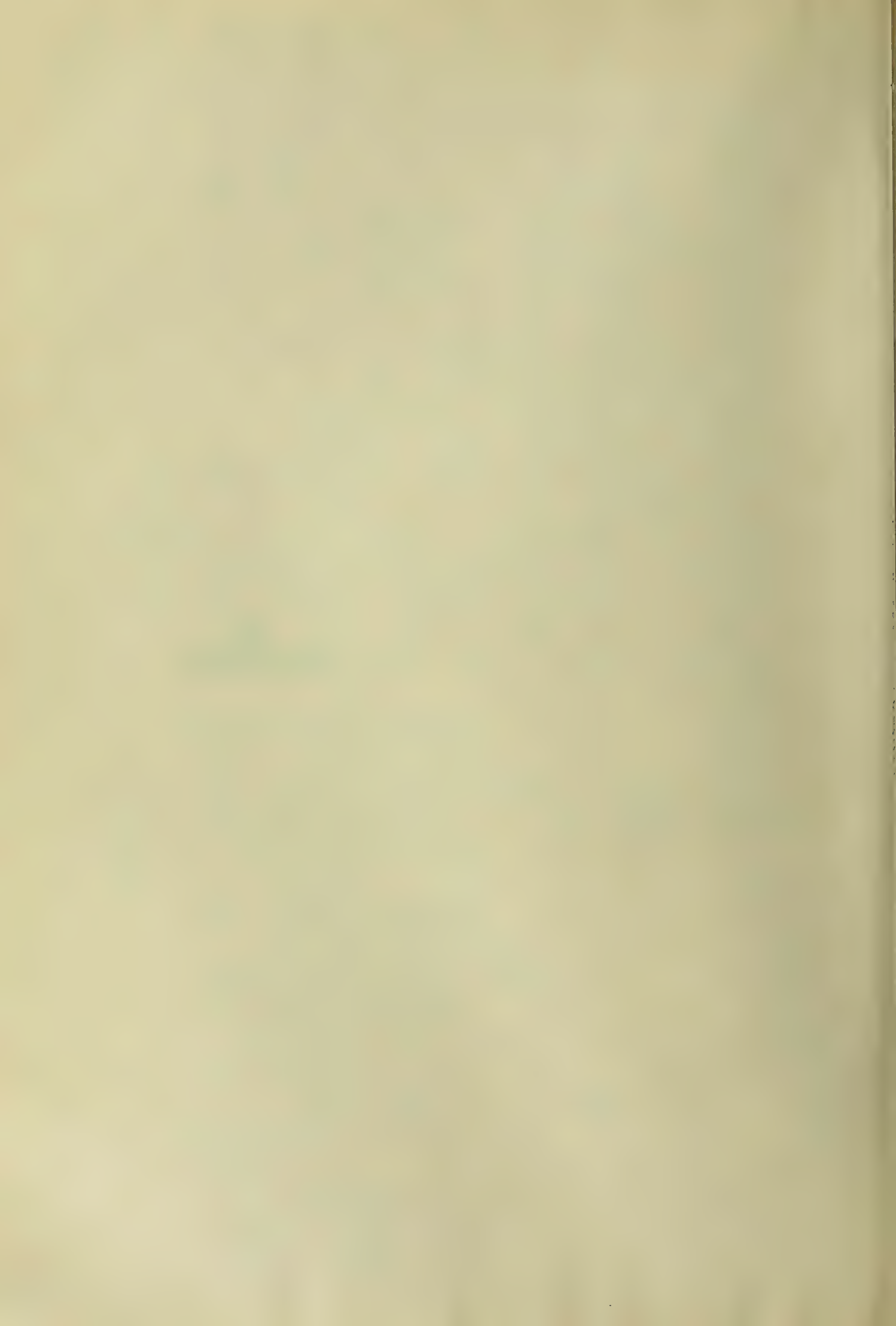
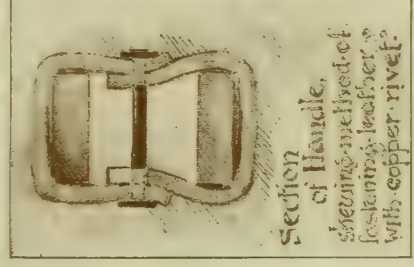
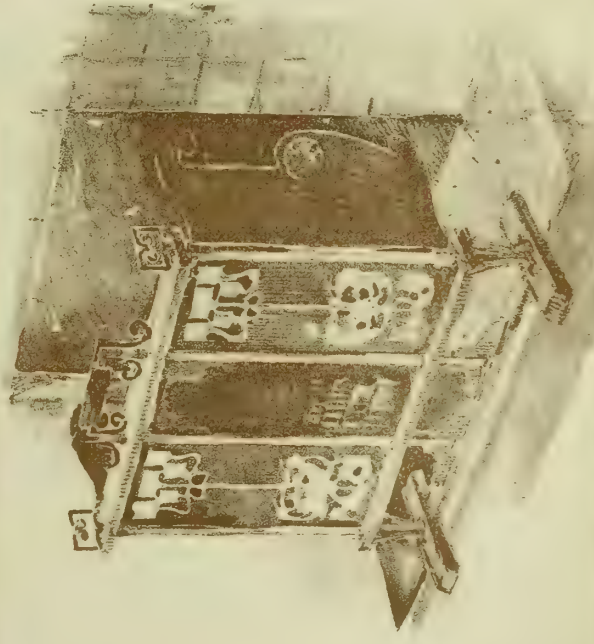


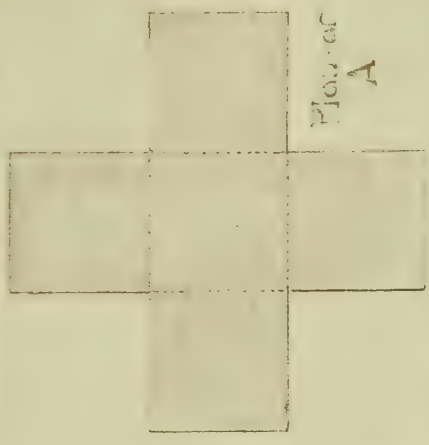




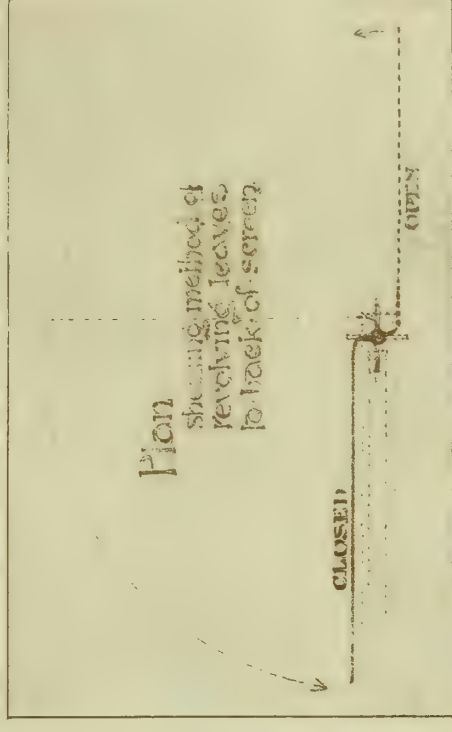
FIGURE 1. METAL SAFE.



Section of handle, showing method of fastening leather with copper rivet.



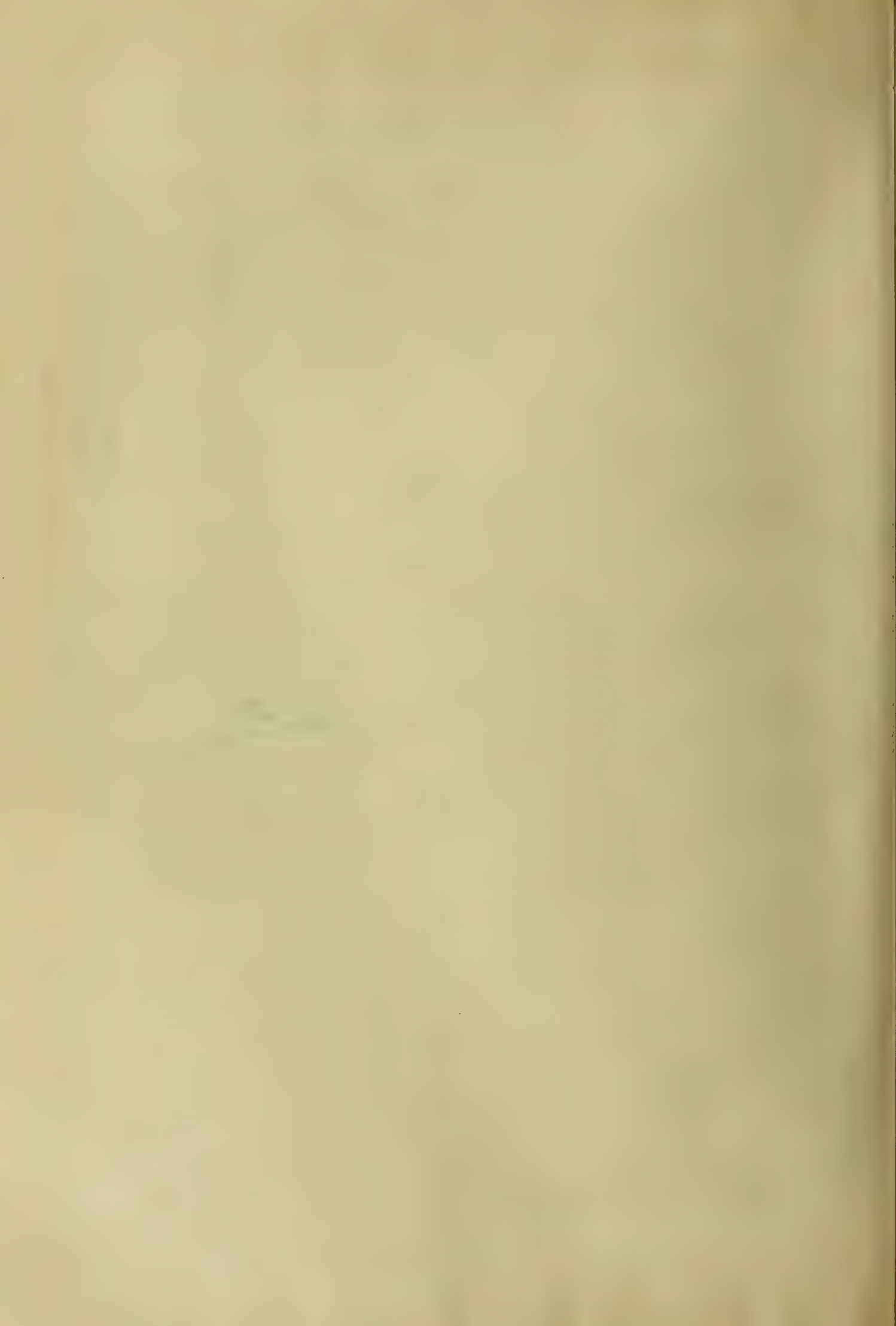
Plan of A



Plan showing method of revolving leaves to back of screen.

DESIGN FOR FIRE-SCREEN IN OAK GESSO WITH STAINED WOOD PANELS ON EITHER SIDE OF A CENTRAL ONE OF COPPER, HAVING ALSO TWO COPPER LEAVES TO FOLD ON IRON RODS. HANDLE OF IRON WITH LEATHER COVERING. See





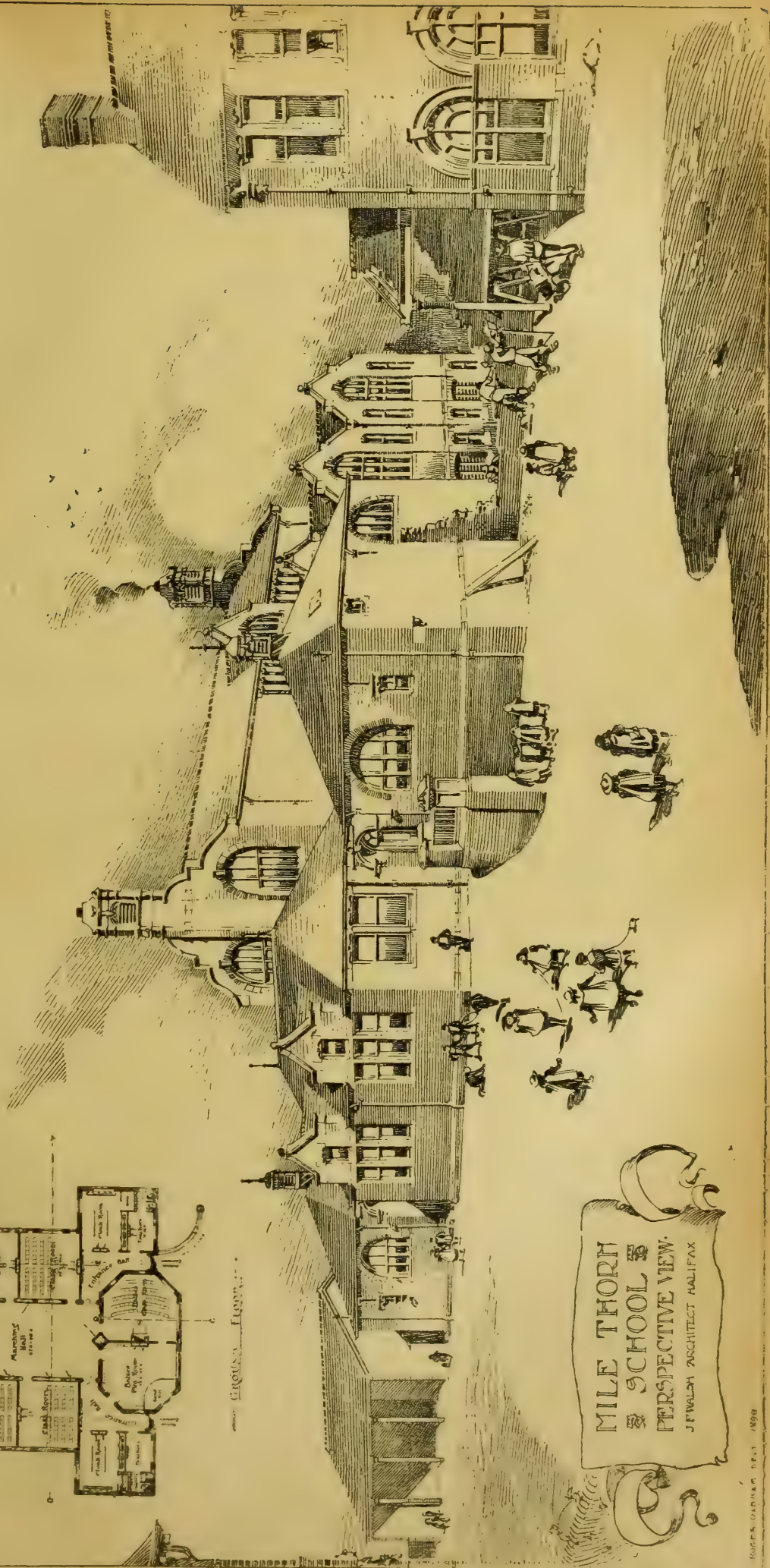


AVENUE THORN



GROUND FLOOR

MILE THORPE  
SCHOOL  
PERSPECTIVE VIEW.  
J. WALSH ARCHITECT HALIFAX





## STATUES, MEMORIALS, &amp;c.

GLASGOW.—The sculpture scheme connected with the new art galleries now being erected at Glasgow is to embrace the names of all the leading Scottish historical, literary, scientific, and commercial celebrities. These will be recorded on the spandrels of the east and west courts. On the main piers of the central hall there will be the coat of arms of the Merchants' House, the Trades' House, and the fourteen incorporated trades; and to the tympana of the window arches the names of the Scottish counties will be attached. The piers dividing the windows will have upon them the names of celebrated painters, and the spandrels of the first floor arches will bear the names of well-known musicians.

## LEGAL INTELLIGENCE.

IN RE H. R. MERCER, OF FOLKESTONE.—The statement of accounts in the failure of Henry Rye Mercer, builder, 96, Guildhall-street, and Darby-road, Folkestone, show gross liabilities amounting to £15,850 10s. 5d., of which £13,910 17s. 11d. is due to fully-secured creditors, who hold securities to the value of £15,355 17s. 11d. To 71 unsecured creditors the sum of £1,922 2s. 10d. is due, and the assets are estimated to realise £2,322 8s. 10d. Debtor attributes his failure to "loss of credit by reason of a lawsuit brought by him for libel; increased price of material and labour since taking Government contracts." Debtor is possessed of considerable property at Folkestone, a piece of land, with 175ft. frontage to Cuthbert-road, Willesborough, and of a moiety of a piece of freehold land, containing about two acres, at Lyminge. Debtor states that he may be under some liability to the War Office with reference to contracts entered into by him for carrying out artificers' work at Lydd and Shorncliffe Camps. He further states that he does not consider himself to be insolvent, as, if his estimate of the value of his property is realised, there will be a surplus.

INFERIOR MORTAR.—At North London Police Court before Mr. D'Eyncourt, Mr. W. E. Stevens, contractor, of Bridge-street, Homerton, was summoned by Mr. Alexander Payne, district surveyor of East Hackney (South) and North Bow on Sept. 9, 1898, for building houses at Retreat-place, Homerton, of inferior mortar, not in accordance with the by-laws made by the London County Council. Mr. Payne stated that he had received notice from Stevens for the erection of nine dwelling houses, and four were nearly constructed. The defendant had removed large quantities of good sand from the ground (presumably for sale), and had used the inferior sand partly mixed with earthy matter in these houses. He had frequently warned him about it, and served him a Notice of Irregularity on June 15th. As there was no material improvement a summons was taken out on Aug. 26. It was shown by the correspondence that Mr. Stevens had complained of the district surveyor being too sharp on him, and had submitted the material to his own surveyor; but it was admitted that his own surveyor could not approve of the material as being in accordance with the by-laws. On this Mr. Stevens requested that the summons might be withdrawn; but this the surveyor declined to do. The defendant was represented by Mr. Romain, solicitor, but no evidence was called, and the facts as stated were not controverted. The magistrate said that only one summons had been taken out, on which he should certainly inflict the maximum penalty under the by-laws of £5 and costs. If a summons had been taken out on each house, he should have inflicted a similar penalty in each case, as it was evident the defendant had been making a considerable profit by using inferior materials, and different to what he professed them to be, in the mortar.

BUILDING ARBITRATION AT WAKEFIELD.—Some time ago a dispute arose between Alderman Sherwood, the proprietor of the new Opera House and Theatre at Wakefield, and Messrs. F. W. Denholm and Co., builders and contractors, with reference to the erection of the new building. Mr. S. E. Smith, of the firm of Messrs. Smith and Tweedale, architects, Leeds, the arbitrator, has given his award. He finds that after making due allowance for Alderman Sherwood's claim against Messrs. Denholm and Company, there is £260 5s. due to that firm, and he directs Alderman Sherwood to pay that amount, and also the costs incidental to the reference and award.

SEWAGE ARBITRATION AT TOWCESTER.—At the last meeting of the Towcester Rural District Council the award of Mr. J. W. Penfold, F.S.I., of London, the arbitrator in the Towcester sewerage works arbitration, was received. It stated that the amount originally claimed by Mr. Heath was £2,908 11s. 8d., and there were additional claims of £72 15s. for expenses, and £100 for breach of contract; total, £3,081 6s. 8d. Of that amount £2,641 7s. was accepted by Mr. Euson, the engineer. The amount awarded by the arbitrator was £365 4s. 9d., in addition to part of the amount already certified,

£2,500 14s. 8d., which made a total of £2,715 19s. 5d. The award also included the return to the contractor of certain materials and pipes, and each party was to pay their own costs. The amount due to Mr. Heath, therefore, was, on Mr. Euson's eighth certificate, £150, on Mr. Penfold's award £365 4s. 9d., for settling tanks £121 9s. 1d.; total, £636 13s. 10d. The present balance in the bank on the loan account was £18 6s. 9d., and the expenses the council had to meet were, balance of Mr. Euson's fees £95 16s. 6d., and various small amounts, in all about £60. The rural council decided to write to the Local Government Board and ask for authority to pay Mr. Heath the amount of the claim out of the general funds as a loan to the parish of Towcester.

## CHIPS.

Sir William Hart Dyke, M.P., has notified his intention to hand over, as a gift, nine acres of land adjoining Swanley Junction Station, to be used as a recreation-ground.

The partnership heretofore subsisting between J. D. Jeans and R. Trestain, builders, of Cardiff, under the style of Jeans and Trestain, has been dissolved.

The Richmond Town Council resolved, on Tuesday night, not to avail themselves of the option of the purchase, for £4,000, of Glover's Island, in the Thames, which had been secured for them by the mayor.

The Union Workhouse Infirmary, Mansfield, is being warmed and ventilated by means of Shorland's patent double-fronted Manchester stoves with descending smoke-flues, the same being supplied by Messrs. E. H. Shorland and Brother, of Manchester.

A portrait of Mr. A. J. Balfour, painted by Mr. W. E. Lockhart, R.S.A., has been presented to the Glasgow Corporation Art Galleries by Mr. Cameron Corbett, M.P.

Two new lifeboat slipways, which have been erected on the east and west sides of Margate Jetty by the Royal National Lifeboat Institution, were formally opened on Wednesday by Mr. J. Lowther, M.P. These slipways have been built at a cost of £3,500 to obviate delay in launching. Two new boats have also been provided.

From Paris the death is announced, at the age of 48, of M. Pezieux, a sculptor, who won a first-class medal at the Salon of 1894 for his "Daphnis," and who this year exhibited a bust of Pasteur.

Preparations for the erection of the new Naval College at Dartmouth, in place of the cadets training-ship, *Britannia*, will commence almost immediately. The plans by Mr. Aston Webb, F.R.I.B.A., have been approved by the Admiralty. They provide for the accommodation of 260 of the young officers as well as the permanent staff of instructors. The college will be three stories high, and will comprise a central block, with clock-tower and wings stretching right and left. There will be a raised terrace in front. The erection of the building is expected to occupy four years.

The old Sessions House in the Old Bailey is to be rebuilt at an estimated cost of £200,000, from plans now being prepared by Mr. Andrew Murray, the City architect. The site will be enlarged by throwing into it the male wing of Newgate Gaol, which has been bought by the Corporation of the Government for £40,000.

The Metropolitan Asylums Board have received a letter from the Local Government Board stating that they had directed their chief general officer, Mr. W. E. Knollys, C.B., to hold, after the vacation, an inquiry into the causes of the excess of cost over the tenders received for the erection, &c., of the Brook Hospital, the architect's responsibility, and the supervision exercised by the committee and the managers as regarded expenditure.

The business transacted at Tokenhouse-yard last week was of an unimportant character. The aggregate realisation, as registered at the Estate Exchange, was £20,905, as against £6,330 recorded for the corresponding period of last year.

Major-General John Julius Johnstone, of 1, York-terrace, Regent's Park, late of the Grenadier Guards, and formerly of the 42nd Highlanders, who died on June 2, aged 59, has bequeathed to the National Gallery a sketch of the head of Lady Hamilton by Romney, two portraits supposed to be by Sir William Beechey, and a portrait of a lady and child.

The church of St. Mary Magdalene, Bermondsey, reopens on the 18th, after repairs, the formation of a new vestry, and entire redecoration. The work has been carried out by Messrs. H. G. Bartlett and Co., Brixton, under the superintendence of Mr. Edward Crosse, architect.

The Gas and Electricity Supply Committee of the Bradford Corporation propose to borrow £10,000 for the extension of electricity cables within the city.

## STAINED GLASS.

BROADHEMPSTONE.—Messrs. Nicholls and Clarke, of High-street, Shoreditch, have just finished a three-light stained-glass memorial window to be placed in Broadhempstone Church, near Totnes, in memory of the late Mrs. Emma Mary Adams, for her son, which will occupy the east end of the church. The centre light, with trefoiled head, represents our Lord rising from the tomb in a rich embroidered robe thrown loosely on His shoulders lined with red, and holding a cross in His left hand, while below on the ground is the crown of thorns and other emblems of the Crucifixion. In the right-hand light are seen the three Marys hastening to the sepulchre, and the other side we see the Roman guard, one of them prostrate with fear, and the angel rolling away the stone, clad in white raiment. The subject is treated with boldness, and the colouring is warm and brilliant, the ruby and brown tints predominating in the garments and accessories. The design is of 13th-century character, with elaborate ornamental canopies over each light in a sort of grisaille work. The blending of the pot-metal tints is relieved by delicate shading, without, however, giving too pictorial a character. The tracery lights above are filled with angelic subjects, and the lights have a structural base. The execution of the work is in every way most creditable to the firm to which it has been intrusted.

## WATER SUPPLY AND SANITARY MATTERS.

POLMONT, N.B.—At a meeting of the Eastern District Committee of the Stirling County Council, held at Falkirk on Friday, a sub-committee appointed to consider the question of the supplying of Polmont district with water reported on the matter. The committee had had under consideration three sources of supply. The first of these was from the Lochcote Reservoir, belonging to the Bo'ness Commissioners, and the second the Forestburn Reservoir, belonging to the Linlithgow County Council. To both of these schemes there was the objection that they could not be carried out except at very considerable cost, whilst with regard to a supply from the Lochcote Reservoir, there was the further disadvantage that the Bo'ness Commissioners could not guarantee a full supply of water. The committee afterwards had considered the Lily Loch scheme, which was reported upon in 1894, and they were of opinion that that source of supply, if obtainable, would, on account of its altitude and purity, solve many of the difficulties in the way of supplying the higher lying villages, and would in the long run prove the most satisfactory source. The report was, after discussion, adopted.

Mr. Norman Neruda, the well-known painter, was killed on Sunday by a fall while descending the dangerous peak in the Dolomites, known as the Fünffingerspitze.

An important decision with reference to Ayr domestic water supply was come to by Ayr Town Council on Monday. The pipe conveying the water from Loch Finlas to the filters at Knockjarder, a distance of fifteen miles, is proving too small to convey sufficient water to keep up with the consumption. A number of schemes to increase the supply have been considered; but it has been decided to lay down a pumping plant at a cost of £4,490, which involves the eventual construction of a storage reservoir at a cost of £2,650, to pump the water from the old water supply in the Carline reservoir to the filters about a mile distant, and at a considerably higher level.

St. Paul's Cathedral is at present receiving a new and clearer dial for its great clock overlooking Ludgate-hill. A few years since the old open face was replaced by an opal dial, the idea being that it should be illuminated by the electric light. That system was, however, found impracticable, and as the opal rather dimmed the clock during the day, it was decided to restore the usual cart-wheel pattern, which will make the hours more visible, and enable the bells to be heard better.

Mr. Henry Thomas Munns, a well-known Birmingham artist, died on Saturday last at his residence at King's Heath. Mr. Munns was born at Northampton in 1833, and obtained there his earliest instruction in painting. He began practice in Birmingham as a portrait-painter in 1858. Some years later he was elected a member of the Royal Birmingham Society of Artists, and was thenceforward a regular contributor to that and other exhibitions in London and in various provincial towns. For some years Mr. Munns had a considerable reputation as a painter of municipal presentation portraits. Some of his works of this kind are to be found at Manchester, at Walsall, and other Staffordshire towns, and other presentation portraits are in Birmingham, notably one of Mr. Henry Van Wart in the Exchange, one of Mr. William Sharp for the General Hospital, and one of Mr. George Dawson hung in the Corporation Art Gallery.



## Our Office Table.

It is reported from Darenth, Kent, that the site of the Roman Villa which was cleared a few years since, revealing very interesting foundations, is about to be closed over again, and that the field is to be utilised for growing wheat, as was the case before the excavations took place. Possibly the amount of the gate-money charged—a shilling a head, no matter how numerous the party may be—together with the distance from the nearest station, Farnham-road, has so deterred visitors as to render the keeping the ground open unremunerative. Why should not the Kent Archaeological Society take the initiative in raising a fund for the purchase of the site?

The teachers of London, who have long desired to build a new orphanage to take the place of the temporary premises at Peckham Rye, have been informed that Mr. J. Passmore Edwards has offered to erect a building at a cost of from £5,000 to £6,000, on condition that the teachers provide a suitable freehold site, and furnish the premises. The teachers have accordingly decided to raise £10,000, so that the usual income for maintenance should not be interfered with. A committee has been formed to raise the necessary sum, and among the first to subscribe are the Marquess of Salisbury, who has sent £100; the Duke of Westminster, £50; the Directors of the *Schoolmaster*, £50; and H. C. Gooch, £25. Earl Beauchamp and Mr. S. Cresswell, of 48, Lebanon-gardens, Wandsworth, are the hon. treasurers.

The Lords of the Committee of Council on Education have decided, at the suggestion of the Council of the Society of Arts, to hold during the autumn an exhibition of lithography in the buildings of the South Kensington Museum on the west side of Exhibition-road. As lithography was discovered by Senefelder in the year 1798, the present is the centenary year of the invention, and therefore offers a suitable occasion for such an exhibition as is proposed. The Department will be assisted in the selection and arrangement of the exhibits by the influential committee, with some additional members, which had been already organised by the Society of Arts. It is proposed that the exhibition should be opened about 1st November and remain open for four months. The lithographs will have to be sent in not later than 1st October. Any further information will be furnished on application to the Secretary, Department of Science and Art, South Kensington, S.W., to whom all communications on the subject should be addressed.

A SHIPBUILDER, who has been making inquiry as to the financial results of electric power for workshops in the United States, sends the *Glasgow Herald* some figures which show that there is gain from every point of view as compared with the existing systems in this country, where the shaft pulley and belt are still retained, although evidences accumulate of a departure in many districts. In one of the large works where the electric system has been installed the total power in use is equal to 1,930 H.P., but it is found that 700 H.P. is all that is required in the steam-engine driving the electric generator, as all the 215 motors are not simultaneously in use. These vary in power from 2 H.P. to 50 H.P., and it is found that two men can attend to the plant, one of them devoting his time to the repair of armatures. The labour cost is thus 24s. a day, and the materials for repairs 8s. per day, so that the rate for the year is 4 per cent. of the prime cost of the plant, which latter worked out to £12,500, or £6 10s. per horse-power required by the machines. This maintenance charge may not be much less than with the ordinary shaft and pulley system, but there is a great saving in power, for the old system is most inefficient owing to slip and friction.

MR. EDWIN DREW writes, pointing out the risk of destruction by fire which exists both at Shakespeare's House, Stratford-on-Avon, and Anne Hathaway's Cottage:—"At Shakespeare's 'birth room' the hot-water pipes in winter are," he says, "so affecting the plaster that it peels off, and owing to this the signatures of Tennyson and Dickens have disappeared. Among the mass of names on walls and ceiling are many which add an interest even to the overwhelming halo of Shakespearean memories, and these great names are a record in themselves. Yet they must disappear without further protection. Could not the walls and ceiling be encased in glass to pre-

serve the names and stop the peeling? At the Hathaway cottage—a thatched house with much woodwork—I found a good coal fire burning, and near was dry wood, only too inflammable. A spark would set the place alight, and it would be in ashes in a few minutes. I saw no adequate means to check fire. I do not think any fire should be allowed in it, and the excellent inmates should live in a house near."

THE Bishop of St. David's endorses an appeal which is being made for £7,000, the sum outstanding on the outlay of £26,000, which is being expended on the restoration and repair of the parish church of Swansea. The old church was till recently, it is stated, not only exceedingly mean and dilapidated, but it was also incommodious with its huge unsightly galleries, too small, and utterly unworthy of this rapidly-increasing borough. Sir Arthur W. Blomfield, A.R.A., prepared plans, and a stately well-proportioned edifice, in the Early English style, is nearing completion. The consecration has been fixed for Thursday, October 20, when the Archbishop of Canterbury has promised to preach. The nave has been lengthened at the west end by 26ft. It is 60ft. in height and 5ft. higher than the old tower. The new tower will be 30ft. higher—85ft. in height. The nave, commenced in December, 1895, was opened in August, 1897, and the tower is to be completed next spring. The accommodation will be increased by about 300 sittings, all on the ground floor.

THE American Section of the International Association for Testing Materials was last week organised at Philadelphia, Prof. Mansfield Merriam being appointed chairman. The International Association for Testing Materials is due to the initiative of Professor J. Bauschinger and others, who formed a preliminary organisation at Munich in 1882. Conferences, increasing in number of attendants, were held at Dresden in 1884, at Berlin in 1886, at Munich again in 1888, at Vienna in 1893, at Zurich in 1895 (when the first international body was inaugurated), and at Stockholm in 1897. Since July, 1896, the transactions of the International Association have been regularly published, in both German and French, in the *Baumaterialienkunde*.

THE annual report of Mr. John Atkinson, the borough surveyor of Stockport, states that during the past year 260 houses were erected in the town, and the area yet available for building purposes is about 415 acres, five acres having been absorbed for building operations last year. There are 54 miles of public highways and 12 miles of private streets and roads in the borough. During the year the Covent-yard and Hill-gate improvement has been completed at a cost of £3,900, and also the Thompson-street widening, and the opening out of Osborne-road; while Andrew's-square has been laid out as an ornamental open space at a cost of £450. An important improvement is in progress at Chester-gate, and other works are being carried out.

WITHIN the last month a vast buried forest of walnut has been unearthed in south-east Missouri. In 1811 an earthquake in that part of the State resulted in the sinking of large tracts of land. Since then there have been annual floods in that district, each year adding to the accretions. Less than two months ago two farmers, walking through a part of the district, noticed what to their eyes seemed to be the ends of walnut trees sticking out of the sunken places and tipped over. Remembering that vast amounts of cedar wood have been dug up in various places, the farmers reported their observations, and the ground was explored. It was found to be rich in trees of black walnut from 28in. to 36in. in diameter. Secretary Watson states that there are two parts to a walnut tree: the centre consists of solid, black wood, and the rest of the tree is a soft, sappy growth, which is of little use for commercial purposes. In these new trees, just unearthed, the sap has all rotted off, leaving only the black heart or solid portion of the tree. This is found to be a fine specimen of walnut, with an unusual depth of colour.

In 1880, an historian, writing of the City of New York, said that "the Tribune Building is the pioneer of tall business edifices. Buildings from five to ten stories are now quite common." It was only five years before that the Tribune Building was completed, and the ten stories, with the tower 260ft. above the curb, was a marvel; but to-day (says the *Scientific American*) it is dwarfed by its next-door neighbour, the American

Tract Society building, which is 23 stories high. In 1880 the Tribune building was one of the tallest buildings in lower New York, other notable buildings being the Mills building, Temple Court, Western Union, Mutual Life and Equitable. For years the last-named building was a regular resort for visitors to New York, as the St. Paul building is to-day. The Washington building was ready for occupancy in 1884. It has 13 stories, and was considered a marvel of the builder's art. Between this time and 1887, the steel skeleton structure was devised, and found to be satisfactory, and from that time until now tall buildings have followed one another with great rapidity. The record of height was passed again and again, until we have a building with double the number of stories of those of the Washington building. Still the limit is not attained by the St. Paul building, for the Syndicate building, which is now under construction, will be 29 stories, and its towers are 382ft. above the curb, overtopping by 100ft. the finial of Trinity's tall spire.

## THE ARCHITECTURAL ASSOCIATION.

SEPTEMBER 4th.—VISIT TO ROCHESTER CATHEDRAL. Members to meet under clock at Holborn Viaduct Station at 1.5 p.m. for the 1.20 train. Postal Order for 3s. to be sent to Mr. H. Dymoke Wilkinson, 34, Granville-square, W.C., before September 23rd. The party is limited to 30.

THE COURSES OF LECTURES CLASSES, &c., COMMENCE ON MONDAY, October 10th, at 6.30 p.m.

A Pamphlet giving full information may be obtained on application to the Hon. Secs., at 56, Great Marlborough-street, W. E. HOWLEY SIM } Hon. Secs.  
G. B. CARVILL }

## CHIPS.

The River Wear Commissioners at Sunderland have adopted a scheme for quay and dock extensions to cost £261,000. This is in addition to the works in progress, which raises the total to £375,000. The object is to provide accommodation for the large steamers which are now being generally ordered by shipowners.

Although all public works in New York city have been stopped, under the new city administration, the Board of Estimate and Apportionment have authorised the re-issue of 375,000dol. in bonds for the construction of buildings for the Botanical Garden in Bronx Park. Work on the museum building is also being carried forward, the contract calling for its completion early next year.

Some years ago a Congregational school-chapel was opened at Meersbrook Park, Sheffield, and it is now intended to erect a new chapel. The Central Church Extension Fund Committee have made a grant of £1,000 towards the cost, and Messrs. Hemmell and Paterson's plans have been accepted.

The directors of the Manitou and Pike's Peak Railroad have just signed a contract for a large observatory to be built on the top of Pike's Peak. The tower will be visible for miles. The structure will be built very solidly, so as to withstand the terrible wind and snowstorms which rage in winter over the barren top of the Peak. There will be four large telescopes mounted in the tower for observation purposes. With these it will be possible to see Denver, fifty miles to the north, and to the west Cripple Creek.

The Royal Caledonian Asylum, which was opened in 1822 at premises in Cross-street, Hatton Garden, with twelve Scottish orphans on the foundation, and in September, 1828, was removed to its present location in Caledonian-road, is again about to be transferred further afield. An eligible site has been bought at Bushey, and when the new building is erected the children will be removed from their present quarters in the Caledonian-road.

The very interesting village church of Norbury, Derbyshire, is about to be restored under the direction of Mr. J. T. Micklethwaite, F.S.A. We have received a long letter from a correspondent calling attention to the appointment, and asking if a London architect is likely to be acquainted with the details of Derbyshire churches. We cannot say; but it is a curious commentary on Mr. Micklethwaite's stirring speeches at the meetings of the Society for the Protection of Ancient Buildings that he in his turn should be severely criticised as a restorer.

The Worcestershire County Council have this week agreed to purchase, for £10,534, Bundy's Farm, near Malvern, as a site for a proposed isolation hospital.

An appeal is being made for funds towards the rebuilding of the Holy Trinity Church, Darby. The accepted plans have been prepared by Mr. Charles E. Hewitt, of Brighton, and show a building of a plain and simple type of Early Decorated, to be executed in red brick with stone dressings, and seating accommodation for 800 persons. Towards the estimated cost of £8,000, which is exclusive of a tower and broach spire, some £1,200 has been promised.



## Trade News.

### WAGES MOVEMENTS.

**THE LABOUR MARKET.**—The report for August prepared by the Labour Department was published yesterday (Thursday), and is based on 2,343 returns—viz., 1,655 from employers, 550 from trade unions, and 138 from other sources. In the 117 trade unions making returns, with an aggregate membership of 466,025, 12,819 (or 2·8 per cent.) were reported as unemployed at the end of August, compared with 2·6 per cent. in June and July, and with 3·5 per cent. in the unions, with a membership of 462,256, from which returns were received for August, 1897. Employment in the building trade has continued brisk. The percentage of unemployed union members at the end of August was 0·9 compared with 1·0 in July and 1·2 per cent. at the end of August last year. The furnishing trades are still well employed, though continuing to show a slight falling off in some branches. The percentage of unemployed union members at the end of August was 1·9 compared with 1·6 on July and 1·7 per cent. in August, 1897.

**DURHAM.**—The plumbers' strike at Durham, which has been in existence for about three weeks, has come to a termination. The men came out because the masters refused an advance from 7½d. to 8½d. per hour. The masters have now conceded 8d. per hour.

**LLANELLY.**—About a hundred labourers employed in strengthening the sea wall at Llanelly came out on strike on Friday in consequence of deductions in their wages. In the evening Mr. G. Watkeys, borough surveyor, met the men at the bulwarks and amicably settled the question in dispute. The men, who are unemployed tinplaters, will have the amount claimed from them as deductions refunded.

**YORK.**—The long standing dispute between the joiners and the master builders has been amicably settled. The men, who came out last May, struck for an advance of 1d. an hour—viz., from 7½d. to 8½d. The masters then offered an increase of ½d., but this was refused. This week, however, the men have accepted an advance of ½d., and so an unprofitable trade war has ended.

The Dover Town Council received on Tuesday an official report that the first year's working of the corporation's electric tramways, after allowing for payment of interest and instalments of the loans, had resulted in a profit of £1,300 being earned. 1,794,903 persons have been carried at the universal fare of 1d.

Yesterday (Thursday) afternoon the Bishop of Southwell consecrated the new nave and chancel of the parish church of West Bridgford, Nottingham. The work has been carried out at a cost of £5,700, and the building, which dates from the 12th century, now seats 700 persons.

The church of St. Katharine Coleman, Fenchurch-street, E.C., has recently been under internal repair. Stained-glass windows will shortly replace the present plain ones, the designs having already been prepared by Mr. Soames. The work, which is estimated to cost about £120, has been entrusted to Messrs. Turnbull and Son, 4, Northumberland-alley.

The Truro Rural District Council have applied to the Local Government Board for sanction to borrow £5,000 for the carrying out of a proposed scheme of waterworks at St. Agnes, prepared by Mr. Worth, C.E.

Sir Philip Magnus will open the new technical institute at Wellingborough on Thursday, the 29th inst., and will deliver an address in the evening.

The chancel of St. Peter's Church, Sudbury, West Suffolk, has been decorated in colour, and a new reredos has been erected and the clerestory windows filled with stained glass. The architect is Mr. G. F. Bodley, A.R.A., of Gray's Inn.

A new synagogue in Fournier-street, Spitalfields, was opened on Sunday. The building, which has seating accommodation for 1,800 men and women, was the first place of worship erected by the Huguenots in 1743, and afterwards passed over to the Wesleyans. It was recently acquired by the East End Jews, and reconstructed at a cost of £6,000.

The death is announced of Mr. J. T. Meredith, architect, of Rowley, Staffs. Mr. Meredith held the appointment of architect to the school board for that town.

At a meeting of the cleansing committee of the Manchester Corporation, on Monday, the resignation of Mr. R. D. Callison, the superintendent, was tendered and accepted. The committee appointed Mr. Plant, the outdoor superintendent, to undertake the duties of indoor and estate superintendent, pending the appointment of Mr. Callison's successor.

## LATEST PRICES.

### IRON, &c.

	Per ton.	Per ton.
Rolled-Iron Joists, Belgian.....	£6 0 0	to £6 10 0
Rolled-Steel Joists, English.....	6 10 0	7 0 0
Wrought-Iron Girder Plates.....	5 15 0	6 10 0
Bar Iron, good Staffs.....	7 0 0	8 0 0
Do., Lowmoor, Flat, Round, or Square.....	17 0 0	17 5 0
Do., Welsh.....	5 15 0	5 17 6
Boiler Plates, Iron—		
South Staffs.....	7 17 6	8 5 0
Best Sneydhill.....	10 0 0	10 10 0
Angles 10s., Tees 20s. per ton extra.		
Builders' Hoop Iron, for bonding, &c., £8 15s.		
Builders' Hoop Iron, galvanised, £15 10s. 0d. per ton.		
Galvanised Corrugated Sheet Iron—		

No. 18 to 20. No.	Per ton.
8ft. to 8ft. long, inclusive gauge.....	£10 15 0
Best ditto.....	11 5 0

	Per ton.	Per ton.
Cast-Iron Columns.....	£6 0 0	to £8 10 0
Cast-Iron Stanchions.....	6 0 0	8 10 0
Rolled-Iron Fencing Wire.....	7 0 0	8 0 0
Rolled-Steel Fencing Wire.....	7 0 0	7 10 0
Galvanised.....	10 10 0	11 10 0
Cast-Iron Sash Weights.....	4 0 0	4 2 6
Cut Clasp Nails, Sin. to 6in.....	8 15 0	9 15 0
Cut Floor Brads.....	8 10 0	9 10 0

Wire Nails (Points de Paris)—		B.W.G.
0 to 7 8 9 10 11 12 13 14 15	8/6 9/0 9/6 10/3 11/0 12/0 13/0 14/9 16/9	per cwt.
Cast-Iron Socket Pipes—		
4in. diameter.....	£5 10 0	to £5 15 0
6in. to 6in.....	5 5 0	5 10 0
7in. to 24in. (all sizes).....	4 15 0	5 0 0
[Coated with composition, 2s. 6d. per ton extra; turned and bored joints, 6s. per ton extra.]		

	Per ton.
Pig Iron—	
Cold Blast, Lilleshall.....	105s. to 110s.
Hot Blast, ditto.....	57s. 6d. to 62s. 6d.
Wrought-Iron Tubes—Discount off Standard Lists f.o.b.	
Gas-Tubes.....	75p.c. Fittings 72p.c.
Water-Tubes.....	70 " 72"
Steam-Tubes.....	62 " 65
Galvanised Gas-Tubes.....	60 " 62"
Galvanised Water-Tubes.....	55 " 57"
Galvanised Steam-Tubes.....	45 " 47"

	Per ton.	Per ton.
Sheet Zinc, for roofing and working up.....	£23 0 0	to £24 0 0
Sheet Lead, 3lb. per sq. ft. super.....	15 0 0	16 0 0
Pig Lead, in 1cwt. pigs.....	14 0 0	15 0 0
Lead Shot, in 25lb. bags.....	17 10 0	18 10 0
Copper Sheets, sheathing and rods.....	62 0 0	63 0 0
Copper, British Cake and Ingots.....	52 10 0	53 0 0
Tin, Straits.....	73 10 0	74 10 0
Do., English Ingots.....	76 0 0	77 0 0
Spelter, Silesian.....	19 0 0	21 0 0

### TIMBER.

Teak, Burmah.....per load	£13 0 0	to £15 10 0
" Bangkok.....	10 10 0	14 10 0
Quebec Pine, yellow.....	4 5 0	5 5 0
" Oak.....	4 0 0	5 0 0
" Birch.....	4 0 0	5 15 0
" Elm.....	5 0 0	6 0 0
" Ash.....	4 5 0	5 10 6
Dantsic and Memel Oak.....	2 0 0	4 0 0
Fir.....	2 10 0	4 10 0
Wainscot, Riga p. log.....	4 15 0	6 0 0
Lath, Dantsic, p. log.....	4 10 0	5 10 0
St. Petersburg.....	5 0 0	6 10 0
Greenheart.....	8 0 0	8 10 0
Box.....	4 5 0	15 0 0
Sequoia, U.S.A. ....per cube foot	0 1 8	0 1 10
Mahogany, Cuba, per super foot		
in. thick.....	0 0 5	0 0 6
" Honduras.....	0 0 4	0 0 5
" Mexican.....	0 0 4	0 0 5
Cedar, Cuba.....	0 0 4	0 0 4
" Honduras.....	0 0 3	0 0 4
Satinwood.....	0 0 5	0 1 0
Walnut, Italian.....	0 0 3	0 0 7
Deals, per St. Petersburg Standard, 120—12ft. by 1in. by 1in. :—		
Quebec, Pine, 1st.....	£18 0 0	to £24 10 0
" 2nd.....	13 10 0	16 10 0
" 3rd.....	6 0 0	9 10 0
Canada Spruce, 1st.....	7 10 0	8 10 0
" 2nd and 3rd.....	7 0 0	8 0 0
New Brunswick.....	7 10 0	8 0 0
Riga.....	9 10 0	13 17 6
St. Petersburg.....	9 10 0	16 0 0
Swedish.....	9 10 0	10 0 0
Finland.....	10 10 0	17 15 0
White Sea.....	5 0 0	16 0 0
Battens, all sorts.....		
Flooring Boards, per square of 1in. :—		
1st prepared.....	£0 9 6	to £0 16 0
2nd ditto.....	0 8 0	0 13 0
Other qualities.....	0 6 3	0 7 0
Staves, per standard M :—		
Quebec pipe.....	—	—
U.S. ditto.....	£35 0 0	£42 10 0
Memel, or pipe.....	220 0 0	230 0 0
Memel, brack.....	190 0 0	200 0 0

### OILS.

Linseed.....per ton	£16 17 6	to £17 7 6
Rapeseed, English pale.....	23 0 0	23 10 0
Do., brown.....	21 10 0	21 15 0
Cottonseed, refined.....	15 7 6	16 7 6
Olive, Spanish.....	28 10 0	29 0 0
Seal, pale.....	20 5 0	20 10 0
Cocanutt, Cochinchina.....	27 10 0	28 0 0
Do., Ceylon.....	23 15 0	24 0 0
Palm, Lagos.....	22 5 0	22 10 0
Oleine.....	18 15 0	19 15 0
Lubricating U.S. ....per gal.	0 6 8	0 7 6
Petroleum, refined.....	0 5 0	0 5 6
Tar, Stockholm.....per barrel	1 0 0	1 5 0
Do., Archange.....	0 12 6	0 15 0
Turpentine, American... per ton	23 15 0	24 0 0

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### TENDERS.

\* \* Correspondents would in all cases oblige by giving  
the addresses of the parties tendering—at any rate, of the  
accepted tender: it adds to the value of the information.BETHNAL GREEN.—For erecting new school buildings  
for St. John's, Bethnal Green, E., for the Rev. E. R.  
Hollings. Mr. A. Cox, 37, Baker-street, W., architect.  
Quantities by Mr. E. Clark, 35, Vaughan-road, Camber-  
well:—

McCormick and Sons.....	£6,830 0 0
Chessum and Son.....	6,829 0 0
Knight and Son.....	6,784 0 0
Outhwaite and Son.....	6,679 0 0
Shurmer.....	6,666 0 0
Harris and Wardrop.....	6,537 0 0
Wall, H., and Co.....	6,488 0 0

BEXHILL-ON-SEA.—For proposed business premises at  
the corner of Wilton-road and Marina, for Mr. Wm.  
Meads. Mr. Wm. Cooper, M.S.A., 21, Havelock-road,  
Hastings, architect. Quantities by the architect:—

Noakes, H., Eastbourne.....	£12,125 0 0
Simmonds and Co., Hastings.....	10,897 0 0
Cruttenden, H., St. Leonard's.....	10,879 0 0
Martin, J., Eastbourne.....	10,700 0 0
Martin, M., Eastbourne.....	10,690 0 0
White, A. H., St. Leonard's.....	10,538 0 0
Padgham and Hutchinson, St. Leonard's.....	10,450 0 0

For excavations and concrete foundations:—

Piper, J.....	390 8 3
Carey, S., Bexhill.....	302 12 6
Gutsell, E., Silverhill (accepted).....	289 0 0

(Continued on page XIV.)



# THE BUILDING NEWS

## AND ENGINEERING JOURNAL.

VOL. LXXV.—No. 2281.

FRIDAY, SEPTEMBER 23, 1898.

### INDEFINITENESS.

A DISTINGUISHING mark of present-day architecture is the multiplicity of channels in which art runs. Instead of a few well-directed aims, such as those of the temple or of the church, the requirements of the guilds or of great municipal objects, the modern builder has to direct his attention to numberless wants of the most clashing kind. The collective requirements of a few organised bodies have given place to a hundred or so individual wants, and to this cause we must attribute the confusion of ideas in our art, and especially that want of definite aim which distinguishes every old style. Perhaps it is hopeless now to expect anything like definiteness, since the individual is now "writ large" on everything. No longer the expression of a creed or state, architecture has to fulfil the independent requirements of a complex condition of society without any distinct aims.

Buildings, in their relation to business, health, and pleasure, are less considered than they are as profitable investments, exponents of the vagaries of style, or of the architect's taste. We find numerous evidences of this in any new suburb or growing town of importance. The large shop is built either for a draper, or an ironmonger, or chemist; the public offices are arranged often so that a portion of the ground floor can be let as shops; the swimming-bath is arranged to be used in the winter as a gymnasium or a concert-room; large blocks of residential flats are erected to serve as offices, and the ground floor is let as shops. Of course, we cannot expect good or expressive architecture to flourish under these conditions of tenure, or alternative uses, without a settled purpose. We cannot imagine a design adapted for two or three purposes that would be worth the name of architecture. It would be simply a fraud. Indefiniteness has been the ruin of architecture, as it has been of all our theological or political thought. Without a distinct aim there can be no conception—no idea worth clothing. The *laissez-faire* spirit has been at work in art, as it has in other departments. One of the reasons which has favoured indefiniteness in architecture is the revolt of the individual against all authority. He must be everything, and be considered before the society in which he lives; he must have his own views carried out in building as in other matters, no matter what the consequences are. He will not take a house or a shop unless it suits his particular whim as to convenience, and the consequence is the builder who looks for a fair remuneration cannot give any decided character to his new premises. This vulgar self-assertion has taken the place, it has been rightly observed, of the "old-world courtesy," and an evil restlessness peculiar to the 19th century dogs our steps everywhere. In building matters, it is as manifest as it is in politics or religion. Every man thinks and does as he likes, and any attempt to be governed by law, or to fall in with a scheme of co-operation, fails. But in art this individual spirit has taken away all definiteness, all point, all form, and the results are chaos and confusion. We look in vain for any of that aggregating and co-operating spirit which produced the old guilds of handicrafts, in which the talents of each individual subserved the society or craft in which he worked. All the former *esprit-de-corps* has vanished from amongst us. Even our legislators are promising to

every man that he shall have exactly what he wants if he only agitates for it. There may be a certain degree of health in this individualism, but there is also a vast deal of selfishness too; the spirit of sacrifice is absent. Let us apply these general principles to our architecture. Take our municipal buildings. How few of them can be said to possess a character of distinctiveness. The town hall has merged into a multiplicity of official departments. Our old guild halls had a character of their own. The public hall was impressed upon the design; they were situated in central sites of the towns, and this distinctness is to be seen in many of our old civic edifices, such as those of Winchester, Peterborough, Salisbury, Rochester, and many other cities that may be named. Even those which have been rebuilt during the present century have retained their public character. They have in some cases dignified Classic façades; in a few they are dull and uninteresting examples of the 18th century. But we cannot mistake them for private residences, or for other than public buildings. The noble city halls of Bruges, Antwerp, Brussels are, of course, unexampled for their dignity and character, and they were erected when the municipalities were flourishing, when the great manufactures of cloth and wool and other industries were carried on in those cities; they were the outcome of the guilds and trades, and the wealth of these municipalities was lavished in producing buildings that should vie with those of other marts. The rivalry was not that between small shops, carried on by separate individuals, but of whole trades, whose life and prosperity was centred in the trade. The great cloth halls, like that of Ypres, are examples of the prosperity of that trade, and were fittingly enriched with all the best art of the day. So with other trades. We have no longer the same motive for monumental art—the private company or the individual has taken their place. Our modern municipal structures are made up of offices and one large room or hall; few of them give any indication of any distinctive use. Such models as those of the Mansion House, London, the Leeds Town Hall, or the Hotel de Ville, Paris, were at one time taken as types of design, and are good examples of municipal edifices. Perhaps the Paris City Hall has been copied or varied more than any other; but what is suitable for the large square looks supremely ridiculous in a narrow street in some English town. The hall proper, with the low-hipped roof emphasised by a lofty clock-tower or belfry in the centre, flanked by higher pavilion roofs and chimney-stacks with the wide-arched entrances, composed a dignified façade; but where these features are copied in a building erected by a corporation for a sum of money equal, perhaps, to only one-tenth of the original, the travesty is indeed complete. Why imitate a palatial building when a collection of offices for surveyors, clerks, accountants, and others is to be the chief object? Why, indeed? Is it not because there is still a lingering desire to give a public character to the building? A court of justice or of sessions is still a function, and this can be made a feature; but it is now often stowed away in a back position in the municipal building, perhaps because a retired position is better. If we try to give a definite character to a building that has, to a large extent, lost its original purpose, we are led into all sorts of absurdities, as we may see in many recently-built offices—colossal towers or campanili, a Guildhall style of façade for a room without any distinct use, let out for miscellaneous meetings.

The office blocks, let out as chambers to business and professional men, may have a decided character if only architects would give up the attempt to make them palaces instead of offices, introducing domes and

turrets at the corners, or a style of fenestration more fit for a town-hall. The large modern hotel is one of the few kinds of buildings to which a distinct character may be given. It is erected by a company or syndicate, and it seeks to embody the life and city requirements of cultivated society. There may be the large quadrangular covered or open suites of rooms suitable for semi-state receptions, the club-rooms, and other separate but distinctive uses of men who have means, and prefer social surroundings to private residences; but it also has its limitations. Various tastes have to be consulted, so that any unity of aim is often impracticable. We may do much, however, towards unification by making more of the absolute necessities of each building instead of trying to suppress them for an ideal that is only visionary.

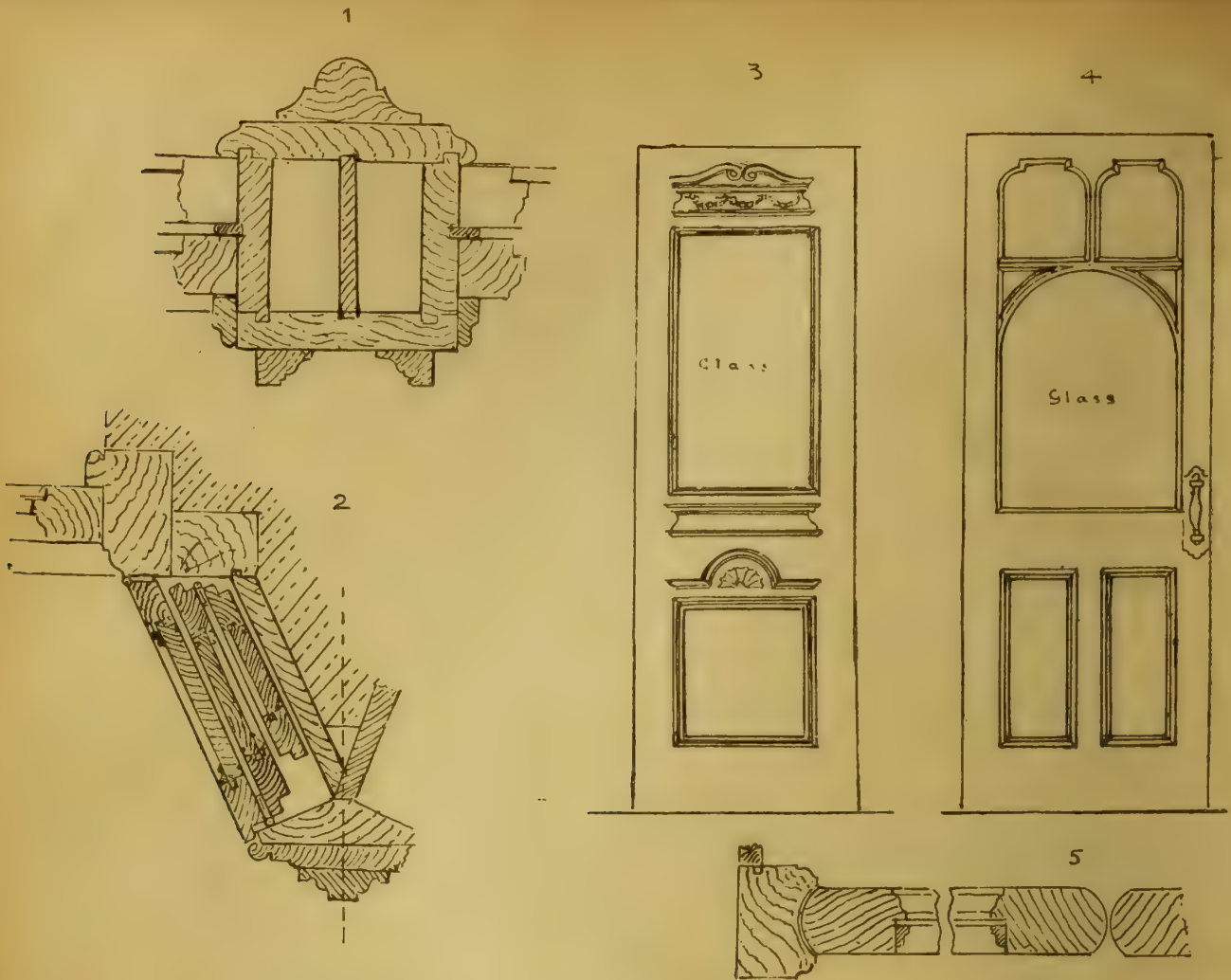
### MODEL SPECIFICATIONS.—XXXI.

#### SHOP-FRONTS, SHUTTERS, FITTINGS.

SHOP-FRONTS are very various, and call for special attention at the hands of the architect. We shall not here enter into the architectural character or design of these modern features. No doubt the modern competitive spirit for display and plate-glass has been mainly answerable for the inartistic and meagre designs we behold in every street. We should like to see a little more solidity in the mullions and bars, less unsupported plate-glass, and more of good joinery and woodwork, carved or otherwise. The French are less of shop-displays than we are, but their woodwork and carving are infinitely better and more varied. Nothing is more trumpery than the turned pillar about 2in. or 3in. diameter, with meagre cap and base rebated for the glass, or the ordinary sash-bar of wiry proportions. The exigencies of revolving and movable shutters have to some extent interfered with the architect and cramped him. Any bold mouldings or transoms have to be avoided, and the frame mullions and transoms have to be kept as flat as possible. Of course, a projecting fascia would obviate the difficulty—but it looks heavy. Then the space for the gearing of shutters, outside blinds, and other conveniences to some extent hamper the architect who desires to do something better. The low showboard is another feature that is difficult to treat in any artistic manner.

Our sketches show two simple arrangements of front with mullions and transom, in which moulded mullions with curved and shaped transom are introduced. Elevation 6 shows a moulded mullion with flat face, which is carried through transom, and the mouldings are mitred round. The flat projection can be made to represent a narrow pilaster. The dotted line on plan *b* represents the face of transom. Sometimes a wider and more pronounced pilaster is shown, with capital and base and shaped shaft, a treatment that looks effective; but it necessarily increases the width and depth of mullion. Elevation 7 is a plainer treatment, with moulded bars and transom, and the upper part filled in with small squares fixed or to open. Section 8 explains the treatment of the sill, transom, and head, and the connection of stallboard and showboard. Section 9 shows how the entablature is cradled out and built up, with space for gearing of revolving shutters, and 10 illustrates the metal groove for iron shutter, and No. 11 the metal stub and plate fixed on the lower rail of movable shutters. We shall give a few other details. The other sketches, 1 and 2, are examples of mullioned windows. Plan 1 illustrates a double pulley stile or sash-casing for a window with two lights, and the manner in which the plain faces of casing may be relieved—on the outside by a small shaft between hollows, and on the inside by bolection mouldings forming a panel; a wood





pilaster could also be placed on the outside face. Plan 2 shows the arrangement of the shutter boxings and shutters behind a narrow window pier or mullion. In this case the shutters project into the room, with splayed fronts and back-flaps, and are finished inside with a moulding fixed to shutter lining. Sketches 3, 4, and 5 represent two ornamental-framed swing doors of mahogany; the first has carved and shaped pediment and rail moulding fixed or doweled on; below is a plan of door-frame, and mode of forming stiles.

109. *Front Door of Teak.*—The entrance door to have 4in. by 4in. wrought teak moulded rebated and beaded frame with segmental (or elliptic) head, with twice rebated, beaded, and moulded transom with label moulding doweled to same. The door to be of 2½in. teak in three (or four) panels, bolection-moulded outside, with flush beaded panels inside (or loose beads) prepared for glass, with moulded label and rail piece on outside, and to be hung on 1½ pairs of 3½in. brass butts with steel washers. The fanlight opening, segmental (or elliptical), to be fitted with 2½in. moulded, rebated, and beaded light, hung to transom on 3in. brass butts, to open inwards, and to be provided with a brass quadrant. Provide door with a brass mortise lock and furniture, one brass night latch and two keys, two 10in. iron barrel bolts, a brass door-guard and chain (or state these are to be supplied by Hobbs and Co., or other well-known firm).

110. *Vestibule Mahogany Swing Doors.*—The screen to vestibule to have mahogany frame, 4in. by 4in., with side framings, moulded and rebated transom, and 2in. wrought mahogany fixed lights, with Spanish mahogany sash swing doors, each with two panels, according to detail; the lower ones bolection-moulded with raised panels, the upper panels to have moulded and rebated stiles with loose glazing mouldings, fitted with brass screws and cups, filled in with bevelled plate glass, bedded with felt or washleather. Dowel or tongue to rails the ornamental pediment and moulded and carved pieces shown. The doors to be hung on Hill and Co.'s or Archibald Smith and Stevens's patent floor spring hinges, and the

meeting stiles of doors and the frames to be rounded and hollowed respectively. The feet of all door frames to have wrought-iron dowels let into floors or thresholds. (Sometimes for expensive internal doors the jamb linings and architraves are in wainscot oak or walnut, with walnut four-panel doors and carved enrichment to mouldings, or oak jamb linings and architraves to hall side, and walnut panelled doors.)

111. *Shop-Front, Mahogany.*—The shop-front framing to be executed as shown in detail drawing, with 6in. by 4in. (or 4in. by 3in.) rebated, moulded and beaded wrought Honduras mahogany (or deal), frame grooved for inside linings; 6in. by 4in. (or 4in. by 3in.) mullions, and transom twice rebated, beaded and moulded with loose beads fixed with brass screws. The transom to have moulding rebated on outside and inside, and the sill to be 6in. by 4in. (or 4in. by 3in.) grooved and weathered. The stall-board to be framed as shown, with 2in. moulded and square framing in three (or more) panels in length, tongued at angles, with capping along top 6in. by 4in., rebated to sill, with moulded skirting; and 1½in. wrought deal grooved and tongued show-board, with moulded nosing on joists, 4in. by 2in., 12in. apart, resting on framed and braced supports 4in. by 4in., 2ft. (or 3ft.) apart, with heads, sills, and braces. The inner riser to be 1½in. panelled in front, with skirting to correspond to that of shop, with one or more framed doors, hung on 3in. brass butts, with brass handle and turn-buckle, &c., complete, to give access to space.

112. *Ornamental Shop-Front.*—The shop-front to be framed to the design and working drawings of the architect, and to his entire satisfaction; the mullions to be of solid Honduras (or Spanish mahogany or American walnut) 6in. by 4in. (or 7in. by 4in.), rebated, beaded, or moulded to design (or grooved for shaped or carved pillars); the sill to be 7in. by 4in., splayed at top, rebated and beaded and grooved for show-board; transom 9in. by 4in., with shaped head to design, rebated, beaded, and grooved for label moulding, and head to match, with turned angles in the solid shouldered on to stiles, and loose beads fixed with brass screws and cups for glass, and guard moulding outside. The fanlights to be filled with 2in. moulded sashes, with loose beads fixed with brass cups and screws, and glazed with leaded lights. The stall board to be framed with three (or more)

panels long, solid moulded and square, rebated to sill, and tongued and mitred at angles (or fill in panels with iron, cast or wrought-iron, grilles to design). Fix rebated and moulded capping and 1½in. skirting 8in. high on ground. The show board to be 1½in. (or 1½in.) wrought deal, grooved and tongued joints rebated to sill, and to be supported on 4in. by 2in. joists resting on framed supports, with heads and sills and braces. The riser to be 1½in. moulded and square, panelled to detail, with moulded nosing and skirting.

If the upper lights of shop-front are filled with small squares, specify—

Fill in above transom with 2in. by 1½in. (or 3in. by 2in.) deal (or mahogany) moulded, rebated, and beaded bars according to drawing (or fill in between mullions rebated for hinged lights, 3in. moulded and rebated casements divided into small squares by bars to detailed drawing).

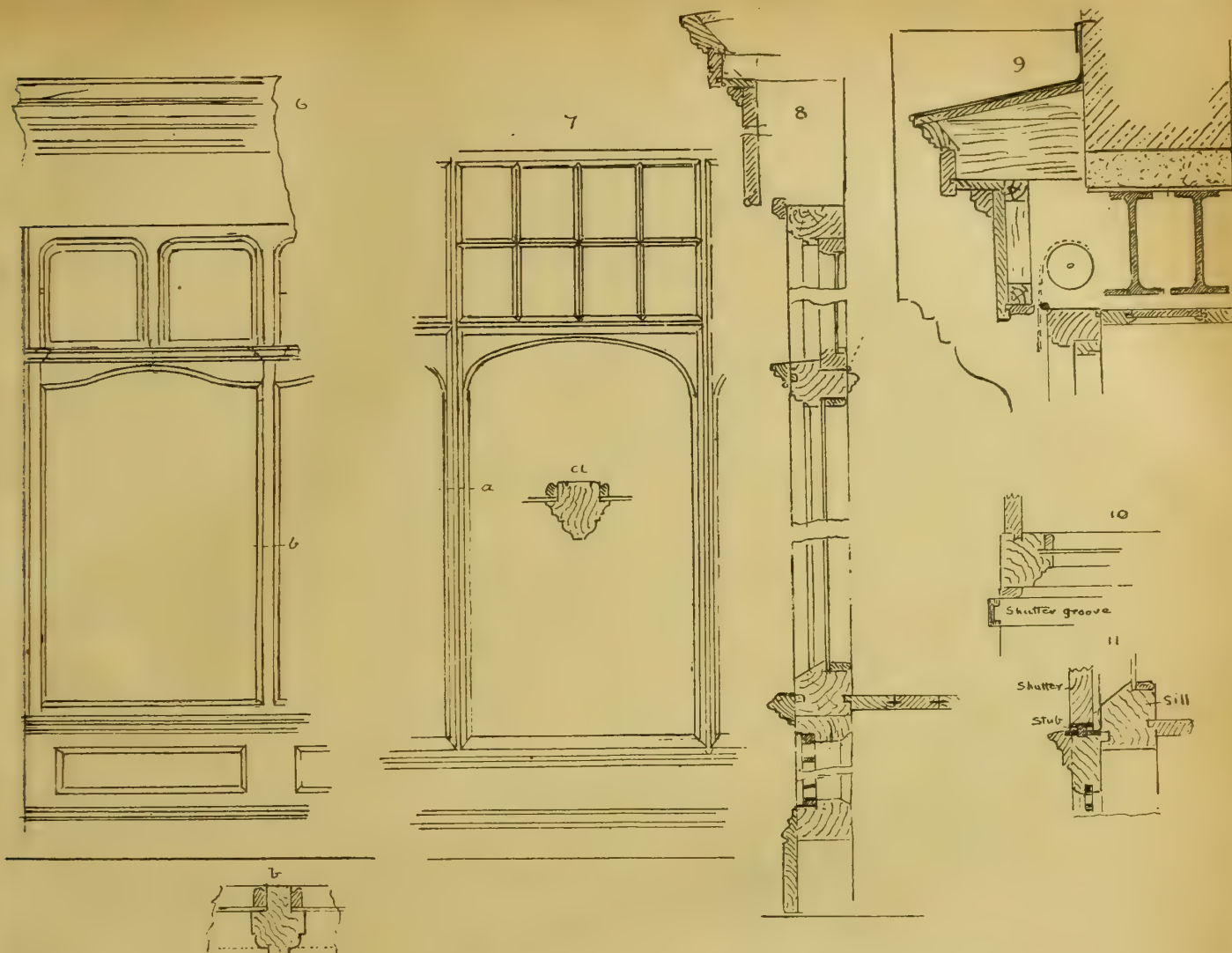
When brass sash-bars are required—

The sills, mullions, head, and bars to be of moulded polished brass of ½in. thick, with wood cores and inside moulded fillets screwed on. Sometimes, if the bars are very thin, iron back standards are fixed behind them.

113. *Movable Shutters.*—The shop-front to be provided with 1½in. bead butt, or flush and square, wrought deal framed shutters, three panels high, each shutter to be 14in. wide, rebated and beaded, each provided with two iron stubs and plate screwed to bottom rail to let into holes in the dado or outer rail of stall-board. The shutters are to fit into a metal or oak groove below the fascia board, and to have a proper wrought-iron shutter-bar and knuckle joints at angles, with plates, an iron or brass flush shutter-lift, &c., complete. Or—

114. *Revolving Shutters.*—The shutters to be of pine laths (convex section) connected by approved webbing, and steel (or copper band) to fall in three (or more) widths in iron grooves with steel springs, round iron barrels fixed on boxing behind fascia, with all necessary brackets, guide rollers, &c. Provide two (or more) movable deal pilasters 4½in. wide, with side iron grooves, heads, stub shoes, and plates, and with long-arm. The shutters are to be painted one coat in oil before





being sent out; or the shutters to be of flat, curvilinear iron or steel laths, supplied by Messrs. Francis and Co., or some other approved maker.

115. *Sliding and Folding Partition*.—Fit up in schoolroom the sliding and folding partition in six (or eight) leaves, hinged together and pivoted, as shown in detail, with patent top (or bottom) pulleys, with all necessary metal grooves, &c. (Or state name of patentee.) The folding panels are to be each in six panels 2in. thick, the lower ones moulded both sides, and the upper four prepared for glass.

116. *Counter*.—Fit up counter 2ft. 6in. (or 18in.) wide, of wrought Honduras mahogany moulded at edges with extra moulding, 2in. deep, screwed on below, with flap front 1ft. 6in. or 2ft. long on brass flap hinges, &c., complete. The counter front to be of 1½in. mahogany moulded (or bolelection-moulded) and square panelling, as per detail, with framed pilasters with moulded capping, and base or skirting fixed with brass cups and screws to framed grounds or backings. (State if it is to slant a few inches.) Provide framed and panelled door under hinged flap on 3in. brass butts. Fit up all necessary lin. wrought deal shelves on standards, with drawers, cupboard, and plinth board on bearers complete, with all brass handles, hinges, locks, bolts, &c.

117. *Shelves*.—Fit up round walls lin. wrought deal, grooved and tongued, matched and beaded, wall lining on 2½in. by ½in. battens, 2ft. 6in. apart, plugged to walls with skirting, and fit up against same three (or more) tiers of cross-tongued shelving, 12in. (or 18in.) wide, with front edges rounded, fixed to 3in. by 2in. deal rails and bearers on chamfered standards, 3ft. or 4ft. apart.

118. *Cupboards*.—The cupboards, 11in. (or more) in depth, to have 1½in. (or 1½in.) wrought deal grooved, rebated, and beaded framing, with circular corners grooved for rebated framing, and hang 1½in. (or 1½in.) folding two-panel moulded and square doors with rebated and beaded meeting stiles on 3in. iron or brass butts, brass cupboard lock, neck bolts, and handles complete. Put 1½in. grooved and tongued top fixed to bearers, with moulding, and provide and fix four or five tiers of lin. deal shelving on deal chamfered

bearers. The edge of framing to be let into plastering.

119. *Dresser*.—The dresser to be of yellow deal 6ft. (or 10ft.) long and 8ft. high, secured to proper plugs in wall; with 1½in. cut and shaped standards grooved for shelves, housed into (1½in. or 2in.) top, which is to be 2ft. 3in. wide; with 6in. skirting, round, lin. matched and beaded boarding at back; 1½in. shelves, 4in., 6in., 7in. wide, grooved for plates and dishes, housed into standards; drawers 9in. deep, with lin. fronts, beaded on edges, ½in. backs, sides, and bottoms; dovetailed at corners, rebated and blocked with two oak-turned knobs, with button, 1½in. grooved and tongued potboard with rounded nosing, grooved for riser, cross bearers and skirting 4in. deep, with 4in. by 4in. legs, rails for drawers; also a lin. top and fascia beaded, and a moulding between top and fascia, with all necessary brass knobs.

120. *Pilasters*.—The pilasters in hall to be framed of 2in. yellow deal (or mahogany) staves, rebated, glued, and blocked together with moulded panels in front, bases and caps, with mitres tongued or dowelled at angles, as detail.

The cornice and entablature over to be bracketed, blocked, and glued to design with moulded cornice dentils (or modillions), or carving as shown.

121. *Casings, Beams, &c.*—All casings to stanchions, beams, girders, &c., to be cradled or bracketed with 1½in. moulded and square beaded framings.

122. *Pipe Casings*.—All chases for pipes to have lin. deal rebated and beaded grounds, and ½in. pipe casing fitted, to be removed, and screwed with brass cups and screws. All linings to be tongued at the angles.

#### THE NATIONAL REGISTRATION OF PLUMBERS.

MR. LEES KNOWLES, M.P., who has charge of the Plumbers' Registration Bill in the House of Commons, speaking on Monday last in the Association Hall, Peter-street, Manchester, on the occasion of the distribution, by

the Lord Mayor of Manchester, of prizes that had been gained in connection with the competition and exhibition of plumbers' work in April last, held under the auspices of the council for Manchester and district for the national registration of plumbers, said that all parties in the House were committed to the principle of the Bill, the main object of which was to afford additional safeguards to the public health by enabling persons employing plumbers to select, when they desired to do so, those who had given evidence of their qualification for plumbers' work. There were opponents to the Bill, but when it was explained that it was not in any way intended to create a monopoly, they withdrew their opposition. The Bill conferred as it were a degree upon plumbers, and what they wanted was that this degree of registered plumbers should be recognised by the law. They had numerous illustrations of registration. Solicitors were registered in 1843, chemists in 1852, the General Medical Council in 1858, dentists in 1878, and veterinary surgeons in 1881, and he could not help but think that this subject was worthy of consideration. He was not speaking without experience. He had steered five Bills through the House, and he advised them to get representative meetings such as that. What they should do was to submit a representation to the Government and say that a Bill for the registration of plumbers was not merely an advantage for them but for the country. He was asked to take up the Bill in 1891, and in 1892 a Select Committee was appointed. A valuable blue-book was published, and all information could be got from it.

#### NOTES ON SPIRIT LEVELLING.

AT the meeting of the American Society of Civil Engineers Mr. Herbert M. Wilson, M.Am.Soc.C.E., presented a paper on "Spirit Levelling of the United States Geological Survey," giving a summary of the details of manipulation, the cost, the rate of speed, and the accuracy with which the work was performed.



In the correspondence on this paper which is printed in the *Transactions* a number of interesting points were brought out, drawn from experience in various localities. Mr. W. Carvel Hall, who had been running a line of spirit-levels in the South for the past two seasons, considered a rod with a flat foot resting on a conical surface preferable to one which rests in a cup-shaped turning point, not only on account of the greater chance of dirt clogging the foot of the rod and point, but because the radius of the cup-shaped point must be larger than that of the rod shoe, and it is possible that there may be a change of height with the rod apparently in the same position. The wedge-shaped stripes on the faces of the targets gave a much better mark for setting than either a plain stripe or the line of division between two colours. The form of the vernier obviated any parallax in the rod readings, the effect of which had been very large for the first 30 miles of the work referred to. On some days the leveller and rodman had differed 20 times in their reading of the same rod, though the personal equation was slight, as sometimes one was too high and sometimes the other. The cross-section of the latest rods was cruciform, which will be much superior to the rectangular shape adopted for the second set of rods, as these warped badly, and when the rod-levels showed them to be plumb other parts of the rods were inclined, making it difficult to bisect the target. The "double-targeted" rods save a great deal of time when it is required either to run in the reverse from the normal direction or to have the leveller check the rod reading before duplicating the lines in the same direction. As Mr. Wilson showed in his paper, a skin of paraffined wood is sufficient to prevent the rod from swelling on account of dampness, and is much better than thorough saturation, because then the screws will not hold, and the rod, being so heavy, it is difficult to keep it from being badly scarred and splintered. The level used in this work was very rigid, kept its adjustments well, and was remarkably steady in windy weather, as work had to be stopped on account of the rods before the instrument was much affected. The wind did not cause the level to vibrate, but made the bubble travel away from the wind, and that only in very bad gusts.

Mr. Wilson devoted some space in his paper to a consideration of spirit-level methods as distinguished from geodesic methods for such work, making reference to the lines run by Mr. C. H. Van Orden, assistant of the United States Coast and Geodetic Survey, from mean sea at Boston to the old Coast Survey "Gristmill" bench mark at Greenbush, N.Y., where the spirit-level determination was nearly a mean between two geodesic determinations. Professor T. C. Mendenhall, then superintendent of the Coast Survey, tested the instruments and methods used in this work, and stated the result was such as to give him great confidence in the line referred to. Mr. Wilson expresses in his paper a preference for spirit levelling. It seems, he states, that, providing the instrument is well made and substantial, and the bubble sufficiently sensitive, precise spirit levelling should be more accurate than geodesic levelling, because the operation is simpler and more direct, while its results are at once evident and unencumbered by complicated and bulky computations. The primary argument against geodesic levelling as compared with spirit levelling rests, says Mr. Wilson, on the fact that in the former all the burden of exact observing and recording rests on the shoulders of one individual, the level-man, whereas, in spirit levelling, the burden of these observations is distributed, resting not only on the level-man, but on two others, the rod-men, who, if they are fairly high-grade and intelligent men, constitute a valuable check on this stage of the work. Again, no instrumental errors—that is, errors by instrument construction—need enter into the spirit levelling which cannot be readily eliminated by adjustment, repeated rod settings, and equalised sights: whereas, in geodesic levelling, every error in instrument construction affects the work seriously, through the fact that it is used as an angle-reading instrument as well as a spirit-levelling instrument, and corrections must be made for errors of micrometer run, errors of collimation, &c. Mr. Hall points out a serious objection to geodesic levelling aside from those mentioned by Mr. Wilson, for the levelling instrument, when in use in the field, is always settling. There are very few cases where masonry can be used as a support, and as there is

nothing whatever which tends to raise the level it must settle. The worst places are where the frozen ground, thawed by the tripod legs, lets the instrument down quicker than usual, and it is almost impossible to keep the bubble centred. In geodesic levelling, after recording the reading of the micrometer head at each station, which indicates the point at which the bubble is level, it is assumed that the reading remains constant during the time of observing at that station. Mr. Hall does not think this can be the case, but that the instrument settles, and the vertical angle computations, instead of being based on a level line as assumed, are really based on lines more or less inclined, which, if true, introduces a serious source of error. Records of a single day's work are quoted to show the relative differences in heights of adjacent turning points. The sights were all between 295ft. and 305ft. long, and the total divergence between the two lines for that day was only 0.004ft. Six times no difference was made; eight times there was a difference of 0.001ft., ten times of 0.002ft., six times of 0.003ft., and twice of 0.004ft. All this difference cannot be charged to the incorrect centring of the bubble. Part goes to the settlement of turning points and instruments, part to "split thousandths," and part to the inaccurate bisection of the targets. Though the bubble may not be truly centred invariably, still the error, by careful manipulation, would be a balancing one, and of slight effect on the work. Mr. Hall believes better work can be done with the eight-second bubble than with the very delicate bubbles generally used in precise levelling, for they are affected by outside influences, and are not so integral a part of the instrument; consequently centring the bubble will frequently throw the instrument out of level. Though shorter sights must be taken with the coarser bubble, more work can be done with it in a day, because of its easier manipulation. The speed attained in the work of the Geological Survey during the past season has apparently been about 7.5 miles per day, against 5.6 miles for that of geodesic levelling, which Mr. Hall considers not such a great difference after all.

Mr. C. H. Van Orden could not agree with Mr. Wilson as to the non-importance of a bubble-tender, as he considers it of the greatest importance to have a man to keep the bubble in the middle of the tube at all times; so important, in fact, that it is to him nearly the difference between good and ordinary work. Professor Boersch, in the *Zeitschrift für Vermessungswesen*, after a discussion of the precise level, states that it remains always preferable in field observations, where the tripod is used, to employ bubbles which come to rest. Mr. Van Orden considered the double simultaneous line of the highest value—for check, if for nothing else—and urged its use even if it were to be run both ways. With a height of instrument common to both lines one is enabled to pick up small errors, such as one rod not on the highest point of the bench, mud on the bottom of the rod, mistake of an even hundredth in reading, &c. It is also important in making observations where there is refraction. Results do not verify the stress which has been laid on the value of short sights and of sights of the same length at all times. In the double line between Boston and Albany the lines diverged at one place by 12mm., and closed at Albany by a 3mm. separation, after having crossed and recrossed each other repeatedly. As to distance, great care was taken to have equal sights at each set-up, but otherwise the lengths of sights were constantly changing from 200ft. to 600ft.

Mr. Van Orden differed from Mr. Wilson in reference to setting the target accurately. He believes it is much better to set it nearly right and then estimate the number of thousandths the target is plus or minus, and at once correct the reading, but to keep on the margin or place ruled in the notebook for it the amount of such correction. By so doing much time is saved and much nervousness to both observer and rod-man, and consequent inaccuracies are avoided. It is fair to assume that the mistakes in these estimates will balance each other for each day. Conceding the fact that there is a small difference in lines run both ways, Mr. Van Orden cannot see why it should be so. When an instrument is set up and the back and fore sights have been read, that operation is completed, and as each set-up must involve a complete operation within itself, it is not evident what difference it makes whether the instrument has been picked up and carried from the east or the west. It is also stated that the

slowly swaying or waving rod, when at the highest apparent reading, will be perpendicular. This is disputed by a well-known engineer, and, although Mr. Van Orden does not question his sincerity, he feels sure that there was at the time some abnormal refraction.

Regarding the relative merits of the two systems, an extract is quoted from the report of the Geodetic Conference in session at the time and immediately after the Washington levels over the test benches around the capital were run by direction of Professor Mendenhall. Mr. Van Orden thinks that the chairman and a majority of the committee on hypsometry concluded that the wye level over the test circuit in Washington gave better results than the precise level; they felt that too few high-class lines had been run with the wye level to speak more definitely, but said that, while the experiments were "inconclusive, all point to a high degree of precision with the wye level, . . . and if upon investigation it shall appear that less elaborate methods of instruments than those employed on the survey will, by the use of small circuits, produce satisfactory results with an increase of economy, purely theoretical considerations should not prevent their adoption." Mr. Van Orden thinks wooden preferable to metal rods. For turning points he found the ordinary railroad spikes to be the best temporary ones he tried. Owing to their shape and size they were very firm. They were always left in the ground, thus enabling a mistake in reading to be picked up in a short time, instead of rendering it necessary to go back to a permanent bench, possibly a day's work behind.

Mr. R. Steckel could not see how a careful consideration of the theory of geodetic as compared with plain spirit levelling could influence Mr. Wilson's preference for the latter. In geodetic levelling nothing is left to chance; curvature, refraction, inclination of level, the quality of collars, errors of collimation, &c., are all taken into account and corrections applied according to the distance between level and rod. Further, should it be considered desirable to take the extra precaution and incur the extra expense of equalising the lengths of the fore and back sights by measuring them, as recommended by Mr. Wilson for plain spirit-levelling operations, all the usual errors would be practically eliminated in geodetic, the same as in plain spirit levelling. By adopting the former method, it would, moreover, be immaterial whether the instrument was perfectly in adjustment or completely out of adjustment, which would not be the case with plain spirit levelling. It stands to reason that the most potent factor in geodetic levelling computations, the distance from the rod to the level, is of no importance in plain spirit levelling, where the fore and back sights are approximately equal or differ from each other not more than 1ft.; neither is in it geodetic levelling under like conditions, but that such an equalisation is always expeditiously and economically obtainable when operating with an ordinary spirit-level is not so evident. Mr. Steckel fails to see how a minute error in distance between the focal centre of the instrument and the face of the rod can affect the results of geodetic levelling to a greater extent than it would plain spirit levelling.

He agrees with Mr. Wilson that in geodetic levelling, as usually performed, the results are encumbered by complicated and bulky computations; but he hopes soon to be in a position to dispense with some of these computations by using, in place of a plain spirit-level, a self-reducing Sangunt tachometer so constructed as to adapt it more advantageously to geodetic levelling. With such an instrument horizontal distances up to about 1,000ft. can be measured automatically, without any computation being required—viz., within 1ft. per 100ft., and by inverting the telescope and wire diaphragm, the level, which is a double-faced one, is reversed at the same time. Besides, by taking four rod readings, which determine three consecutive intervals, corresponding to 0.01, 0.005, and 0.005 of the distance from the rod to the tachometer, there is secured an unfailing means of checking in the office at any time both the height and the distance, should it be necessary to do so. These four rod readings are not obtained by noting the intersections of an equal number of horizontal wires stretched on a diaphragm, as the unequal lighting of the rod might in the long run lead to erroneous results; but with a single horizontal wire, which can be raised or lowered by a micrometer screw, automatically, as it were,





THE VICTORIA PAVILION, ON THE OVAL, FREEMANTLE, W.A.—MR. F. W. BURWELL, F.R.I.B.A., *Architect*.

so as to determine on the rod the series of intervals mentioned. Some self-reading target-rods, divided into feet, tenths, and hundredths, for use with the tachometer, have a double scale, or two scales, laid out along the same vertical and in one plane; beside which, they can be used with one or several sliding vanes.

The indiscriminate use of the same target line or stripe for very short as well as for comparatively long sights does not appear to Mr. Steckel to permit of the observer making uniformly accurate pointings throughout, or of the eye estimating with a uniform degree of precision the space that intervenes between the apparent intersection of the horizontal wire with the rod and the nearest division line of the rod scale. A centimetre space, for instance, cannot be bisected or trisected by the eye with the same degree of accuracy when it is seen at a distance of only 5 metres or 6 metres as when it is viewed from a distance of 100 metres or 200 metres. In this new tachometer rod the lines indicating the smallest divisions are put on so as to be practically undiscernible at a distance of about 100ft., only the larger divisions being intended to remain plainly visible at a greater distance. By this means the difficulty of making uniformly correct estimates of the parts into which a unit space appears to be subdivided by the cross wire is in a great measure overcome.

#### VICTORIA PAVILION, ON THE OVAL, FREEMANTLE, WESTERN AUSTRALIA.

**T**HIS building, shown in the illustration, has recently been erected on the Oval—the principal pleasure ground of the city—by the Municipal Council, Mr. Solomon, M.P., being mayor.

The materials employed in the construction were stone and brick, and the native Jarrah timber.

The accommodation consists of a suite of rooms for the use of the Governor, also offices for the committee, secretary, umpires, Press, and telegraph, together with large dining and refreshment-rooms, caretaker's quarters, kitchens, &c. Provision has also been made for cricket, football, bicycle, and other clubs, whose apartments are fitted up with lockers, bicycle stables, dressing-rooms, bathrooms, &c. Above these is the large grand-stand, with private stands for mayor and councillors, committee and Press. His Excellency the Governor, Sir Gerard Smith, laid the foundation-stone, and the Right Hon. Sir John Forrest, Premier of the Colony, opened the building. Out of thirteen competitive plans

received, those by Mr. F. W. Burwell, F.R.I.B.A., of Freemantle, were adopted, and the work has been carried out by him at a cost of over £5,000.

#### THE ECONOMICAL CARE OF MACHINERY.

**M**ACHINERY, to be of the greatest value as a money-getting, or labour-saving, appliance, should be kept clean and free from all dirt, dust, grease, &c., possible: a mere wiping with engine waste is not sufficient to keep all parts free from accumulation of dust, greasy or oily matters, while the application of alkalies for the removal of grease is one that cannot be recommended on any account, because of the oxidation or rusting of the metal that would be set up by the aqueous alkaline solution. Paraffin-oil, although a grease remover, is not volatile enough to evaporate quickly and leave no adherent grease behind it; benzene and other volatile hydrocarbons cannot be used on account of their inflammability. The following machinery cleansing fluid is one that can be highly recommended, as all greasy matters are removed by it, while the thin film of solid paraffin-wax that is left on the metal prevents the metal being oxidised (i.e., corroded or eaten into rust):—Put into a bottle 1 part (by weight) of paraffin-wax cut up small, 3 parts (fluid measure) petroleum spirit (say, 1oz. of wax to 3oz. of the spirit). Let this mixture stand until the solid is dissolved, and for use spread it on the metal to be cleansed. Allow it to remain thereon for 24 hours, and then rub it off with a dry woollen rag.

Economy in the conveyance of steam will save a large item in the coal-bill. Such economy is best effected by preventing the steam heat from evaporation. This is best effected by insulating the steam-pipes as much as possible from conducting the heat away. Such insulation is carried out by covering the outside of the steam-pipes with some material that is a non-conductor of heat. The following compounds have been practically used, and found of value.

No. 1. Make into a pulp or paste with a suitable agglutinant—as marine glue, finely-communited felt, cork waste, mineral wool (black furnace-slag made into “wool”), or asbestos. Pulp, and lay this pulp on the pipes as a plaster.

No. 2. Puddle clay to the consistency of stiff paste, and then work in some straw chopped up in lin. lengths. Lay this mixture on the steam-pipes for about lin. thick, and when it is dry, spread a paste or coat of infusorial earth (called also “fossil meal” or kieselguhr), made by mixing it with silicate of soda. When the coat is dry (known by its white appearance), then give a

second application of it. Afterwards brush over a coating of raw linseed-oil, when the covering will be complete.

Economy in raising steam is effected by having the boiler-pipes free from incrustation of “fur” or other solid matter which is deposited from water containing salts of lime and magnesia. There are many remedies on the market for effecting the prevention, or else removal, of such deposits; but nothing beats the use of caustic soda of about 20° Bé. Mr. J. L. Stead, of Skinner-lane Works, Leeds, makes an “anti-crustaceous fluid,” which only requires one pint per 1,000 gallons of water converted into steam per week. The writer has seen pieces of boiler scale  $\frac{1}{2}$  in. thick that have been removed by this fluid, while where it has been used before the formation of any scale, there has not been the slightest deposit of scale or incrustation on any part of the steam-boiler pipes. This fluid is suited for all kinds of waters—hard, soft, spring, rain, river, or sea water. The following compounds, that have been used and proved useful, are worthy of recommendation:—

No. 1. Ingredients (all parts by weight): 10 parts of catechu, 5 parts of potash, 5 parts of soda, 2 parts of lime, 1 part of common rosin, 20 parts of water. Method of preparation:—Boil the catechu in water (100 parts), and strain the decoction thus prepared; keep this fluid ready for use. In a separate vessel boil all the other ingredients for thirty minutes, and then allow to settle; finally mix the catechu decoction with this. For use, put 1 pint of this liquid per horsepower into the feed-water every six weeks.

No. 2. If the feed-water contains sulphate of lime, use the following (the proportions are calculated per 10H.P.):—Ingredients: 4lb. of catechu, 2lb. of dextrine, 4lb. of crystallised soda, 1lb. of potash, 1lb. of cane-sugar, 1lb. of alum, 1lb. of gum-arabic.

No. 3. For feed-water containing lime (for the same size boiler), use the following:—Ingredients: 4lb. of turmeric powder, 2lb. of dextrine, 4lb. of sodic bicarbonate, 1lb. of potash, 1lb. of treacle, 1lb. of alum.

No. 4. For water containing iron (same size boiler), prepare the following:—Ingredients: 4lb. of gamboge, 4lb. of soda, 2lb. of dextrine, 1lb. of potash, 1lb. of sugar, 1lb. of alum, 1lb. of gum-arabic.

No. 5. For sea-water boiler, same size, use the following ingredients:—1lb. of caoutchouc, 4lb. of sulphate of soda (Glauber's salt), 4lb. of dextrine, 1lb. of alum, 1lb. of gum-arabic. For use, mix either of the above fluids with half-gallon of water and put it into the boiler once a month; but for very bad water twice a month.

Another formula for sea-water 30H.P. boiler



is this. Ingredients: 8lb. of soda, 8lb. of dextrine, 4lb. of sugar, 1lb. of alum, 1lb. of potash.

If river-water be used, employ the following ingredients:—6lb. of crystallised soda, 6lb. of dextrine, 2lb. of alum, 2lb. of sugar, 1lb. of potash.

For dissolving incrustations already formed, and preventing further deposits, use either of the following:—(a) Ingredients: 250 parts of carbonate of baryta, 325 parts of ammonium nitrate, 225 parts of sodic chloride, 200 parts of animal charcoal. (b) Ingredients: 15 parts of sodic hyposulphite, 10 parts of rain-water, 10 parts of glycerine.

To conserve heat in steam-boilers that cannot be coated with the compounds already mentioned, cover them with paper prepared as follows:—Dip strong brown or other paper in a solution of silicate of soda, and, when dry, cover it with a mixture composed of 2 parts of magnesia, 2 parts of zinc-white, 4 parts of sodic silicate, and 1 part of linseed-oil, and when dry dip in sodic silicate again. Wrap this paper round the steam-pipes.

The following simple Rules for Management of Steam Boilers should be well grounded in the mind of every employé who has anything to do with the working of a steam-boiler.

1. *Condition of the Water.*—The first thing to do before unbanking or replenishing the fuel in the furnace is to carefully note the amount of water in the boiler, as indicated by the water-gauge.

2. *Low-Water.*—If the water in the boiler be low, at once damp down the fire with some ashes or else small coal. Do not turn on the feed-water under any circumstance, nor tamper with nor open the safety-valves. Let the steam outlets remain as they are.

3. *In Case of Foaming.*—Close the throttle, and keep closed long enough to show true level of water. If that level is sufficiently high, feeding and blowing will usually suffice to correct the evil. In case of violent foamings caused by dirty water, a change from salt to fresh, or *vice versa*, in addition to the action above stated, check draught, and cover fires with fresh coal.

4. *Leaks.*—When leaks are discovered, they should be repaired as soon as possible.

5. *Blowing-Off.*—Blow down under a pressure not exceeding 20lb. at least once in two weeks; every Saturday night would be better. In case the feed becomes muddy, blow out 6in. or 9in. every day. Where surface blow-cocks are used, they should be often opened for a few minutes at a time.

6. *Filling-up the Boiler.*—After blowing down, allow the boiler to become cool before filling up again. Cold water pumped into hot boilers is very injurious, from sudden condensation.

7. *Exterior of Boiler.*—Care should be taken that no water comes in contact with the exterior of the boiler, either from leaking joints or other causes.

8. *Removing Deposit and Sediment.*—In tubular boilers, the hand-holes should be often opened, and all collections removed from over the fire; also when boilers are fed in first and blown off through the same pipe, the collection of mud or sediment in the rear end should be often removed.

9. *Safety-Valves.*—Raise the safety-valves cautiously and frequently, as they are liable to become fast in their seats, and useless for the purpose intended.

10. *Safety-Valve and Pressure-Gauge.*—Should the gauge at any time indicate the limit of pressure allowed by the chief engineer, see that the safety-valves are blowing off. In case of differences, notify the chief engineer.

11. *Gauge-Cocks and Glass Gauges.*—Keep gauge-cocks clear and in constant use. Glass gauges should not be relied on altogether.

12. *Blisters.*—When a blister appears there must be no delay in having it carefully examined and trimmed or patched as the case may require.

13. *Clean Sheets.*—Particular care should be taken to keep sheets and parts of boilers exposed to the fire perfectly clean; also all tubes and flues and connections well swept. This is particularly necessary where wood or soft coal is used as fuel.

14. *General Care of Boilers and Connections.*—Under all circumstances keep the gauges, cocks, &c., clean and in good order, and things generally in and about the engine and boiler-room in a neat condition.

A new coat of paint on a boiler makes it look neat and trim, and at the same time prevents a risk of aqueous vapour reaching through cracks in the old paint. Owing to the heat to which the

metal of the boiler is subjected ordinary paints cannot be used. Asphalt varnish, however, even coal tar and graphite, thinned with turpentine, make an excellent paint for boiler fronts and pipes in boiler room. The steam-pipe for heating should not be painted, or, if required, should only have a very thin coat of lampblack and linseed-oil.

Steam-boiler cements are useful to have at hand in case of leaks. The following compounds will meet any want in the engine-room.

No. 1.—*Cement for Stopping Cracks in Steam-Boilers.*—Ingredients: 2 parts of finely powdered litharge, 1 part of very fine sand, 1 part of quick-lime, raw or boiled oil q.s. Make into a paste with the oil, and apply it quickly to the boiler cracks. Of course, the boiler should be cooled or cold before using the cement.

No. 2.—Ingredients: 6lb. of dried and powdered clay, 1lb. of iron filings, boiled oil q.s. Make into a paste, and fill up the cracks therewith.

No. 3.—Mix together equal weights of linseed-oil varnish, white-lead, oxide of manganese (pyrolusite), pipeclay. Grind up into a paste.

No. 4.—1 part of dried clay, 2 parts of sifted clean iron filings; acetic acid q.s. to make a paste.

No. 5.—8 to 10 parts of dried and powdered clay, 4 parts of iron filings free from rust, 2 parts of peroxide of manganese (black oxide), 1 part of sea-salt, 1 part of borax; water q.s. to make a paste.

No. 6.—1 part of sulphate of barium, 2 parts of clay, thick solution of silicate of potash and borax. Make into a paste; stands high heat.

No. 7.—50 parts of iron filings free from rust, 2 parts of flowers of sulphur, 1 part of powdered hydrochlorate of ammonia; water or urine q.s. to make a stiff paste.

No. 8.—4 parts of iron filings, 2 parts of loam, 1 part of powdered sandstone; salt water to make a paste; becomes very hard in setting.

No. 9.—Make a paste of silicate of soda and iron filings, or else use equal parts of oxide of zinc and oxide of manganese (i.e., black oxide or pyrolusite).

No. 10.—84 parts of sand, 166 parts Portland cement, 18 parts litharge, 0.90 parts powdered glass, 0.45 parts red lead, 0.90 parts suboxide of lead, linseed-oil q.s. Sift the solids together in the dry state, and then rub up in the oil.

#### ADJUSTMENT OF BELTING OF MACHINERY.

The proper adjustment of belting of machinery is a great source of economy. A belt that runs too loose is losing power: it has not sufficient grip or friction on the pulley to convert all its energy into work. A belt that is too tight requires more steam-power than is normally required to drive it. A belt that is run on the wrong side is also falsely worked. The following few directions concerning the management of leather belts will be valuable to bear in mind:—

*To Clean Belts.*—If they are not brittle or rotten, thoroughly wipe off excess of oil, and scrape the face with a sharp tool to take off the gummy matter; finally wipe the inside of belt with a little naphtha or gasoline on a cloth. Clean the pulley also.

*Slipping of Leather Belts.*—The slipping of belts is a great annoyance which is not always remedied by tightening. A ready remedy consists in sparingly sprinkling powdered whiting on the inside of the belting; this is the least harmful of powder to use. Rosin is bad, as it soon dries the leather and cracks the belt, while it is difficult to get it out of the leather, whereas whiting may be wiped off or washed off with water. The use of water on belts preliminary to oiling them is good. The belt should be washed on shutting down at night, or on Saturday after the closing of the works is better, and then the oil applied when the belt is dry. Never oil or wash a belt while stretched on the pulleys. If iron-faced pulleys were always lagged with leather there would be little complaint of the slipping of belting. But often this slipping is due to too much strain on the belts. There is economy in running wide belts, wider than is the usual practice. Many a 3in. belt has to do duty for a 4in. one, to the annoyance of the operator, and the ruin of the belt. A piece of rubber belting fastened round the belt pulley of an engine will keep the belt from slipping. As a temporary remedy in cases of emergency rub the inside of the belting with beeswax. Mr. J. L. Stead, of Leeds (already referred to), makes indiarubber cotton and hair belting (as well as leather ditto), which, for many purposes, is better suited than leather belts. He makes all widths and qualities,

and also eyeletted belting, which is extremely useful.

As regards which side of the belt to run, all the best belt-makers say run grain-side to the pulley, and it is claimed that one-third horsepower more can thus be transmitted than with flesh side to the pulley. The grain of the leather has a velvety surface which enables it to bring the pulley closer than with the hard flesh side. Some users run the flesh side to the pulley for small belts, and then daub and stick up the belt with beeswax or rosin to make it take hold; but this is not economical for the life of a belt; it is also unwashable, and there is always more or less fussiness in running machinery where the belts are so treated, instead of them running for years without any attention, as they will sometimes do when run grain side to the pulley, and of proper size to transmit the desired power.

*As a Preservative for Leather Belts,* castor-oil, vaseline, pure lard oil, or neat's-foot oil may be used to prevent belts from cracking. No grease or oil should be used that is of a heating nature, as, for example, linseed oil, which absorbs oxygen from the air, and by thus being oxidised would tend to burn up or rot the leather.

*A Belt-Grease or Lubricant* for making them run smooth and prevent slipping is prepared as follows: Prepare a lead-soap mass (i.e., make some linoleate of lead) by boiling 9 parts of linseed oil with 4 parts of litharge, with the addition of a small quantity of water. Boil this mixture until a sample when taken up shows the consistency of plaster—this is ascertained by allowing a few drops to fall into cold water and testing with the thumb and forefingers whether the mass is still smeary or can be twisted into a small ball. If the latter is the case, the boiling vessel is taken from the fire, allowed to cool somewhat, and sufficient of a mixture of equal parts of rapeseed oil and oil of turpentine or petroleum is added to make a mass of the consistency of cream.

*A Lubricant for Driving-Belts* is prepared as follows: Ingredients—5 parts of indiarubber cut up small, 5 parts of oil of turpentine, 4 parts rosin, 4 parts yellow wax, 15 parts fish-oil (sperm oil), 5 parts tallow. Method of preparation:—First, melt the rubber and turpentine together by putting them into a jar or bottle, and corking up and standing in a vessel of hot water; then to the mixture, while it is hot, add the rosin; stir well and heat until the rosin is melted, and then add the melted wax; and, continuing the stirring while that is melting, while this compound is still warm, add the mixture of fish oil and tallow which has been heated until the tallow has melted. Stir the whole mixture constantly until it congeals. This lubricator is applied to old belt upon both sides in a warm place, and, when the belts are in use, from time to time upon the inner side.

Another proportion in which to use the above components is this: 8oz. indiarubber or caoutchouc, 15lb.oz. of oil of turpentine, 14oz. rosin, 14oz. yellow wax; 48oz. fish oil, 8oz. tallow. Prepare as above. Instead of caoutchouc old waste rubber can be used; but it must be first boiled with soda lye for 15min. to 20min., and instead of 8oz. 12oz. must be used.

*Cement for Leather Belting.*—Leather belting frequently requires to be cemented together. Unfortunately, there is no good cement for such purpose. The best of what there is consists in making a kind of artificial leather by first coating one piece of the leather with softened gelatine and the other piece of leather with a solution of tannic acid or nut-gall. These astringent bodies convert the gelatine into a kind of artificial leather, which acts as a cement, and unites the leather when subjected to hydraulic pressure.

Another cement for joining driving-belts is prepared from the following ingredients:—10 parts (by weight) of bisulphide of carbon, 1 part (ditto) of oil of turpentine, gutta-percha sufficient to form a paste when dissolved in the above mixed fluids. Clean the pieces of leather from all grease and oil by placing a rag upon the surfaces and a hot iron on the rag, so as to cause the rag to absorb the oil from the leather; then spread the above paste on both pieces of the leather, and subject them to pressure until the cement is dry. The writer has recently formulated a cement for joining leather to leather, or to any other materials, no matter whether the material be of wood, stone, metal, brick, plaster, &c. By the employment of eyeletted belting, such as Messrs. Stead's make, cementing by leather is dispensed with, as the



ends of the belts can be lapped over and bolted through the eyelets.

Belts may be laced together thus: Cut off the ends square, make the holes in the leather with a small punch at a suitable distance from the end; the size of the hole and the distance of them depending on the width of the belt. Tie the end of the lace with a square knot in the middle of the outside, for the corners of the belt, where it is cut, are most exposed, and apt to whip out. The laces should be of the same thickness from end to end. If the laces have very thin spots in them such laces should be used only on short belts, not on long ones. The holes must be made at equal distances apart, and not too many of them. Every hole weakens the belt, and none that are not absolutely necessary should be cut. All new laces, as well as new belts, should be stretched by hanging weights on them before being used. Do not bore the hole with an awl; always use a hollow or cutting punch, as by the use of the awl the holes are apt to be made irregular, and much larger than there is need for.

Lubricants for machinery are of such a diverse nature, and special lubricants are required for special parts of machines, that such substances deserve a short article to themselves.

### VENTILATING AND WARMING SCHOOLS.

THE Local Government Board have just issued an elaborate report by Mr. Wm. N. Shaw, F.R.S., of Emmanuel College, Cambridge, on ventilating and warming in certain Metropolitan Poor Law Schools. It gives the opinions of an expert on both questions, and we, therefore, give some passages of general interest. He first lays down the general principles upon which his criticisms are based. First, as to the amount of air required for ventilation. Since the rooms can be thoroughly aired by opening the windows fully in the "recess," after about an hour's use we may restrict the amount of air to that required for keeping the air within the limits of respirable impurity for an hour. This consideration enables us to reduce the supply from that required for ventilating with a view to continuous occupation in the ratio of two to three. Dr. de Chaumont fixed it at 2,000 ft. per hour for an average audience. If we allow some deduction on account of the members of the audience in our case being smaller than the average, we may, perhaps, put down 1,500 ft. per hour per child as the amount required. Dr. Carnelly, in his "Report on the Heating and Ventilation of Schools," wherein he supported the view that mechanical ventilation by propulsion is the best method in practice for ventilating schools, quoted quantities between 800 ft. and 1,400 ft. of air per head of accommodation as supplied by mechanical arrangements in good order at certain schools reported upon, so that 1,500 ft. per hour would seem to be a good allowance. This allowance per head implies, however, an enormous flow of air through the windows or other openings by which air is supplied for ventilation. We require for classrooms more effective cross ventilation, and a greater window opening than in the case of dormitories. At the same time there is need for quite as great, or even greater, care to protect the children against draughts, for they are more exposed to the cold than when they are under the bedclothes. It is not, therefore, a matter for surprise that when schools are to be ventilated the mechanical method, by which a certain definite volume of warmed air can be delivered where it is wanted, should gradually gain ground as the most effective method of solving a difficult problem. As regards temperature, Morin gives 59° Fahr. as the proper temperature for schools. Some latitude may be allowed, but the temperature ought not to fall below 57° Fahr. In order to maintain the temperature, closed stoves, open fires, fires with fresh-air supply, hot-water pipes, steam pipes, or steam radiators are used in different schoolrooms. Closed stoves cannot be regarded as a permissible form of heating for rooms that require warming and ventilating for a number of persons distributed more or less uniformly over the whole floor space. Their numerical efficiency as warming agents is very high; but they afford very little assistance to the ventilation. The most serious practical difficulty arises when the warming has to be combined with ventilation for a large number of persons. All the air inlets are cold. The stove distributes most of its heat by

conduction, the direct heating is very local, and is associated with a rapid upward current of very much heated air all round the stove. The cold incoming air reaches the stove by coming through floor ventilators, or by dropping down to the floor and moving along it towards the vertical rising column round the stove. Before it becomes warm it has already performed its ventilating. There is, therefore, no satisfactory distribution of heat and air together. A room heated by closed stoves is always close if it is warm.

Open fires are themselves very active ventilators; they are unsuitable for warming and ventilating rooms occupied by a large number of persons, because they distribute their heat mainly by radiation, and in a schoolroom it is practically impossible to distribute the desks so that each occupant gets an equal share of the radiation. Generally speaking, some get the advantage of the fire with a cold current of air to their feet by way of ventilation, others get a supply of fresh cold air to their backs, but lack the necessary warmth. The ventilating grates with fresh air supply afford considerable improvement, if the supply of warmed air can be successfully distributed over the room. The warmed air naturally rises at once to the ceiling, and there is danger of its passing into extract flues without having been used. In a room warmed by an open fire there is an upward current of air near the grate rising to the ceiling and passing along it. The warmed air from behind the grate should be delivered into this current. The system is very much disturbed when a room is lighted by gas-jets unprovided with separate flues, for in that case a reservoir of air vitiated by the gas collects at the ceiling and must find its way out at the top of the room, otherwise the whole air of the room becomes very heavily loaded with impurities due to the gas. To deliver warmed fresh air into this reservoir of heated and vitiated air is simply to waste it. It is from this point of view an advantage to have the amount of air delivered from behind the fires as large as possible and only slightly warmed, and to have it delivered not higher than the top of the grate. One open fire will provide ventilation for about 14 children in a class-room under the conditions indicated. A good deal of supplementary ventilation will therefore be required in the way of cross ventilation, where a classroom for 60 children has only a single open fire. Hot-water pipes and steam pipes distribute the heat satisfactorily, and they diffuse the air of the room by the local air circulation which they produce; but, as applied to schoolrooms, they are open to the objection that of themselves they give rise to so little head for ventilation that it is difficult to get the necessary amount of air through the rooms. The ventilation has, in fact, to be provided for independently.

### SOME SPECIAL SPIRIT VARNISHES FOR DECORATORS' USE.

THE manufacture of spirit varnishes is a comparatively simple affair compared with that of oil varnishes. In the latter case special plant has to be used, and suitable premises selected for operations, whereas, in the case of spirit varnishes only, a shed or workshop free from dust will answer. The only apparatus required are casks, tubs, or other suitable vessels in which to dissolve the "gums" and resins.

With some brands of spirit varnishes heat is required to effect solution of the gum or resin in the spirit. Owing to the inflammability of the spirit or other solvent fluid a direct heat should not be used, but only such as can be obtained by the heat of a sand or water-bath. Such a suitable appliance is easily and readily made by selecting a suitably large iron or other metal receptacle that can be placed over a source of heat and filling this vessel three-parts full with clean dry sand. Into the sand the vessel, jar, tin, or bottle holding the gum and solvent fluid is placed so that the sand reaches a few inches up the sides of such vessel, and a layer of sand rests between it and the metal of which the sand-bath is constructed. The sand in such bath is then heated by means of a fire below the bath, and as the sand can thus be heated to a very high temperature, which can be regulated at will, a very safe method of heating the inflammable contents of the jar is obtained.

Some resins and gums do not require a greater heat than the temperature of boiling water, in which case the water-bath is capable of being

used. This kind of bath simply consists of a vessel partly filled with water, into which the jar holding the gum and solvent fluid is stood, and the vessel placed over a fire or source of heat, so as to cause the water to boil. To prevent the jar, or other vessel that may be used, becoming cracked by the heat, it is best to stand it on an earthenware tile in the vessel of water. Another point to attend to in using such appliance is to guard against the steam or vapour which is given off from the water entering the vessel containing the gums and solvent, for if it should do so the varnish will be spoiled: it will exhibit an opalescence or milkiness. This is so because spirits of wine readily absorb water, and as the presence of water in a varnish will cause a deposition of the gum or resin in a very finely divided state, the presence of this precipitated resin in the varnish "chills" or dulls it, causing it to bloom. The best way to stop the ingress of vapour is to lay a sheet of stout paper over the mouth of the jar or vessel, or else plug it up lightly with cotton wool. Never on any account cork up the vessel, for if you do you run the risk of an explosion, because as the spirituous solvent becomes heated it will also be partially vaporised, and if the pressure of this vapour be too strong in the vessel, it will burst the vessel if tightly confined; whereas by adopting one or other of the methods just specified any extra pressure of the vapour will raise or blow out the wool instead of bursting the jar or bottle.

When the varnish is one that can be made without the aid of heat, any tub, glazed pan, or other suitable vessel with a cover to can be used into which the resin and solvent fluid are put, and the mixture frequently stirred or agitated until the solids have dissolved. This operation frequently occupies some weeks if large quantities of varnish are under preparation; but the operation can be considerably facilitated and shortened by fitting up a cask on pivots at each end, and after putting in the gum and solvent fluid, corking up tightly, and then set the cask revolving. The cask should be well cleaned out after each operation by means of a similar solvent fluid to that which has been used in preparing the varnish. Such washing fluid can be utilised either in the making of common varnish, or it can be sufficiently clarified for future use by allowing it to stand undisturbed for some considerable time, and then pouring off the clear fluid from the dregs. A record should be kept, in some book for the purpose, of the name of this solvent fluid, so as not to make the mistake of using it in the making of some varnish for which it is unsuited.

Straining or clarifying spirit varnishes is necessary before they are fit for the market. Some resins are much mixed with *débris*—of leaves, twigs, dust, &c.—and as a consequence deposit a quantity of dregs which would spoil the varnish if not removed. To effect such removal, the usual and cheapest (but longest) process is to allow the varnish to clarify by standing undisturbed for some time. A quicker process consists in straining or filtering the varnish. The straining process consists in straining the varnish through a piece of muslin or other suitable fabric placed over the mouth of a receiving vessel. The filtering of a spirit varnish is a much more elaborate affair, as, owing to the loss of spirit by evaporation, the varnish thickens if the operation occupies some time. To guard against the loss of volatile solvents, it is usual to have the apparatus used air-tight.

The commonest method of filtering spirit varnishes is to plug up the neck of a glass funnel with cotton-wool, fill the funnel with the varnish that is to be filtered, and stand a sheet of glass over the funnel so that the spirit shall not evaporate. A warm temperature should be maintained, and if the varnish be filtered hot, the quicker will be the process. To some special superfine varnishes a vessel fitted with a tube and tap is connected with an air-tight funnel, and this funnel is supported by the receiving vessel. The varnish to be filtered is put in the vessel with a tap; such a vessel is placed on a shelf above the funnel, the tap is turned on, and the varnish allowed to escape into the funnel, in the neck of which is a plug of cotton wool. By this means as little air as possible reaches the varnish, and consequently its correct consistence is maintained. In the present paper the formulae selected are for

### SPECIAL SPIRIT VARNISHES FOR DECORATORS' USE.

Owing to the porosity of wood, whether hard or soft, it is usual to give the wood a coat of



# EAST HAM DISTRICT COUNCIL PROPOSED PUBLIC BUILDINGS

FIRE ENGINE STATION  
PUBLIC BATHS &  
OFFICES for SANITARY  
DEPARTMENT



GROUND FLOOR PLAN

SCALE OF FEET

SECOND PREMIATED DESIGN: THE PUBLIC BATHS.—MESSRS. SPALDING AND CROSS, Architects. (See Page 445).

size, or some special "wood filler," so as to prevent the varnish being absorbed in the pores of the wood. Ordinary glue size is the material generally used; but if potato starch or similar substance be used as a filler, it is apt to cause the coat of varnish to effloresce or show white spots and particles.

**Brilliant Elastic Varnish for Soft Woods.**—Ingredients: 6lb. of sandarac resin, 4lb. of elemi resin, 1lb. of anise resin,  $\frac{1}{2}$ lb. of camphor, 2 gallons of methylated spirit. Preparation:—Crush up the resins and dissolve them in the spirit at a gentle heat. Sandarac resin coheres very tenaciously, and consequently takes a considerable time to dissolve unless aided by heat. The addition of coarsely-powdered glass to spirit varnishes made from sandarac, mastic, and other coherent resins facilitates the solution of the resin in the spirit, as the coarse particles of glass prevent the gum coalescing into a solid mass. The addition of camphor in this varnish renders it extra soft and elastic; but owing to the presence of the camphor, such varnish should be used only in a warm, dry air and on perfectly dry wood;

otherwise it will bloom. A damp or cold air will cause a deposition of the camphor in the varnish, and thus bring about an opalescence.

**Spirit Varnish for Pitch-Pine.**—Ingredients: 10lb. of orange shellac, 10lb. of sandarac resin,  $1\frac{1}{2}$  gallon of methylated spirit. Preparation: Mix the shellac and resin together before putting it into the spirit. Dissolve by agitation in the cold, or by the aid of a gentle heat. The colour of this varnish is a straw or yellow one.

**Spirit Varnish for Walnut.**—Ingredients: 4lb. sandarac resin, 2lb. seed lac, 1lb. elemi resin, 2lb. Venice turpentine, 4gal. of methylated spirit. Preparation: Dissolve the three resins in the spirit, and after solution add the Venice turpentine, mixing well by stirring. Allow to clarify by standing. The Venice turpentine prevents the varnish becoming very brittle.

**Spirit Varnish for Brown Oak.**—Ingredients: 6lb. sandarac resin, 4lb. shellac, 8gal. strong spirits of wine, 3gal. turpentine varnish. Dissolve the sandarac and shellac in the spirit, and when dissolved mix in the turpentine varnish, and strain for use.

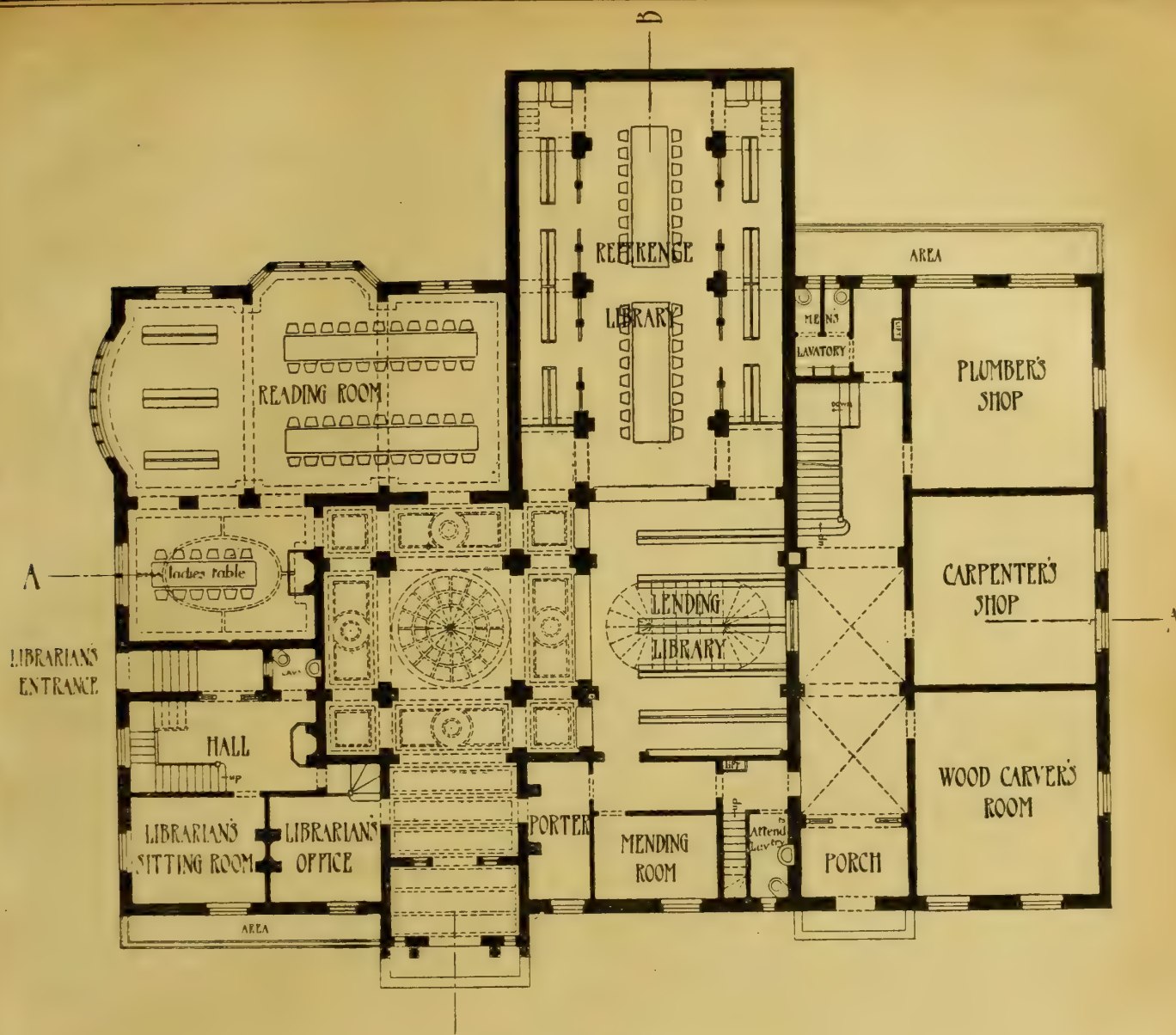
**Varnish for General Use on Wood.**—Ingredients: 10lb. of shellac, pale orange; 14lb. of mastic resin,  $1\frac{1}{2}$  to 1 $\frac{3}{4}$ gal. of methylated spirit. Preparation: Dissolve by cold digestion, with frequent agitation.

**Quick-Drying Varnish for Soft Wood.**—Ingredients: 1lb. shellac, 2oz. camphor,  $1\frac{1}{2}$ gal. of methylated spirit. Preparation: Dissolve at a gentle heat, with frequent shaking up.

**Common Varnish for Rough Work.**—Ingredients: 6lb. common brown rosin, 5 pints spirit of turpentine,  $7\frac{1}{2}$ gal. of boiled oil. Preparation: Dissolve the rosin in the turpentine by cold digestion and frequent agitation, and then mix in the oil, and after well incorporating the ingredients, allow it to clarify by standing, and thin with turpentine if desired.

**Spirit Copal Varnish for White Wood.**—No. 1. —Ingredients: 4lb. copal resin, powdered,  $\frac{1}{2}$ lb. camphor, 2gal. of methylated spirit. Preparation: Dissolve the camphor in the spirit, and then put in the copal, and heat the mixture over a sand bath until the copal is dissolved. Turpentine may be used instead of the methylated





## GROUND FLOOR PLAN

SECOND PREMATED DESIGN, EAST HAM PUBLIC BUILDINGS: THE PUBLIC LIBRARY.

MESSRS. SPALDING AND CROSS, Architects.

spirit, the proportion to use being 6lb. of copal, 2gal. oil of turpentine, 3oz. of camphor.

No. 2.—8lb. of copal resin, melted by heat before added to the solvent fluid, 2lb. of balsam of capivi heated, 10lb. of spirits of turpentine. Preparation: Make the turpentine hot, and then add the resin and balsam, and dissolve by the aid of heat.

*Varnish for Use on Ornamental Ironwork.*—Ingredients: 3lb. copal resin, melted and added when cooled, 6lb. of sandarac resin, 2½lb. of mastic resin, 2½lb. of clear turpentine, 4gal. of methylated spirit. Dissolve by gentle heat. Powdered glass may be used to facilitate the solution of the resin, in which case the varnish must be strained before use.

*Colourless Varnish for Soft or Hard Woods.*—Ingredients: 10lb. of dammar resin, 5lb. of sandarac resin, 1lb. of mastic resin, 20lb. of oil of turpentine. Preparation: Dissolve by the aid of heat, and thin with turpentine q.s.

*Varnish for Mahogany.*—Ingredients: 4lb. of shellac, 8lb. of sandarac resin, 2lb. of mastic resin, 2lb. of elemi resin, 2lb. of Venice turpentine (or else colophony), 1lb. of dragon's blood, 1lb. of annatto, 5 to 6gal. of methylated spirits. Preparation: Digest the dragon's blood and annatto in the spirit until the fluid is well coloured. Then filter off and dissolve the resin in the coloured fluid.

*Varnish for Gilded Wood.*—No. 1.—Ingredients: 1 part of shellac, 1 part of gamboge, 1 part of dragon's blood, 1 part of annatto, saffron q.s., 50 parts of spirit of wine. Preparation: Divide the spirit into five equal quantities, and

in each lot of spirit digest one of the colouring matters and the shellac. Strain or filter each lot of coloured spirit, and then mix them, and finally add the shellac solution. By mixing the coloured spirits in various proportions, so the tone of colour of the gilding can be made redder, yellower, &c., as desired.

No. 2.—Ingredients: 1 part of gamboge; 8 parts of dragon's blood; 1 part of turmeric; 40 parts of shellac; 40 parts of sandarac; 320 parts of oil of turpentine; all parts by weight. Digest all the ingredients in the turpentine for a few weeks, and then strain or filter.

*Cheap Varnish for General Use.*—No. 1.—Dissolve 24oz. of shellac in 1 gallon of naphtha.

No. 2.—In 1 gallon of naphtha dissolve 12oz. of shellac and 3oz. of copal resin (powdered).

No. 3.—1 gallon of methylated spirit; 24oz. of shellac; 4oz. of seed-lac; 4oz. of sandarac resin; 2oz. of mastic.

No. 4.—1 gallon of methylated spirit; 32oz. of shellac; 4oz. of benzoin.

No. 5.—1 gallon of naphtha; 10oz. of shellac; 6oz. of seed-lac; 6oz. of sandarac resin; 6oz. of copal varnish; 3oz. of benzoin.

Dragon's blood, turmeric, or any other of the vegetable colouring matters, may be used for darkening these varnishes. Aniline dye colours will not dissolve in turpentine, only in methylated spirits, so that they cannot be used in the above varnish.

*Colourless Varnish for Superior Work.*—Ingredients: 1gal. of methylated spirit, 24 fluid oz. of ether, 1lb. of Venice turpentine, 13½oz. of sandarac resin, 4oz. camphor, 24oz. of oil of lavender,

5lb. of mastic resin. Digest in the cold, with frequent agitation, and strain before use.

*Spirit Varnish for Metal Work.*—Ingredients: 2 parts of water, 1 part of camphor, 3 parts of sandarac resin, 1 part of elemi resin, methylated spirit q.s. Dissolve the solids to the consistency of thin syrup.

*Hard Durable Varnish for Metal.*—Ingredients: 2 to 3 parts rectified spirits of wine, 1 part copal resin, 1 part oil of rosemary. Digest all together at a gentle heat.

*Cheap Varnish for Oak.*—No. 1.—Ingredients: 3½lb. of colophony, 1gal. of turpentine. 1½lb. of Canada balsam can be added to make this varnish more flexible.

No. 2.—Common Varnish.—Mix 4 parts of Venice turpentine with 5 parts of oil of turpentine, both by weight.

No. 3.—Ditto for Wood or Metal.—2gal. of drying oil, 1gal. of turpentine, 6lb. of common rosin. Melt the rosin, make the oil hot, and mix while hot with constant stirring, and, when cool enough, add the turpentine so as to thin the compound.

*Varnish for Plaster Mouldings, &c.*—Ingredients: 1 gallon of water, 2oz. of curd soap, 2oz. of white wax. Cut up the soap and wax, and dissolve them in the water by boiling until the mixture is homogeneous. Allow this varnish to cool, and lay on cold with a brush. The porosity of the plaster will not affect this varnish, nor will it sink in. A dull polish can be obtained by rubbing the varnished surface with a piece of felt or flannel.

A flexible shellac varnish is made for general



use as follows:—Ingredients: 12 parts of shellac, 12 parts of methylated spirit, 5 parts of castor-oil, aniline dye colour q.s. Preparation: Colour the spirit by dissolving a small quantity of a suitable coloured aniline dye in it, then dissolve the shellac in the coloured spirit, and finally mix in the castor-oil to give flexibility. All parts by weight.

*Soft White Spirit Varnish.*—Ingredients: 1 gal. of methylated spirit, 2oz. of camphor, 4oz. of anise resin, 16oz. of elemi resin, 24oz. sandarac resin.

*Hard White Spirit Varnish.*—1 gallon of methylated spirit, 2oz. of turpentine, 8oz. mastic resin, 16oz. sandarac resin. Dissolve at gentle heat.

*Hard Brown Spirit Varnish.*—No. 1. One gallon of methylated spirit, 1lb. of sandarac resin,  $\frac{1}{2}$ lb. seedlac, 4lb. elemi resin, 8lb. Venice turpentine. Add the Venice turpentine to the compound after having dissolved the other resins in the spirit.

No. 2.—1 gallon of methylated spirit, 1 pint of turpentine varnish, 1lb. shellac,  $\frac{1}{2}$ lb. of sandarac resin. Dissolve the lac and resin in the spirit, and then mix in the turpentine varnish.

No. 3.—Ingredients: 1 gallon of methylated spirit, 12oz. of seed lac, 12oz. of colophony. Dissolve in the cold.

*Polishing Varnish for Hard Wood.*—Ingredients: In every 16oz. of oil of turpentine dissolve 2oz. of beeswax and  $\frac{1}{2}$ oz. of colophony at a gentle heat.

Another varnish for a similar purpose is obtained by dissolving 8oz. of dammar resin in 16oz. of oil of turpentine in which  $\frac{1}{2}$ oz. of camphor has been dissolved. The varnishes are used by rubbing on with a piece of flannel and polishing by rubbing with a piece of cloth. They are useful for mahogany, polished oak, or other woods of which it is desired to show the grain in its natural state without being polished.

*Turpentine Varnish.*—Ingredients: 1 gallon of spirit of turpentine, 5lb. of clear rosin (colophony). Dissolve at gentle heat. H. C. S.

## CHIPS.

The corporation of Falmouth have decided to purchase the Gyllyngdune estate for £13,000.

The urban district council of Saxmundham have adopted a scheme for the drainage of the town, prepared by Mr. H. J. Wright, of Ipswich.

The estate of Niggley, in Erie, Orkney, was exposed for sale at Kirkwall on Friday, and, after competition, was sold at £1,325. The property extends to over 200 acres, and is at present held under a lease maturing two years hence.

A limited company has been formed at Halifax for the erection of a public hall in that town, at the junction of Commercial-street and Fountain-street. At a meeting of shareholders held on Thursday of last week, the chairman stated that the plans the directors had selected provided an auditorium that would provide a total accommodation of 2,662 seats. Provision would also be made for a lecture-hall. A special floor for dancing would be constructed. There would be four exits from each level, and a wide passage would be formed round the auditorium. From all parts of the hall the view would be unobstructed. The building would be fireproof throughout, steel and concrete being used. Nearly the whole of the work had been let to Halifax tradesmen. The contracts amounted to about £20,482, and to this must be added the cost of the land. They had not yet provided for the organ, and he put the total cost at £30,000.

A United Free Methodist chapel is in course of erection at Padsey, near Leeds. The contractors are Messrs. Appleyard Brothers, of Bramley.

The death of Mr. John Whaley, joiner, of Ellis Leazes, Durham, and a town councillor of the city, is announced. Mr. Whaley, who had carried on an extensive business in that city for many years, was widely known in the town and district. He had been a member of the corporation for over six years.

A new school erected for the Willesden School Board at the corner of Chamberlayne Wood-road and Harvist-road, Kensal Rise, were opened last week. The schools afford accommodation for 1,270 children—400 boys, 400 girls, and 470 infants. Each department has a large central hall and eight classrooms. The school has a cookery-room, laundry, and washhouse adjoining the main building near the girls' entrance. The floors are fireproof, being constructed with concrete, supported on steel girders. Mr. Laurence is the architect, and the cost has been £17,500.

Lord Egerton of Tatton has consented to lay the foundation-stone of St. David's New Welsh Church in Lime Grove, Oxford-street, Manchester, on October 3.

## THE GENESIS OF STREET MUD.

MUD on the streets of city, town, or village is a subject of perennial controversy. To resolve the painful question, "Whence all this mud?" the *Western Mail* (Cardiff) has taken the practical step of obtaining cubes of various specimens of macadam in common use and submitting them to tests by percussive attrition and absorption as well as ordinary thrusting. The results of these experiments, which were carried out by Mr. Arch. C. Elliott, D.Sc., M.Inst.C.E., Professor of Engineering at the Cardiff University College (Mr. W. S. Boulton; F.G.S., A.R.C.S., furnishing the mineralogical description of each cube) are published to-day by our contemporary in a report signed by Professor Elliott. The specimens included three samples of basalt (submitted by the London Basalt Stone Company, Limited) and cubes of Penlee and Clew Hill Dhu basalts, Cornish, Clew Hill, Wicklow, Guernsey, and Aberdeen granites; Mumbles, Sweldon, and Cwmyfnydd limestones, sandstone, and neat Portland cement. In the thrusting tests the London Basalt Co.'s three sets of specimens stood a respective average maximum stress per square inch of 9.35, 12.02, and 12.45 tons; the other basalts bore 5.54 and 9.45 tons respectively; the Clew Hill, Wicklow, and Guernsey granites went up to 5.49, 6.41, and 7.99 tons; the Mumbles limestone to 5.96, and the other two limestones to 3.99 and 3.09 tons. The real mud test, of course, was that by percussive attrition, the specimens being separately subjected to rapid motion against the ribbed sides of an iron cylinder in a manner calculated to reproduce the action resulting from vehicular and other traffic. The reports on this test, and on that by absorption, were as follows:—

REPORT ON PERCUSSIVE-ATTRITION TESTS FOR THE "WESTERN MAIL."

(Date of testing: 18th day of August, 1898.)

Material.	Dust or dry mud produced in four hours' test per cent.	Average compressive strength: tons per sq. in.
Basalt C .....	3.2	12.45
Basalt A .....	5.9	9.35
Basalt B .....	6.5	12.02
Clew Hill granite .....	7.0	5.49
Penlee stone .....	7.2	5.54
Clew Hill Dhu stone .....	7.9	9.45
Wicklow granite .....	8.0	6.41
Guernsey granite .....	9.3	7.99
Aberdeen granite .....	15.7	—
Red brick (hard) .....	16.9	—
Black limestone, Mumbles .....	20.0	5.96
Cornish granite .....	22.1	—
Road metal from Cardiff Gaol Store (Castell Coch) .....	22.5	—
* Road metal from Cardiff Gaol Store (Ely) .....	26.4	—
Sweldon stone .....	3.2	3.99
Cwmyfnydd, Tongwynlais .....	34.7	3.09
Hard sandstone .....	89.4	—
Neat Portland cement .....	89.5	—

\* Laid down in Plasterston district.

REPORT ON ABSORPTION TESTS FOR "WESTERN MAIL."

Material.	Hours soaked.	Per cent. absorbed.
Basalt A, B, and C .....	72	Mere trace
Penlee Stone .....	72	" "
Clew Hill "granite" .....	72	" "
Clew Hill Dhu stone .....	72	" "
Wicklow "granite" .....	72	" "
Guernsey "granite" .....	29	" "
Black limestone, Mumbles .....	54	8.7
Cwmyfnydd, Tongwynlais .....	102	15.9

ARCH. C. ELLIOTT, D.Sc., M.Inst.C.E.

The foundation-stone of a new brewery was laid at Newport, Salop, on Thursday in last week. Messrs. Inskipp and Mackenzie are the architects, and Mr. E. Whittingham is the builder.

The commissioners of Troon, N.B., acting with the sanction of Mr. J. H. Turner, factor for the Duke of Portland, have decided to recommend scheme "D" to the ratepayers at a special meeting to be called to consider the question on Tuesday next, 27th current. Scheme "D" is one of the four plans submitted to the commissioners on April 15 last by Mr. H. V. Eaglesham, C.E., Ayr, and embraces a broad embanked sward, protected next the sea by a stepped concrete wall, promenade, and pitch slope wall. The estimated cost of construction from the Ballast Bank to St. Meddan's-street—683 lineal yards—would be £4,160. The Duke of Portland has offered to pay one-third of the cost of the work as certified by the engineer.

## OBITUARY.

WE have to announce the death, after a long and painful illness, of Mr. HENRY HEWITT BRIDGMAN, F.R.I.B.A., formerly a well-known and esteemed member of the City Corporation, and in extensive practice in the City, which occurred at his residence, 1, Camden-square, N.W., on Thursday, the 15th inst., at the age of 53 years. Mr. Bridgman, whose portrait was published in our issue of April 18, 1890, was a native of Torquay, being a grandson of Mr. John Bridgman, one of the pioneers of that watering place in the early days of the present century. He was born in 1844, and received his education at Chumleigh Grammar School. He commenced his professional career as an architect and surveyor on the Cary estates of his native town, and for the next six or seven years devoted the whole of his time and attention to promoting the development of this popular seaside resort. In his youth he was one of the pioneers of the Torquay School of Science and Art, becoming in time a pupil, hon. secretary, and assistant-master, while he was also the recipient of one of the first prizes awarded to the school by the South Kensington Science and Art Department. In 1867 he came to London and obtained a position in the office of the late John Gibson, the pupil of Sir Charles Barry during the building of the Houses of Parliament, and at that time an architect of great repute. In 1869 Mr. Bridgman was elected one of the surveyors of the St. Pancras Vestry. Two years later he commenced to practise on his own account, when he joined the Royal Institute of British Architects as an Associate, becoming a Fellow twelve years later. In 1875, upon the death of his brother, Mr. Albert Bridgman, he succeeded to his business, and removed to 42, Poultry. He won in 1880 the first premium of £100 in connection with the Westgarth competition for the best essay on street realignment and reconstruction in Central London. He was the architect of the central fish market that it was proposed to erect on the Lambeth side of the Thames, between Waterloo and Charing Cross railway bridges, and for his plans he was awarded at the International Fisheries Exhibition a prize of 50 guineas offered by the Corporation of Liverpool. Amongst the buildings erected from his designs were the earlier extensions of St. Pancras Workhouse, the reconstruction of Kensington Workhouse, and the Camden Turkish baths. He also carried out various offices and warehouses in the City and other parts of the Metropolis, and also had a large practice at Bedford. In 1884, Mr. Bridgman entered upon municipal life, following a close connection of several years' standing with the parochial administration of the ward in which he carried on his practice. Of handsome presence and eloquent in speech, he soon made his mark in the Council Chamber and took a prominent part in civic affairs. As chairman of the Law and City Courts Committee, it fell to his lot to officiate at the laying, by the Lord Chancellor (Lord Halsbury), of the foundation of the new City of London Court. During his year of office as chairman of the Gas and Water Committee several clauses of great moment to the ratepayers and consumers were—to a great extent owing to his initiative—introduced into the Bills promoted by the various water companies in connection with the creation of new capital. One such clause paved the way for the purchase of water undertakings by municipalities. A lengthy inquiry was held at the instance of the City Corporation on his initiative, and, as a result, the Bill for appointing a water commission for the Metropolis was promoted. Unfortunately, the proposal proved abortive. It was also during his year of office that the Bill was introduced and placed on the Statute Book for enabling the Corporation to hold a fire inquest on the occasion of any outbreak of doubtful origin occurring in the City. Later, Mr. Bridgman was appointed the chairman of the Streets Committee of the Commission of Sewers, and it was during his term of office that the present scheme of lighting the City by electricity was promulgated. Later he was chosen as the chairman of the Sewers Commission, and it was at his suggestion that the rebuilding of Moorgate-street Station was insisted upon, whilst he was responsible, in a great measure, for the carrying through of the scheme that led to the retirement of Colonel Haywood, and the appointment of the present engineer. He was the first to suggest the construction of subways under the crossings of Mansion House-street for the purpose of facilitating the traffic at that point,



and the idea thus ventilated has been utilised with modifications in connection with the London Central Railway. The widening of the western end of Cheapside by the removal of the projecting blocks of buildings at the junction of Newgate-street, Paternoster-row, and St. Paul's Church-yard—an improvement on the eve of being commenced—was advocated by him until finally agreed to by the authorities. As a member of the City of London School Committee, he took an active part in the reorganisation of the school following the retirement of Dr. Abbott, and the formation, under Mr. A. T. Pollard, the present head master, of a modern side. It was also on his suggestion that the Corporation celebrated the 700th anniversary of the mayoralty. Mr. Bridgman held office as corporator for the ward of Cheap from the year 1884 to St. Thomas's Day, 1896, and on the election of the late Mr. Alderman Halse as successor to Sir James Whitehead, Bart., he was appointed Deputy to the ward. This office, however, he was compelled a few months later to resign, owing to failing health and financial troubles, and his consequent withdrawal from municipal life. Mr. Bridgman was a member of the Glovers', Wheelwrights', and Paviers' Companies, being a member of the Court of Assistants of the last-named guild; and was also one of the professional advisers of the London Chamber of Arbitration. Of late years he had been unable to attend to business owing to the progress of an internal malady which necessitated a series of serious operations, to which he eventually succumbed. He leaves a widow and eight children.

Mr. JOHN ASHLEY RANDELL, architect and surveyor, of Exchange-place, Devizes, died at his residence on Thursday, September 8, 1898, aged 75 years. He was in practice for 40 years, for the last 15 years in connection with his son, Mr. A. J. Randell. In 1884 he was elected a member of the Society of Architects. For many years he took an active interest in public affairs, being a member of the Devizes Town Council for 27 years, served the office of Mayor in 1892, elected an alderman, and appointed a justice of the peace for the borough. For 16 years he served as a member of the board of guardians, and was also a member of the burial board. He took a lively interest in technical education, acting as joint hon. secretary of the school of art and technical school, also joint secretary of the cottage hospital for 12 years. As a volunteer he was one of the pioneers of the force, joining in 1859, and retiring as captain and hon. major in 1895 under the provisions as to age; he was an excellent shot, and hon. secretary of the Wilts Rifle Association for 20 years, and was elected an honorary life member of the N.R.A. in 1886. In Freemasonry the deceased also took an active part, being a Past Master of the Craft in Mark Arch and Ark Mariners Lodges and Director of Ceremonies in all at the time of his death. He was also a P.P.G.S.W.R. Wilts., P.P.G. Senior Warden Wiltshire Mark, and P.P.G.H. Wiltshire Arch Lodges. His urbane manner and kindly disposition won for him the esteem of all with whom he was connected.

Mr. H. J. WHEATLEY, aged 60 years, of Fern-tower-road, Canonbury, for many years well-known to all builders and builders' merchants as the energetic and courteous secretary to the Builders' Clerks' Benevolent Society, left home one day last week for the purpose of posting some letters. When he was crossing Wolsley-road, Mildmay Park, a cyclist came along. Thinking that Mr. Wheatley would walk on, the rider went behind him. Suddenly Mr. Wheatley stepped back, and was knocked down by the cyclist, who dismounted when he saw a collision probable. The injured man died from fracture of the skull. At the inquest last week a verdict of accidental death was returned. Mr. Wheatley was buried at Finchley Cemetery on Saturday last, and his premature end is deeply regretted by all who knew him.

A Prebendary Scott memorial window is about to be placed in St. Mary's Church, Lichfield. The subject is the Gloria in Excelsis, and the artists, selected in competition, are Messrs. Ward and Hughes, of London.

At Peterborough, a new Wesleyan Chapel in Midland-road was opened on Thursday in last week. It has cost £650, and has been built from plans by Messrs. Kerridge and Sons, of Wisbech. Messrs. Watson and Lucas, of Dogthorpe-road, Peterborough, were the builders.

## Building Intelligence.

**ABERCYNON.**—The new church of St. Donat, at Abercynon, was opened on Friday. The building affords accommodation for 500 adults, and comprises a chancel, nave, south aisle, and western gallery. The latter is supported by a brick arcade. The church is lined throughout internally with red Cattybrook bricks. The open timber roof is of pitch-pine, left free from stain or varnish. The external dressings are of red Cattybrook bricks, with the exception of the east and west windows and buttress weatherings, which are of hard Doulting stone. Owing to the building site being on the side of a hill, there is a considerable space under the nave floor, which will ultimately be utilised for the purpose of a parish-room. The treatment is extremely plain and simple, the cost having been about £6 per sitting, inclusive of boundary fences, kerbing, and channelling in the new road. The architect is Mr. E. G. Halliday, F.R.I.B.A., diocesan surveyor, and the contractor is Mr. Games, of Abercynon.

**BENWELL.**—A new Presbyterian church in Armstrong-road, Benwell, was opened on Wednesday. The hall occupies the eastern portion or rear of the site, and between the church and hall the classrooms and vestries are placed. The church is planned with nave and aisles, the aisles and west end having galleries, the whole providing seating accommodation for 650. The entrances are placed in the west front, giving access to porch and vestibule. The floor of the church has a fall of 9 in. in the length; the pulpit and Communion platform are at the east end, and the west gallery has been reserved as an organ-chamber. The site being on the sloping banks rising from the Tyne, the architects have taken advantage of the fall of 16 ft. in the length of the site to get the caretaker's house, tea-room, heating-chamber, and coals under the hall and classrooms, but entering off the back street. On the same level as the church, and immediately behind, are placed the minister's vestry, a room for ladies, and a small hall for prayer-meetings and infants' class, and a flight of steps leads to the large hall, with accommodation for over 400. The first floor over the vestries is occupied by three classrooms, and there are lavatories on all the floors. The block of buildings is designed in the Early English style; the walling is of local stone in coursed rock facing, with chiselled stone dressings, the bays of the nave having buttresses at every principal, and the alternate bays having the upper windows carried up as dormers. The west front has two projecting porches with mullioned and traceried window in gable, and to the north a small octagonal turret breaks the line between the gable and staircase roofs, a buttress marking the southern division. Internally the nave is divided from the aisles by an arcade of five bays on either side, and the east gable has a traceried rose window. The architects are Messrs. Badenoch and Bruce, of Newcastle-on-Tyne.

**BOLSOVER.**—St. Mary's Church, Bolsover, Derbyshire, was almost entirely destroyed by fire on January 25, 1897. The only remaining portions of the old building are the 13th-century tower and spire, portions of the outside walls of the 14th-century chancel, the Cavendish Chapel, erected A.D. 1618, and the north porch and parts of the outside walls of the north aisle and transept (the latter used as a vestry), which were built about 20 years ago. The former church provided seats for about 500 adults, and it was desired to increase the accommodation. This has been done by extending the south aisle laterally, about 100 additional seats being thus obtained. The nave has been made 3 ft. 6 in. wider than the one destroyed. A triple arrangement of roofs over the nave and aisles has been adopted, the nave arcades being carried on octagonal pillars with capitals, as before. Most of the remaining portions of the building having been of the 14th-century period or style, it has been considered best to build the new portions in the same style. The external walls are of Bolsover Moor stone, with Weldon stone for the window tracery, &c. Ancaster stone throughout has been used for the interior, the walls, which were formerly plastered, being now lined with stone, those of the tower having been repaired and pointed only. The woodwork of the roofs is chiefly pitch pine, the whole stained palm-leaf green. The roofs are covered with Buttermere green slates. The new

roof of the Cavendish Chapel is of oak, with carved beams and pendants, &c., and enriched plaster panels, in the Jacobean style, and covered with lead. The floors under the seats are of wood blocks. The passages are paved with terrazzo and cube marble mosaic. The chancel floor is of marble mosaic, with Devonshire marble steps. The total cost of the rebuilding and restoration, with such fittings as are at present provided, is about £1,000. Another £1,000 will be required to complete the work. The architect is Mr. Louis Ambler, A.R.I.B.A., 7, Arundel-street, Strand, London. Mr. J. Coates Walker is the clerk of works. Messrs. Bowman and Sons, Stamford, are the contractors, and the carving has been executed by Mr. A. Tuttle, sculptor, of Lincoln. The reopening services took place on Wednesday.

**CROSBY, LIVERPOOL.**—The dedication of a new Congregational church at Crosby took place on Friday evening. The building has been erected on land adjoining the old church at the corner of Mersey-road and Eshe-road. The building has been erected by Messrs. Hughes and Stirling, of Bootle, from plans prepared by Messrs. Douglas and Fordham, of Chester. It has been constructed of Runcorn stone, and is Early Gothic in style, with a wide nave. There are two transepts, a chancel with choir stalls on each side, and also vestries for the pastor and choir. The principal entrance is by a large porch approaching from Eshe-road, four entrances in all being provided. The exterior is marked by simplicity, general proportion and solidity being relied upon for effect, rather than ornament. All the joinery work has been executed in pitch-pine, and the seats are of the same material. The church, which has cost about £7,000, is lighted with electricity, and is heated by hot-water pipes. A two-manual organ has been fixed on the west side of the chancel at a cost of £630. The building will accommodate 650 worshippers. The old place of worship will in future be used for a Sunday-school and lecture hall.

**FAIRFIELD, LIVERPOOL.**—The church of St. John the Divine, Holly-road, Fairfield, was re-opened last week, after an embellishment of the interior and an improvement of the organ. Decorative designs were submitted by several firms, and those of Messrs. Jelley and Co., of Slater-street, were chosen by Mr. George Bradbury, of Liverpool, the diocesan architect. The walls in the nave and aisles have been diapered in Gothic fashion, while the spandrels between the arches in the nave are occupied by paintings of the Twelve Apostles. A leading point in the scheme of decoration occurs in the chancel arch, this being a representation of our Lord sitting in majesty, and surrounded by adoring angels. The organ, which is a fine instrument by Gray, with three manuals and 40 speaking stops, has been fitted by Messrs. W. Rushworth and Sons with pneumatic action throughout, draw-stops being included.

**GOVAN.**—The foundation-stone of the public halls and municipal buildings for Govan, near Glasgow, was laid on Saturday. The buildings are being erected on the Whitefield estate, and will have a frontage facing Govan-road of 157 ft.; facing Summertown-road of 240 ft.; facing Carmichael-street of 157 ft.; and Merryland-street will have two frontages of 71 ft. and 86 ft. respectively, the centre being reserved for future extensions. The principal frontage will face Govan-road. The council-chamber is situated on the ground floor in the centre of the building, surrounded by suitable ante-rooms and a public gallery with a separate entrance. The burgh officers' rooms will be situated at the entrance to the main hall, with the Provost's room as its counterpart opposite, with committee rooms beyond the latter corresponding to the town clerk's offices. The treasurer's offices will be next to the town clerk's, but will have entrance from Summertown-road, while on the other side, beyond the committee rooms, will be situated the offices for the inspector of weights and measures, with entrance from Merryland-street. The further side of the block of buildings will provide the public hall, capable of accommodating 2,000 people, having the principal entrance in Summertown-road. The hall will be oblong, with two aisles, and will have galleries on three sides, with a platform at the upper end, behind which will be reserved a space for a grand organ. Behind the upper end of the hall will be the usual dressing-rooms, &c. On each side of the principal entrance will be stairs leading to the



upper floors. The first will accommodate the burgh surveyor's staff, the cleansing inspector's offices, and the sanitary inspector's offices. On that floor, with a separate entrance from Summertown-road, will be a small public hall, capable of seating 500 people, with cloak-rooms, &c. On the second floor will be placed the janitor's house, and the building will be finished with a dome, to be used as storage, lumber rooms, &c. In the basement there will be a kitchen, communicating with the two halls by lifts; two heating-chambers, with coal-houses and shoots; strong room for burgh documents, and a fire and draught-proof room for the use of the inspector of weights and measures. The estimated cost of the Public Hall and Municipal Buildings is £32,000, and the architects are Messrs. Thomson and Sandilands, West George-street, Glasgow, whose design, selected in competition, was illustrated in the BUILDING NEWS for May 21, 1897.

GUILDFORD.—The foundation-stone of St. Saviour's Church was laid in Woodbridge-road on Wednesday week by Mrs. Randall Davidson. The architects, Messrs. H. S. Legg and Son, of Christ's Hospital, London, have designed the new church in the style of 14th-Century Gothic. The church will be built chiefly of local, or Bargate, stone, with Bath stone dressings and red tile roof. Accommodation will ultimately be provided for 730 worshippers; but the portion now to be built will accommodate about 540 persons. This section will consist of a chancel, transepts, and four bays, with vestry and organ-chamber, the remaining two bays, with tower and spire and west front, to be completed when funds permit. The internal dimensions of the complete church will be 120ft. by 52ft., but of the part which is now being erected the measurements are:—Chancel, 32ft. floor; nave, 52ft.; width, 52ft. Artificial lighting will be by electricity. The church will be heated on the low-pressure hot-water system; the apparatus will be supplied by Messrs. Kite and Co., of Euston-road, London.

HUDDERSFIELD.—The new Central Police-Station in Peel-street, adjoining the town-hall, was formally opened by the Mayor on Thursday last week. The building has been built from designs by Mr. Dugdale, the late borough surveyor, and its erection has been superintended by his successor in office, Mr. K. F. Campbell, M.Inst.C.E. The station is faced with stone, and is two stories in height. The main entrance leads into a central hall, conducting to the various departments. On the lower ground floor there are six women's cells, mortuary, post-mortem-room, parade-room, living rooms for caretaker, search office, store and photographing rooms, charge office, documents' store-room, and stolen property room. From this department is a sub-way into the courthouse in the town-hall. On the floor above are nine cells for men, detention solicitors' room, chief clerk's office, inquiry office, superintendent's office, chief constable's private office and retiring room, the chief detective's and detectives' offices, warrant office, muster day-room, all fitted with lavatory arrangements. At the rear of the building is a billiard-room for the men.

KILMARNOCK.—The foundation-stone of the Public Library and Museum in course of erection at Elmbank, Kilmarnock, was formally laid on Saturday afternoon by the wife of the donor, Mr. James Dick, of Glasgow. Some time ago Mr. James Thomson, F.G.S., presented to the town his unique collection of fossils, and more recently the bulk of the Braidwood collection was gifted to Kilmarnock by the late Dr. Hunter-Selkirk. The difficulty of providing housing for these has been solved by Mr. Dick, who has undertaken to defray the whole cost of the building, estimated at not less than £11,000. The style adopted is Italian, the leading feature of the design being a portico at the main entrance, surmounted by the figure of Britannia and the Kilmarnock arms. The frontage is 138ft. in length, with a depth of 114ft. On the ground floor are the reading-rooms, library-rooms, and lecture-hall. On the second floor the main staircase leads to a spacious vestibule, with dome of coloured glass, to the right and left of which are the two wings of the museum, each having a total area of 1,750sq.ft. The architect is Mr. R. S. Ingram, and the principal contractor Mr. Andrew Calderwood.

LEEDS.—The corporation building inspector, in his annual report, states that during the past twelve months plans were submitted for no fewer than 3,829 houses. Of this number 3,318 were

approved, and 511 rejected. The number approved included 21 villas, 84 semi-detached villas, 1,033 through houses, and 2,180 back-to-back houses. Under the head of mills, warehouses, sheds, workshops, &c., plans for 1,491 buildings were submitted, of which 1,174 were approved. Eighty out of 110 street plans were approved. Thirty-seven miscellaneous plans were sent in, and these were for buildings of the following description:—Two churches, one addition to a church, three chapels, one addition to a chapel, one mission-room, seven schools, 11 additions to schools, one nurses' home, two clubs, one hotel, one arcade, one palace of varieties, one addition to the Tivoli Palace of Varieties, one bank, an addition to the Yorkshire College, and an imbecile ward and laundry at the workhouse. The number of buildings completed and certified within the same period included 2,399 houses, comprising six villas, 31 semi-detached villas, 729 through houses, and 1,633 back-to-back houses. Of the buildings for which plans headed Miscellaneous were submitted, 1,289 have been completed, including seven schools and eight additions to schools, one addition to a church, one chapel, one addition to mission chapel, two mission-rooms, one club, two hotels, one addition to an hotel, and a laundry at the workhouse. In the same period 3,984 water-closets, ash-pits, &c., have been constructed.

STRATFORD, E.—At a cost of £60,000, the council of the borough of West Ham has just completed the erection of a pile of buildings, situate close to Stratford Church in Romford-road, for use as a public technical institute for the locality. The structure and its environs occupy about an acre and a half. The body of the building is of red brick, heavily corniced and ornamented with masonry, the portico of the main entrance being supported on either side by carved figures. Between the first and second floors is a broad belt of masonry, carved in bas relief with cupids, vases, and garlands of flowers, and at each extreme are lofty turrets, surmounted by seated figures representing the arts and sciences, and above these are towers of higher elevation surmounting the roof of the large hall. The architects are Messrs. Gibson and Russell, and the builders Messrs. Shillitoe, of Bury St. Edmunds. Mr. A. E. Briscoe has been appointed principal of the institute, which is provided with well-equipped workshops for all the mechanical trades, a cookery school, laundry, and a free public library. The institute is to be formally opened on Oct. 3 by Mr. J. Passmore Edwards and the mayor and corporation of West Ham.

WALTHAMSTOW PUBLIC BATHS.—The public baths controversy at Walthamstow entered upon another stage last week, when tenders were opened by the urban district council for the erection of the buildings in accordance with plans by Messrs. Spalding and Cross, of London, selected in competition. The tenders were fourteen in number and ranged from £14,687 to £16,896, and, after much discussion, the lowest but one—that sent in by Messrs. Kilby and Gayford, of Shoreditch—was accepted. In the course of the discussion which resulted from the receipt of the tenders, a member, Mr. Ogilvie, said designs were invited for baths to cost £7,000, and competitive plans were submitted by Messrs. Spalding and Cross and Mr. J. Williams Dunford. Mr. Rowland Plumb was appointed assessor, and his report was in favour of Mr. Dunford's design, as being the one which could be carried out at a sum nearest to the limit of £7,000. Mr. Dunford was then appointed, and the seal of the council was affixed to the contract. Subsequently, after the election of last April twelvemonths, the council rescinded Mr. Dunford's appointment, and appointed Messrs. Spalding and Cross. That firm were afterwards asked what their estimate of the cost was, and they said £9,000. But after the specification had been approved by the council and the bill of quantities had been prepared, the bill of quantities was altered. He thought they had been grossly misled in the matter right through. Mr. Hill, a builder, said he saw no reason why the work should not be carried out for £7,000, plus 15 per cent. for contingencies. This very builder had tendered for the work at £16,300. Mr. Anderson: He had not seen the specification at first. Mr. Wilkes said Mr. Dunford stated that his design would not be carried out for £7,000, but that was kept from the council for months. The plans of Messrs. Spalding and Cross were far and away beyond those of Mr.

Dunford. Mr. McSheedy said they could never get Mr. Dunford, in committee or out of committee, to give them any estimate as to what his design could be carried out for, and his appointment was a gross act of jobbery. The plans of Messrs. Spalding and Cross at £20,000 would be cheap compared with Mr. Dunford's at £7,000. The new Compensation Act had a great deal to do with the tenders, as being high as they were. Mr. Good elicited that the specification had been cut down by £1,200. Mr. Wilkinson said that when they had experienced architects like Messrs. Spalding and Cross saying they believed their scheme could be carried out for £8,000 or £9,000, it was strange that the Council were invited to accept a tender for £14,836, and this after £1,200 had been cut out. There were always extras, and they probably would not get through with the scheme much under £20,000. In the end the proposal that Messrs. Kilby and Gayford's tender at £14,836 be accepted was carried without opposition, and it was resolved that application be made to the Local Government Board for sanction to borrow £16,000.

WHITECHAPEL.—The largest scheme for the provision of working-class dwellings as yet undertaken by the London County Council, known as the Boundary-street, Whitechapel, Scheme, is now nearing completion. There will be in all 23 separate blocks of buildings on the area, the first of which was commenced in 1894. The number of persons displaced from the area is 5,719. The Council was required by the scheme to provide accommodation for not fewer than 4,700 persons, of which number 144 were to be accommodated on the Goldsmith-row site, acquired for that purpose. On the Boundary-street area, however, dwelling accommodation has been planned for 5,380 persons, which, with the 144 rehoused on the other site, makes a total of 5,524 persons rehoused, or only 195 fewer than the number displaced, and 824 more than the scheme requires. In addition to this, 18 shops and 77 workshops have been provided. The 5,524 persons will be rehoused in 1,069 tenements, making an average of 5-168 persons per tenement. There are 601 tenements entirely self-contained. In the first half of the area the living rooms average 144sq.ft., and the bedrooms 96ft., while in the latter buildings these sizes were increased to 160 and 110sq.ft. respectively. Every habitable room on the area is provided with a 45° angle of light horizontally and vertically, and nearly every room commands an open outlook. The entrance avenue and the circus are 60ft. wide, and the principal streets 50ft. There are on the area three public gardens, of an aggregate area of nearly three-quarters of an acre. There is clothes-washing accommodation in two blocks only, it being provided in a central laundry, behind which is an annexe containing 12 hot and cold slipper-baths and a cold shower-bath, and over the laundry are two club-rooms for the use of the tenants. A bakery and an estate workshop are in course of construction. The buildings have been designed within the financial requirements of the Treasury, the interest on the capital being calculated at 3 per cent., and the sinking fund for land and buildings for terms varying from 52 to 60 years. The rents charged are somewhat higher than those charged by the Peabody and Guinness trustees.

In the course of the next few months the work of laying underground wires through some fourteen miles of streets at Dublin, for the purpose of transforming the telephone service of the city from an overhead wire to an underground wire service, will be completed, and the new system may be expected to be in operation shortly afterwards. The work is being done under agreement with the corporation.

Extensions have been carried out to Well-street Sunday Schools, Coventry. There are three classrooms on the ground floor, with an entrance from the lower school-room. On the first floor is a new lecture hall for the use of a Bible-class. The builder is Mr. C. Garlick, of Coventry, and the cost, including furnishing, will be £600.

The Cricklewood, Kilburn, and Victoria Railway Construction Syndicate, Ltd., has been formed for the purpose of applying to Parliament in the next session for a Bill to authorise the construction of an underground electric railway from Cricklewood to Victoria. The proposed line will be about five and a quarter miles in length, commencing at Cricklewood and proceeding thence under the Kilburn High-road, Maida Vale, Edgware-road, and Hyde Park to Victoria.



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## ILLUSTRATIONS.

SELECTED AND SECOND PREMIATED DESIGNS FOR THE  
PROPOSED EAST HAM DISTRICT COUNCIL PUBLIC BUILDINGS.  
—CHURCH OF OR SAN MICHELE, FLORENCE.—PONTE  
VECCHIO, FLORENCE.

## Our Illustrations.

EAST HAM PUBLIC BUILDINGS: SELECTED AND  
SECOND PREMIATED DESIGNS.

(For description and further sketches, see  
pp. 422, 423, and 445.)

## FLORENCE VIEWS.

M. EUGENE MUNTZ, Membre de l'Institut de France, is the author of a beautifully-illustrated large quarto volume descriptive of Florence and its historic monuments, including many particulars of the buildings and topography of Tuscany. His volume not only furnishes a vast amount of information of interest to the traveller on his excursions either within or beyond the confines of the city, where the country is replete with radiant loveliness, but the book may well be numbered among the pictured treasures of an architect's library. Railways and political changes have not modernised Florence to the same degree seen in Rome, but the municipality during the past few years has encouraged building speculations and so-termed improvements in a way which has done much to impair the harmonious beauty of "La bellissima e famosissima figlia di Roma," as Dante calls her, and a large number of buildings of interest have in this way already been destroyed in Florence.

Of all the fairest cities of the earth  
None is so fair as Florence. 'Tis the gem  
Of purest ray; and what a light broke forth  
When it emerged from darkness! Search within,  
Without; all is enchantment! 'Tis the Past  
Contending with the Present; and in turn  
Each has the mastery.

The Florentine character is distinctly conservative, and with becoming pride scarcely an old building or house once associated with distinguished persons is left unmarked by an inscription recording the circumstances. Few cities, indeed, have their history so vividly marked upon their stones as Florence, which has always been a distinguished centre of art and learning. Other, though not many, cities have histories as noble, treasures as vast; but no other city has them living, and ever present in her midst, familiar as household words, and touched by every baby's hand and peasant's step as Florence has. Every line, every road, every gable, every tower has some story of the past present in it. Every tocsin that sounds is a chronicle; every bridge that unites the two banks of the river unites also the crowds of the living with the heroism of the dead. Mr. Muntz has done aright to reproduce so well such a series of photographs and drawings in illustration of its winding dusky and irregular streets with the outlines of their loggie and arcades, while, with due regard to architectural detail, he has chosen several masterpieces of sculpture and carving among his pages, which help to make this interesting book the more complete. To-day we are enabled, by permission of the publishers, Messrs.

Hachette and Co., of Boulevard Saint Germain, to produce a double-page sheet of reductions from among these original illustrations, and in making our choice we have selected typical examples. Ascending the Lung' Arno Acciajuoli, the visitor reaches the oldest and most picturesque bridge in Florence, the Ponte Vecchio, built by Taddeo Gaddi, and covered with the shops of goldsmiths and jewellers, who were established here by Cosimo I. Here it was that this personage first saw the enchanting Camilla Martelli, daughter of one of the goldsmiths on the bridge, whom he made his mistress, and subsequently his wife. Her end, however, was embittered by sadness, unrelieved except by the imbecility into which disappointment and confinement had driven her after a but too brief reign of splendour. The Hospice of the Knights of Malta stood at the end of this bridge. Here Ariosto stayed for six months in 1513, enjoying the society of the beautiful Alexandrina Benucci during the early days of her widowhood. Hard by stood the statue of Mars, at the foot of which young Buondelmonte was murdered by the Amidei family because he had married a girl from the rival house of Donati, notwithstanding the fact that he was already engaged to one of the Amidei. The space of one house in the middle of the bridge is left open, so that a view of the river is obtained on both sides among the huddled roofs and gables of the adjacent buildings, a perfect picture set in a frame. Above it the Gallery of the Grand Duke crosses the river. This was built to connect the two great palaces by a secret passage, and it takes its jealous course among the streets and houses with true despotism; going where it lists, and spurning every obstacle away before it. The second illustration given on our sheet shows the famous church called the Or San Michele. It was built in 1380 by Simone Talenti, in order to shelter a miraculous image of the Madonna by Ugolino da Siena. The site originally was occupied by a loggia for the shelter of corn, and built by Arnolfo del Cambio. The original building is commemorated in the present name, "Horreum Sancti Michaelis." For two centuries after the lower portion had been converted into a church the upper story of the building was used as a granary. No one in passing would take the exterior of Or San Michele for a church. It is enriched with windows of exquisite tracery, and has a noble series of statues, erected by different guilds, and including the St. George and St. Mark of Donatello. The interior is fitted with beauty and glows with colour. The frescoes of Jacopo Landini da Casentino, however, are faded. On the right of the high altar is the beautiful Gothic shrine (1348-59), containing Ugolino's sacred picture of the Madonna. Connected with the west-end of the church, by the arch seen in the view, is the grand old battlemented Palace of the Guild of Wool, repeatedly adorned with their emblem, the Lamb bearing a banner. On the opposite side of Via Calzaiooli is the Gothic church of St. Carlo Borromeo. From the Baptistery we give some drawings of the ornament of the gates, by Lorenzo Ghiberti. Michelangelo remarked they "were worthy to be the Gates of Paradise." Ghiberti said, "In modelling these reliefs I strove to imitate Nature to the utmost, and by investigating her methods of work to see how nearly I could approach her." Those who would learn more of the customs and historic incidents of Florence would do well to add to their libraries the interesting book of notes and pictures which Messrs. Hachette and Co. have thus produced.

The subway at Boston, Mass., was opened to the public on September 5 for its entire length. The Boston Elevated Railway Company, which controls the street railways using the subway, has begun the construction of foundations for its superstructure in Charlestown.

Plans for the erection of a new isolation hospital at Scarborough, at a cost of £15,000, have been passed by the local authority. Thirty-two beds will be provided, sixteen in the scarlet fever block (four private), ten in the typhoid block (two private), two for measles and diphtheria, and two for observation.

The 1st of October will see the commencement of the demolition of old buildings between New-street and Union-street, Birmingham, preparatory to the construction of the new arcades. The building contract has been let to Mr. E. J. Charles, of Moseley. A feature in the buildings to be erected will be their flat roofs, which will be covered with vulcanite.

## PROFESSIONAL AND TRADE SOCIETIES.

THE SOCIETY OF ARCHITECTS.—The "house list" of nominations of members to serve as officers and council for the ensuing session of the Society of Architects has just been issued. Mr. Walter Emden, J.P., L.C.C., is named for re-election as president, and Lieut.-Col. F. Seymour Leslie, R.E., of the War Office, and Mr. Silvanus Trevail, J.P., of Truro, are again nominated as vice-presidents. For the Council, the old members are renominated, with the exception that Mr. James Bartlett, of the Outer Temple, is proposed in the stead of Mr. A. J. Lacey, of Norwich, who retires. The honorary secretary, Mr. Ellis Marsland, the honorary corresponding secretary, Mr. Edgar Farman, the honorary treasurer, Mr. H. G. Quartermain, and the honorary auditor, Mr. W. R. Mallett, are again asked to serve the society in the same capacity.

## CHIPS.

At the offices of the Stretford District Council, on Friday, Colonel W. Langton Coke held an inquiry on behalf of the Local Government Board with reference to an application by the council for permission to borrow £6,000 to provide a technical institute and free library, and £4,000 for the purchase of a plot of 13½ acres of land at Pennington-lane, for the purpose of a public recreation ground.

Works of water supply have just been completed for the Morpeth Urban District Council, and will be formally opened shortly. The works, which are situated at Tranwell, have been carried out from plans by and under the direction of Mr. A. S. Dinning, of Newcastle-on-Tyne.

The Thetford and Louthland Board of Guardians have adopted plans for a pauper children's home, to be built at an estimated cost of £2,800, on a site of 4½ acres of land at Normanstone, near Lowestoft. Accommodation will be provided for 35 boys and 35 girls.

The loan required by the Llandudno District Council for the purpose of erecting their municipal buildings has been authorised by the Local Government Board. The contract has been given to Mr. Samuel Warburton, of Manchester, who is carrying out the extension of the Denbigh Asylum, and the work will be commenced without delay.

The laying of the foundation-stone of the new isolation hospital for Southampton at Mousehole-lane, Shirley, took place on Wednesday.

At Chingford, on Friday, Colonel Hepper, D.S.O., held a Local Government Board inquiry into an application by the urban district council for sanction to borrow £1,350 for sewerage works at Chingford Hatch. No opposition was offered to the proposals.

The Mayor of Gloucester laid on Friday the foundation-stone of the public free library, which is to be built on a site adjoining the Municipal Technical Schools. The building, with additions to the schools, will cost £9,000. Messrs. Waller and Son, of Gloucester, were the architects.

On Sunday the Primitive Methodists of Great Ellingham, Norfolk, reopened their chapel, after repairs carried out by Mr. King, builder, of Mattishall. The exterior has been faced with red brick, relieved with white. The old brick floor has been taken out and replaced by a board flooring. Modern pews with an ornamental stall-head have been provided, and the seats are fitted with a book-rail and hat-rest, and are panelled at the back.

The town council of Southampton adopted, at a special meeting held on Tuesday, a new code of by-laws with respect to new streets and buildings.

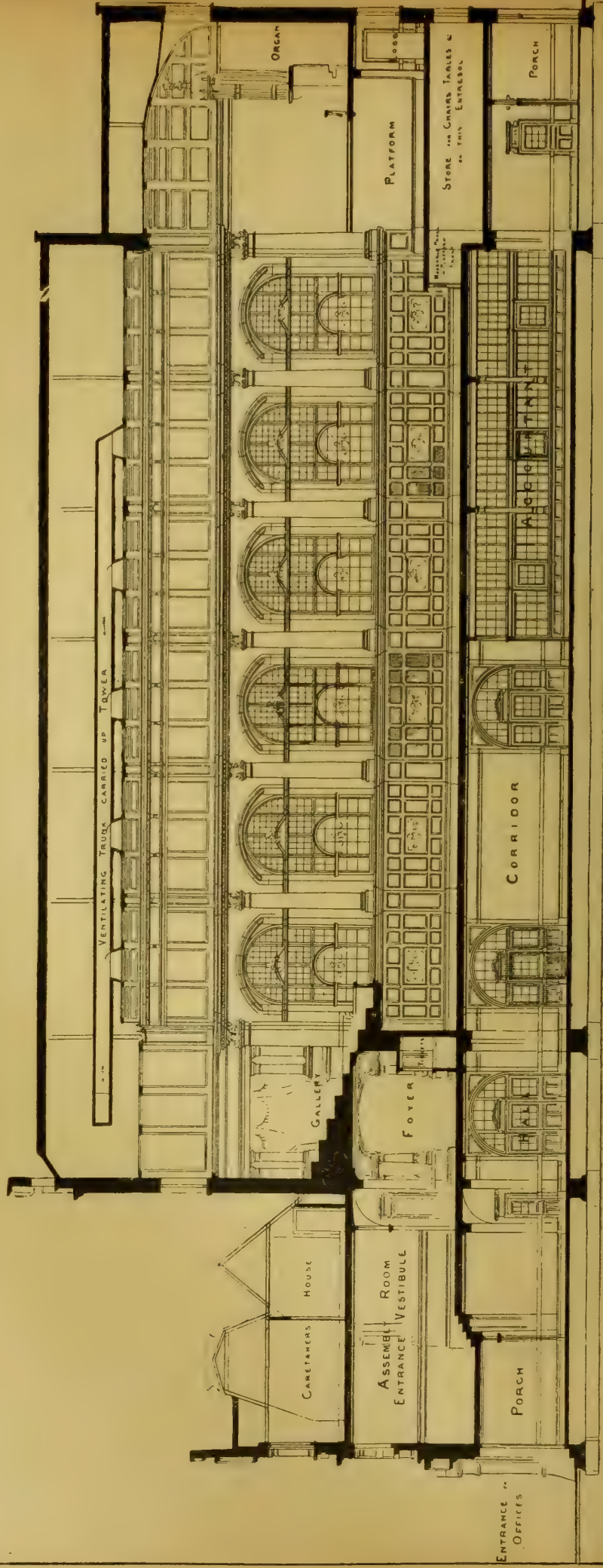
Out of the estimated proceeds of the Public Works Cess in Bengal during the current year, a sum of Rs.10,86,000 has already been allotted for the construction and maintenance of roads.

The foundation-stone of the mission church, now being built in Spon-street, Coventry, was laid on Thursday in last week, by the Rev. the Marquis of Normanby. Mr. F. Foster, of Coventry, is the architect, and Mr. C. H. Barber, of the same city, the contractor.

At Purley, on Saturday, the new building for boys in connection with the Warehousemen, Clerks, and Drapers' Schools was formally opened. The schools were founded in 1866, when the Prince of Wales visited Purley and performed the opening ceremony. In 1877 the Leaf memorial wing for girls was added, and the building opened on Saturday (erected through the munificence of Mr. J. R. Roberts at a cost of £9,000) marks the third stage in the growth of the schools. The architect is Mr. J. Kingwell Cole.



CROSS SECTION THROUGH TOWN HALL &c



LONGITUDINAL SECTION THROUGH TOWN HALL

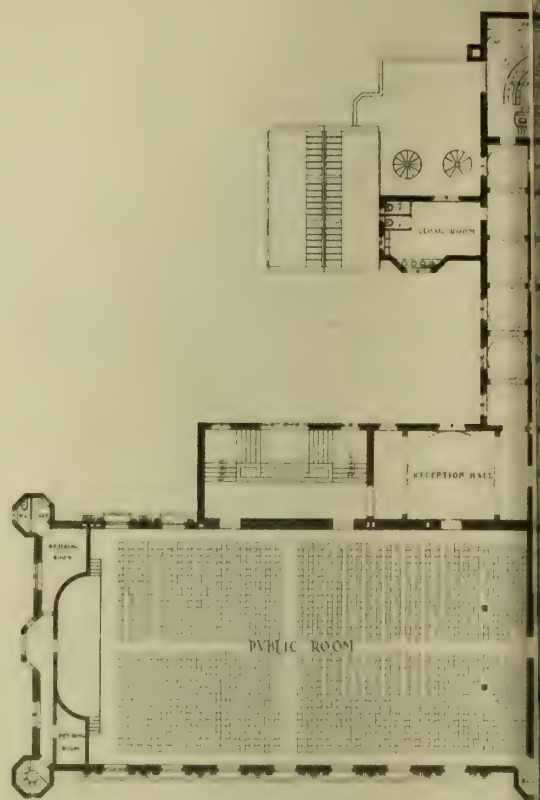




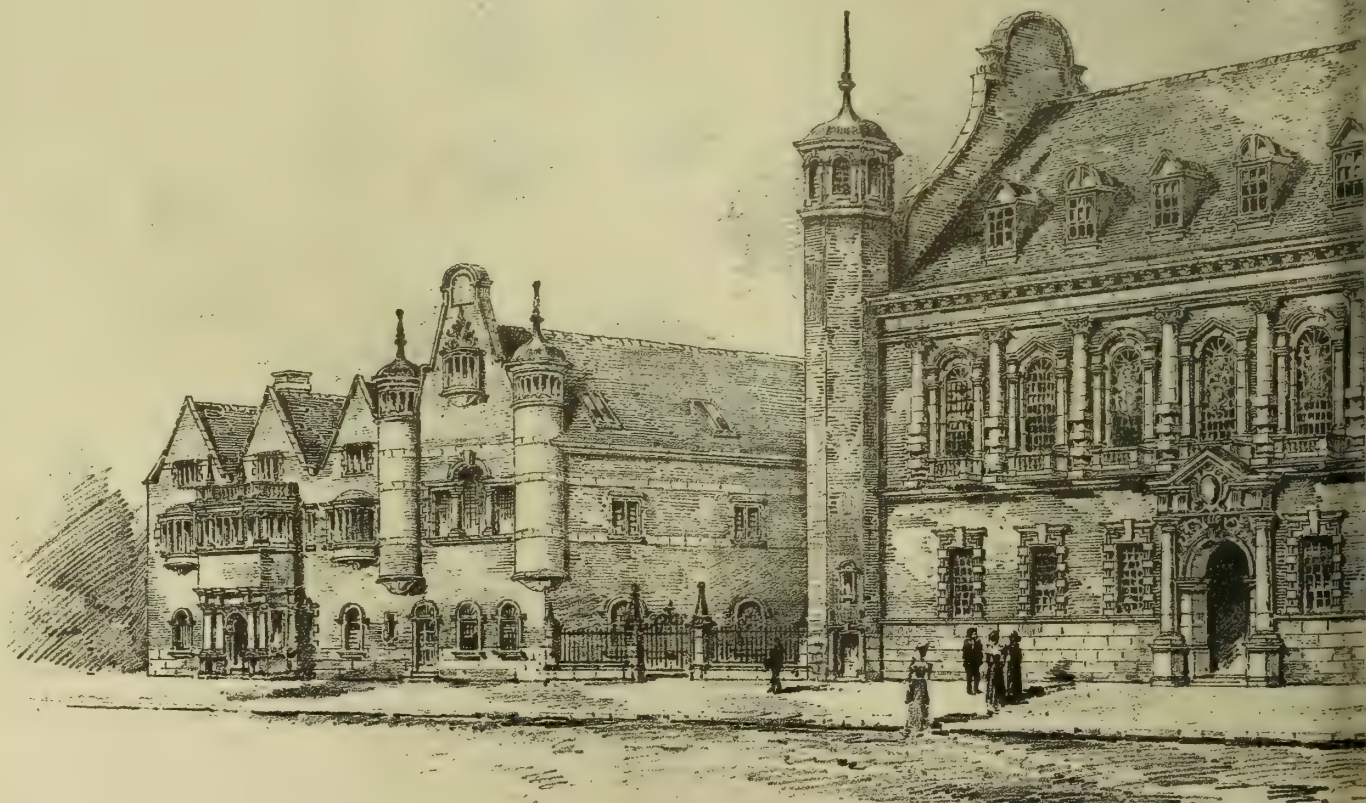




GROUND FLOOR PLAN



FIRST FLOOR PLAN.





PUBLIC BUILDINGS, EAST HAM.

SECOND PREMIATED DESIGN.

SPALDING & CROSS, ARCHITECTS.





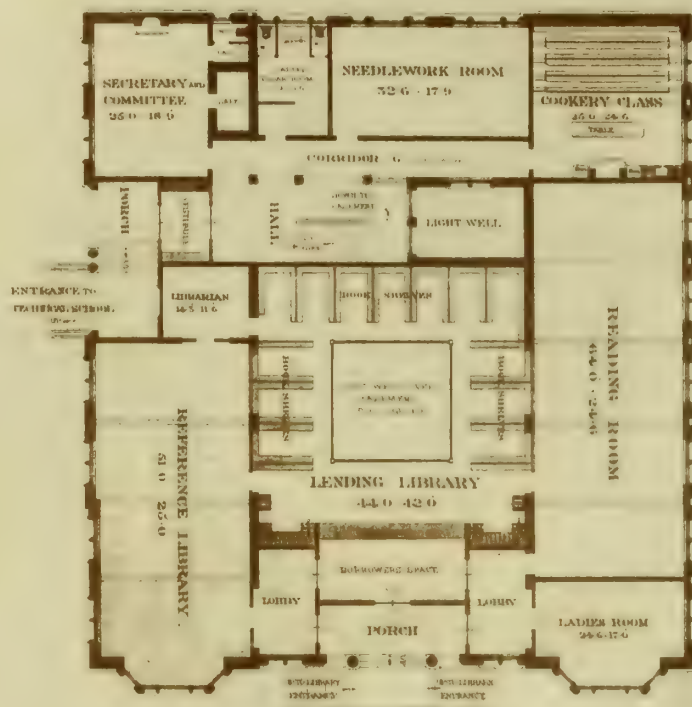








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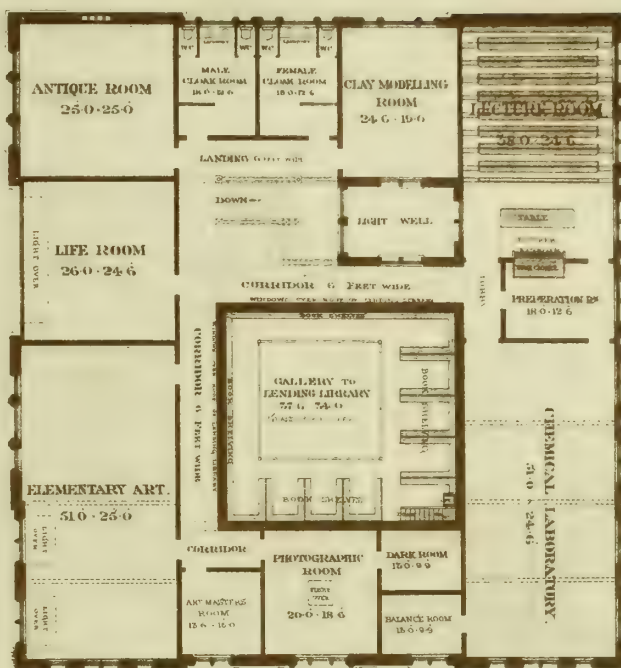


GROUND FLOOR PLAN LIBRARY BLOCK



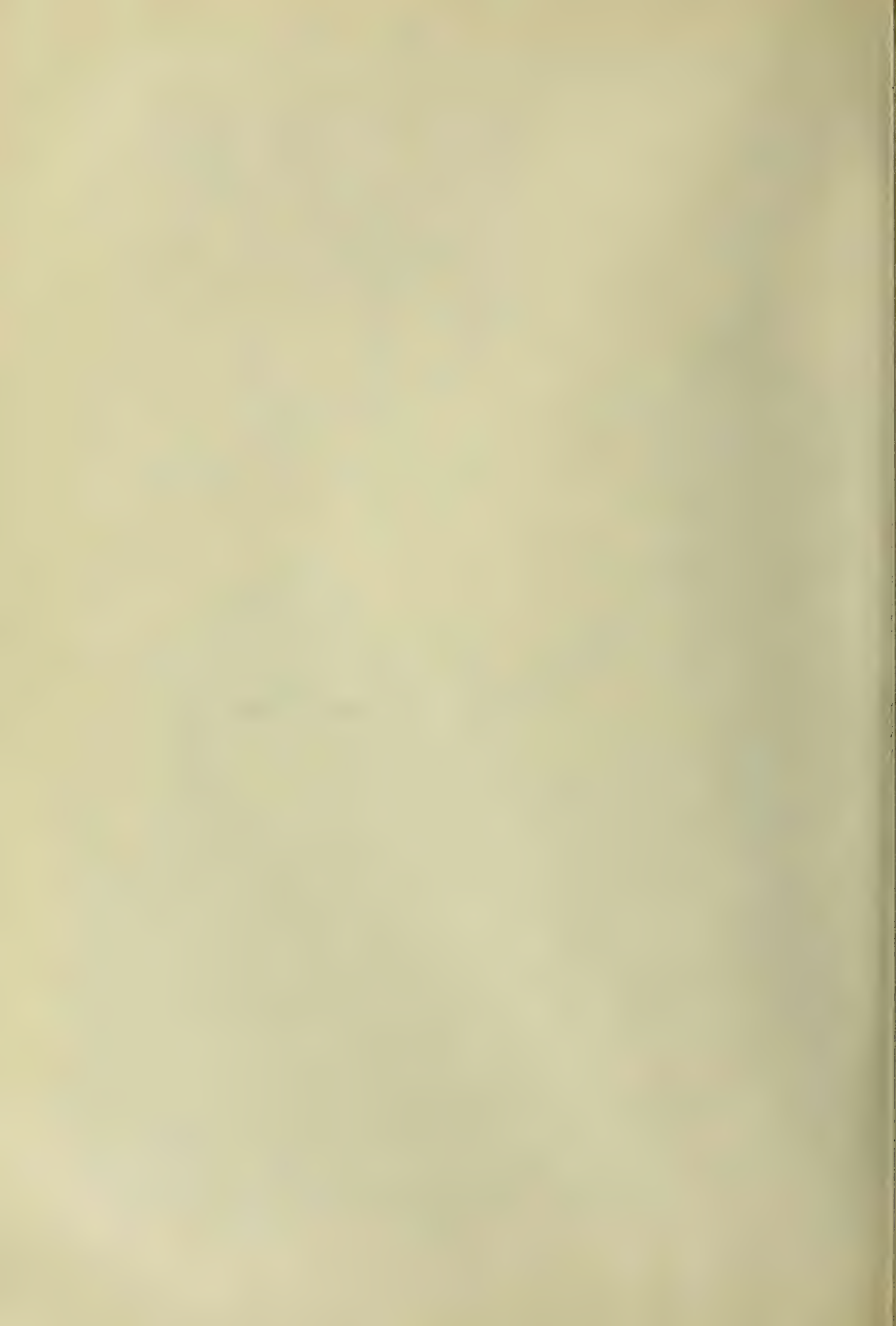


INGS. EAST HAM.  
ED DESIGN.  
EPH SMITH ARCHITECTS



FIRST FLOOR PLAN LIBRARY BLOCK



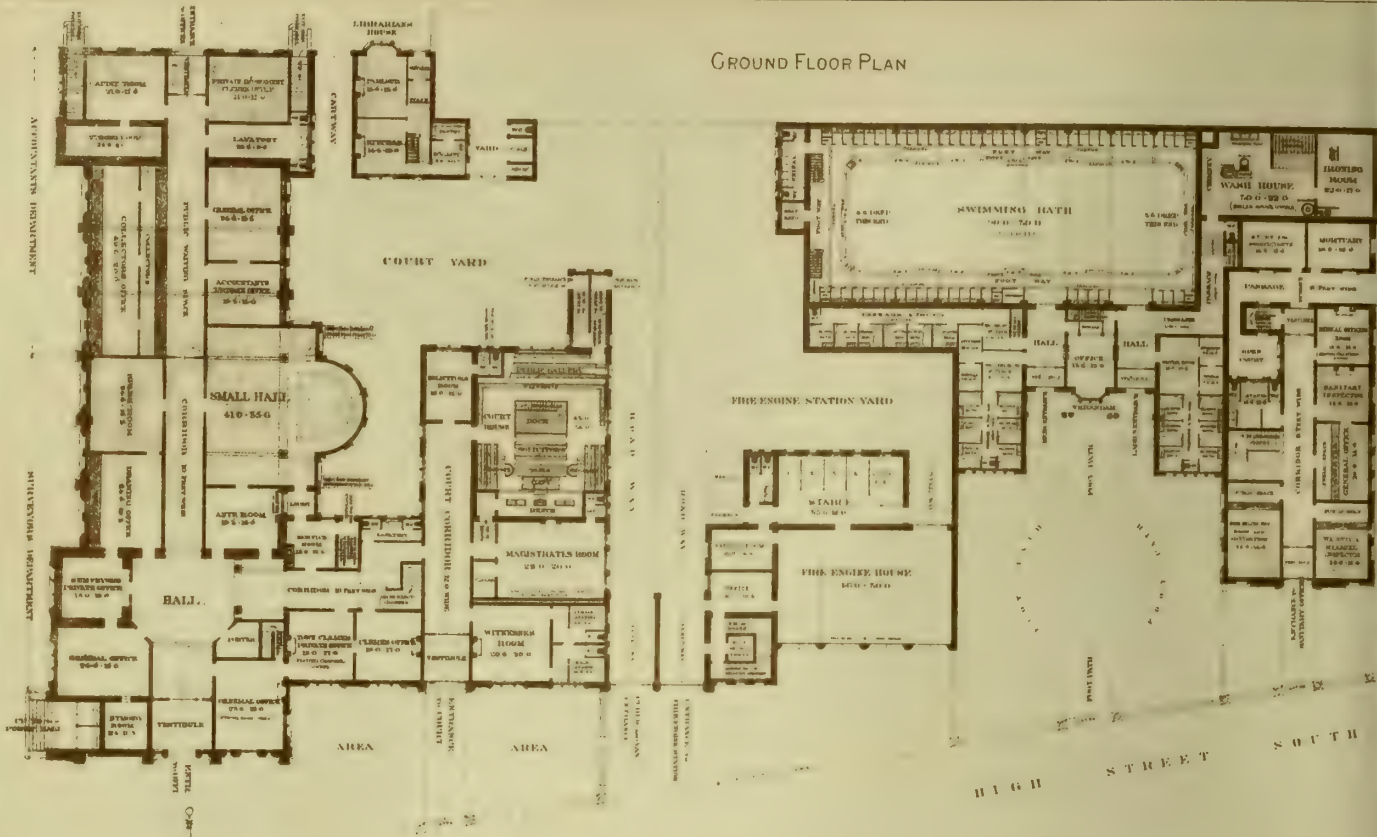






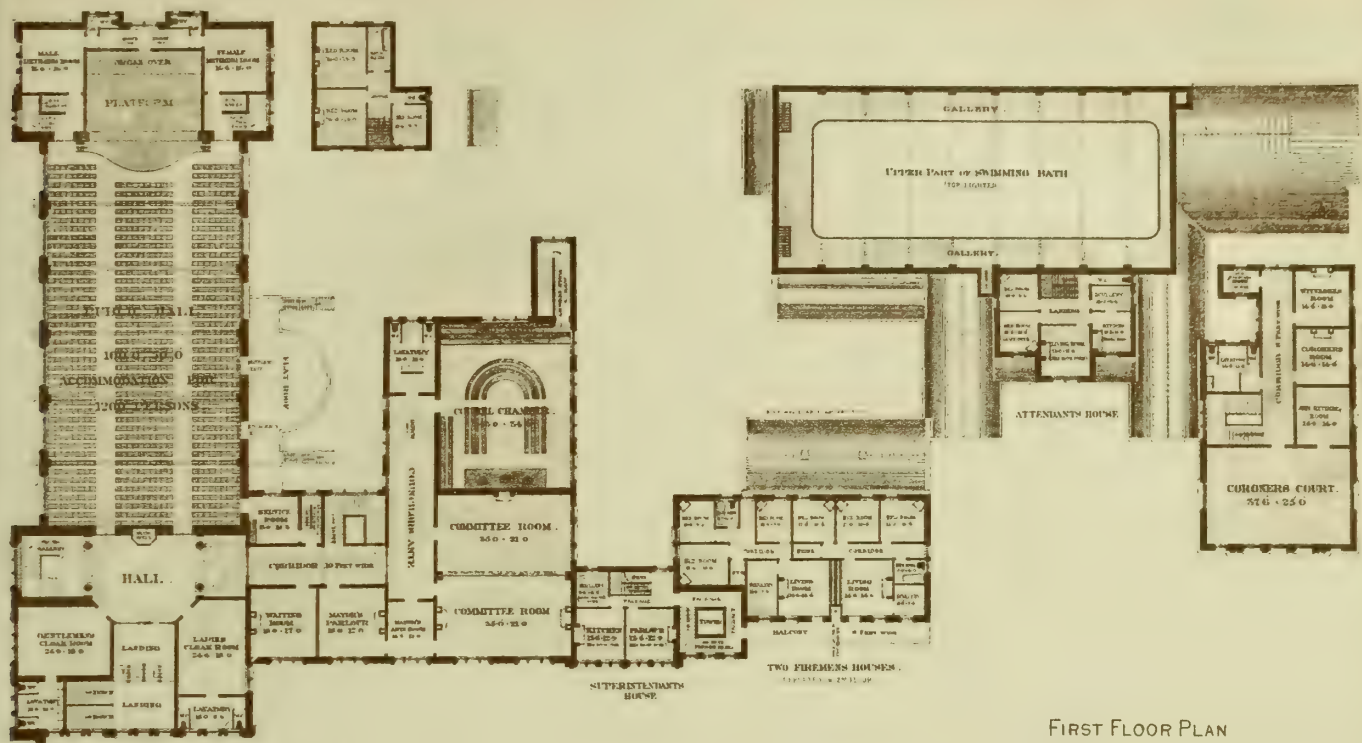


GROUND FLOOR PLAN



TOWN HALL ... MUNICIPAL OFFICES





# PUBLIC BUILDINGS, EAST HAM.

SELECTED DESIGN.

HENRY A. CHEERS & JOSEPH SMITH, ARCHITECTS.



FIRE ENGINE STATION

BATHS

CORONERS COURT

ELEVATION

STREET SOUTH













PONTE VECCHIO, FLORENCE.



RELIEF  
GATES OF THE BAPTISTERY



SEP. 23, 1895.

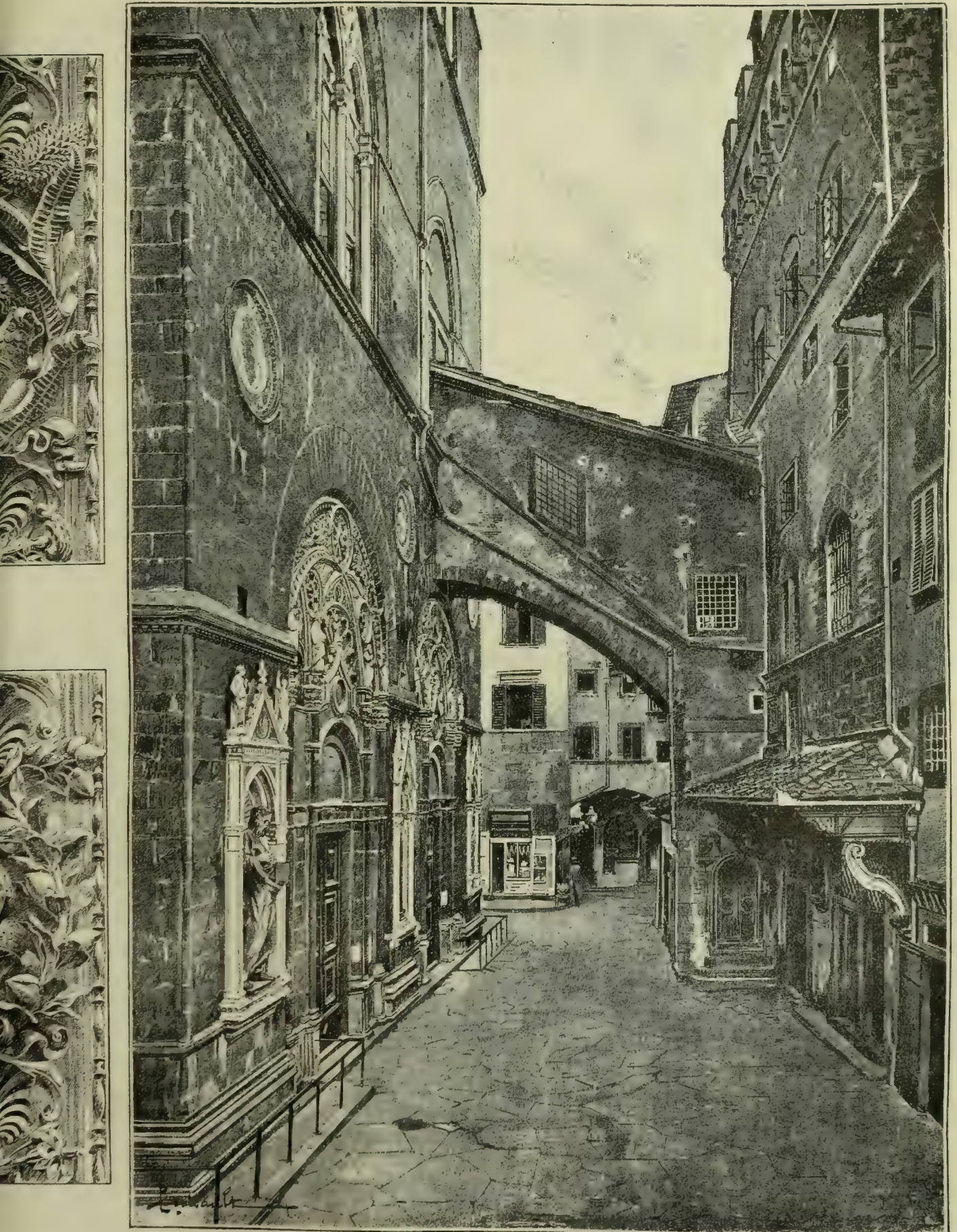
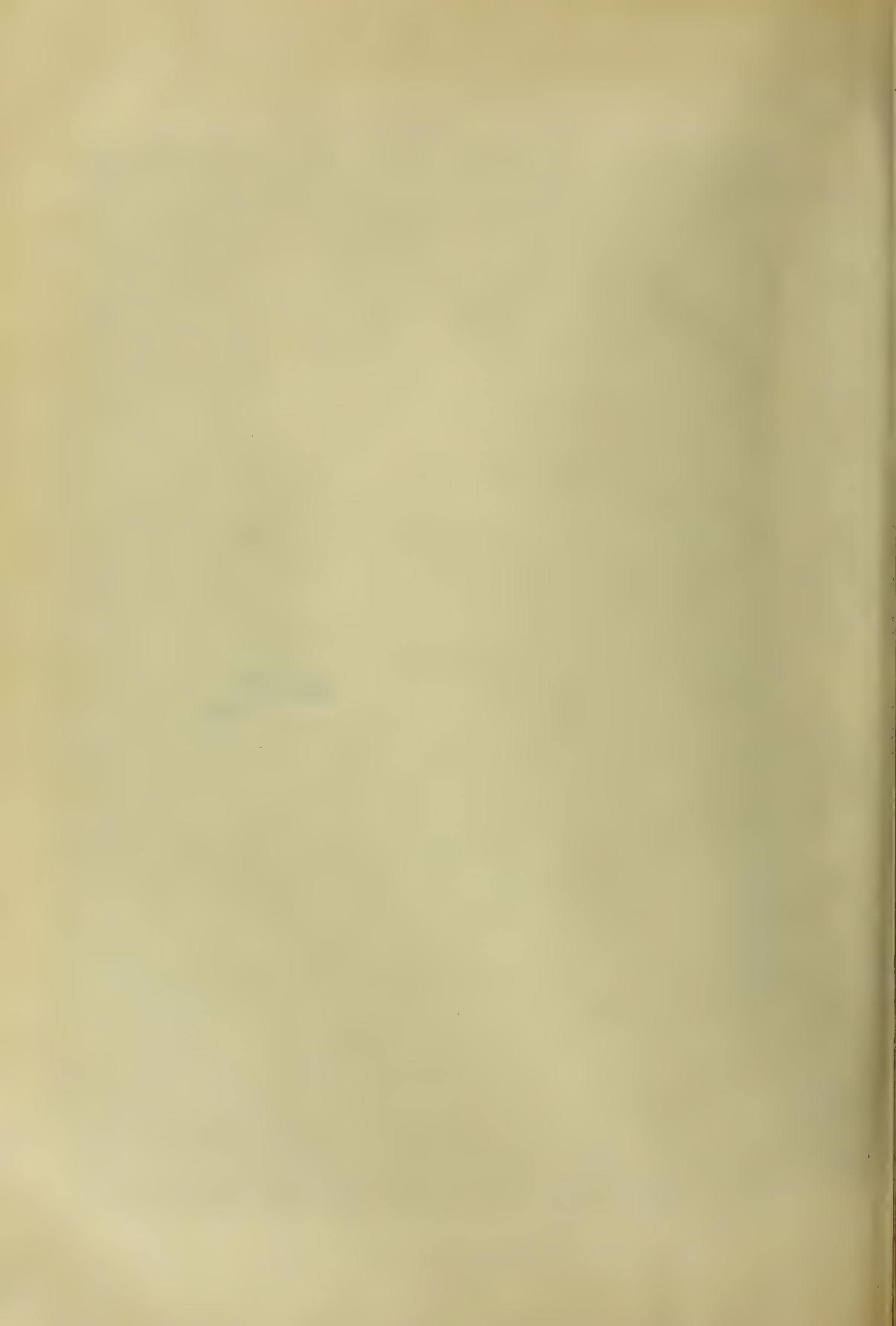


Photo Lithographed by ... ..

CHURCH OF OR SAN MICHELE, FLORENCE.

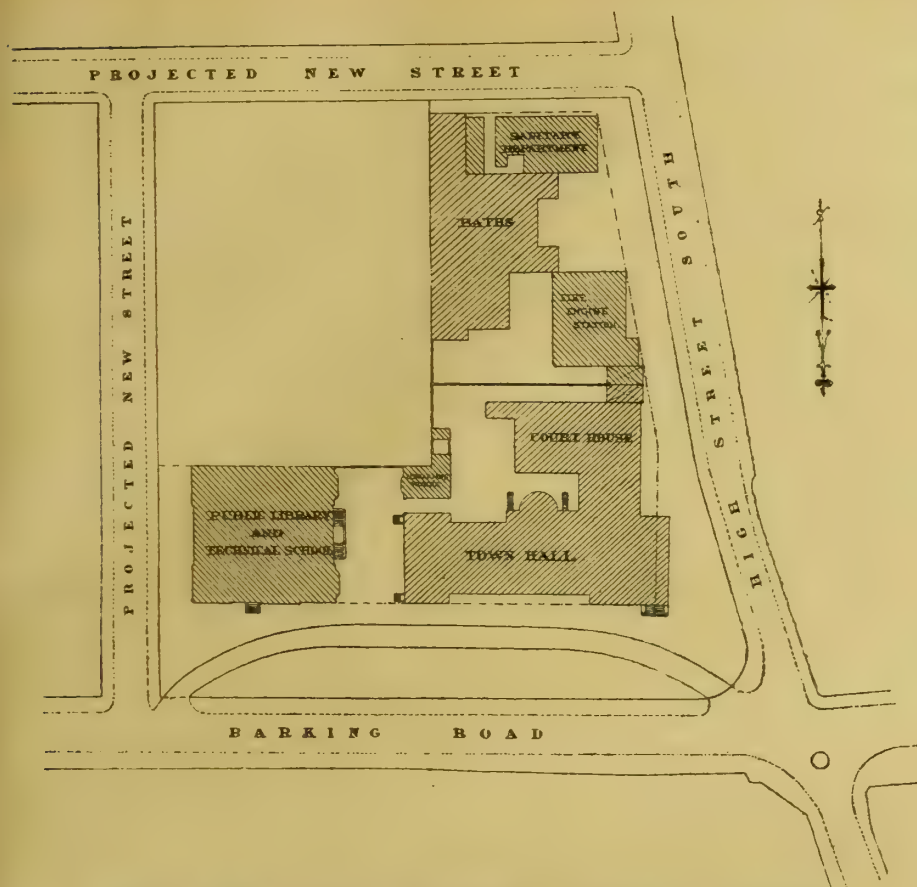
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RY, FLORENCE.







## BLOCK PLAN



## EAST HAM PUBLIC BUILDINGS: SELECTED DESIGN.

MESSRS. H. A. CHEERS AND JOSEPH SMITH, *Architects.*

## EAST HAM PUBLIC BUILDINGS.

## SELECTED AND SECOND PREMIATED DESIGNS.

PROFESSOR GEORGE AITCHISON, R.A., the professional referee who awarded the premiums in this competition, had very many points to investigate before he could determine the matter sufficiently to finally advise the District Council as to the relative merits of the plans submitted in this competition just decided, because of the variety of the individual buildings comprised within the whole scheme—viz., a town-hall, a public library and technical institute, public and sanitary offices, public baths, courthouse, and a fire station. These various buildings had to be grouped together as an intrinsic whole and yet necessarily individually separate and complete. The week before last we noticed the designs, and gave a brief description of the leading proposals. It cannot be said that, as a whole, the invitation of the Council called forth the amount of talent which might have been expected in so important and extensive an undertaking. Of course, it is no slight matter to embark as a competitor in a complex scheme of this kind, and the large number and the scale of the necessary drawings made it very expensive for those who seriously went in as competitors. The amount of work which an architect has to face in such a case, and that as a mere speculation, is enough to prevent many a capable man from taking part in a contest of this sort, particularly as most architects of experience and ability have their ordinary practice to attend to. Two premiums were offered, one of £100 and one of £50. As we have already said, when we announced the result of the competition, we do not think Professor Aitchison could have made a better choice from the plans sent in. To-day we illustrate somewhat fully both the premiated designs. The superiority of Messrs. Cheers and Smith's plans is very evident, and, as a group, the buildings seem to suit the site and its surroundings. Taking each building, too, for its particular purpose, the arrangements certainly are cleverly contrived. It is, however, we understand, a hastily prepared competition design,

which will well repay its authors as well as the promoters for more mature consideration and refinement so as to inspire the planning in its detail with a more finished character, while the elevations would gain much by a simplification of their many features, some of which might be modified, or even omitted entirely. The canted walls to the main entrance porch, for example, seem to be neither dignified nor beautiful, and of course would not weather well. The doorways also in other façades are too much cut up in their minor parts to look well. Over-elaboration only harbours dirt and courts damage. The money provision of the conditions was limited to £55,000. The architects of the chosen plans calculate their estimate on the basis of 6d. to 8d. per foot cube, working it out to £52,770; but at present prices this would surely seem to be an exceedingly moderate outlay for so extensive an amount of work. We give a block plan, showing how the several buildings come together, and in this respect the selected design is much superior to the others. As to the second premiated design we have not much to add to what we have already said on p. 343 (September 9). The view and plans given herewith illustrate the proposal, which is marked by ability in various ways, and distinguished by a massively-treated tower at the junction of the two roads and located at the end of the big hall, the gable of which flanking the tower on either hand comes unhappily to its rear. The clock looks a trifle over-large, and the opening in the turret at the corner of the hall would be ungainly in its effect if executed, an opening severing the shaft by so unqualified a shadow. The perspective hardly does justice to the detail of the fenestration and columniated piers along the façade of the hall.

The new branch library at Heaton, erected at the cost of Ald. W. H. Stephenson, and presented by him to Newcastle-on-Tyne, is to be opened by Earl Grey, on Thursday, October 6. The library will be called the Victoria Library, and it is a building almost identical with the Stephenson Library in Elswick-road, also given to the town by the same donor, and opened by Sir M. W. Ridley.

## CHIPS.

The Clyde Lighthouses Trustees have accepted tenders, amounting altogether to £3,088, for alterations on Cumbræ Light, which includes the substitution of the electric light for the present illuminant.

A large area of land in Bridwell-street, St. Budeaux, East Cornwall, has been purchased by Sir John Jackson, the contractor for the Keyham-extension works, as a site for a number of workmen's dwellings.

A Local Government Board inquiry was held at Ruskington, near Sleaford, on the 15th inst., by Mr. H. P. Boulnois, C.E., with reference to the borrowing of £1,900 by the Ruskington Urban District Council to construct waterworks ordered by the Local Government Board.

The Archbishop of York visited Middlesbrough on Thursday in last week and dedicated five memorial windows in St. Paul's Church, and afterwards dedicated the Holy Cross Mission in Cannon-street.

The National Association of Master House Painters of England and Wales will hold its annual convention at Liverpool on Oct. 11-13. The Lord Mayor will give a reception at the town-hall; the president (Mr. Alex. G. White) will also hold a reception, and a series of excursions has been arranged.

Lord Balfour of Burleigh formally opened, on the 14th inst., the new Grammar School and William B. Barbour Academy at Paisley. The new Grammar School and Academy has been erected, including site, at a cost of over £30,000. Towards the cost of erecting the Academy the trustees of the late Mr. William B. Barbour, who for a number of years represented the burgh in Parliament, granted £15,000.

The Swansea Harbour Trustees have under consideration some important harbour improvements, consisting of a new deep-water lock to the Prince of Wales's Dock, or an alternative new dock outside the South Dock. The estimated cost of improvements is £300,000.

The city council of Liverpool has approved of plans for the extension of the City Fever Hospital East, Mill-lane, Old Swan, and an application to the Local Government Board for sanction to borrow £40,000 for that purpose.

Colonel W. R. Slacke, R.E., one of the inspectors of the Local Government Board, held a public inquiry at Hanley on the 15th, with reference to an application by the town council for sanction to borrow a further sum of £4,000 for electric-lighting purposes. Mr. W. Cowell, the electrical engineer, produced and explained the plans.

Mr. James Duckworth, M.P., will open to-day (Friday) the new wing of the Free Methodist College in Victoria Park, Manchester. The opportunity will be taken to unveil the portrait of the late Principal Holliday, which has been purchased by those who were students at the time of his principalship.

The Great Council of Canton Vaud has introduced a project of law for the preservation of historical monuments. The new law, which passed the first reading on September 5th, provides for the appointment of a "Cantonal Archaeologist," and also of a standing commission of Historical Monuments at Lausanne, whose business it will be to keep watch and report upon all buildings within Canton Vaud which possess a national, historical, or artistic interest.

The Academy of Fine Arts of Brussels has divided the triennial prize for sculpture between the two young artists MM. Jacques Marian and Paul Rocquet.

Mr. R. H. Bicknell, C.E., a Local Government Board Inspector, held an inquiry on the 14th inst. at the Guildhall, Bath, into the urban authority's application for the sanction to borrow £18,000 in connection with the London-street improvement scheme. After hearing the evidence of Mr. C. R. Fortune, city surveyor, and others, the inspector expressed the opinion that the loan would not be sanctioned in the present state of the scheme.

A special meeting of St. Andrew's Burgh Commissioners was held on Friday, for the purpose of receiving and discussing the report of Messrs. Belfrage and Carfrae upon the best means of augmenting the St. Andrew's water supply. Their recommendations embraced the formation of a new reservoir in connection with the present supply, and also a reservoir upon the line of the Kinaldy burn. The estimated cost was put down at £18,000, exclusive of the price of land, compensation, or wayleave. No decision was arrived at, the consideration of the question being adjourned.

The centenary of the Baptist chapel at Kingsbridge, Devon, was celebrated on Friday, when the building was reopened after reseating with open pews of pitch-pine, reheating, and decorating.



## Engineering Notes.

**BANAVIE AND MALLAIG RAILWAY.**—The extension of the West Highland Railway to Mallaig, on the coast opposite Skye, has been in progress for 18 months past, the contractors being Messrs. Robert McAlpine and Son, of Glasgow, and the engineers Messrs. Simpson and Wilson, also of Glasgow. The new railway, which is 39½ miles in length, branches off from the main line a little south of the station at Banavie, and is to be carried across the Caledonian Canal on a swing bridge of 50ft. span. From this point to Corpach—where the first station will be—a distance of 1½ mile, two overhead accommodation bridges, formed of concrete, have been completed. On leaving Corpach Station, the line comes so close to the shores of Loch Eil that a concrete wall, 350 yards long and 7ft. high, had to be built to retain the slope, and protect it from the lake. From 3 to 9½ miles the line continues to follow the shores of Loch Eil, and is hemmed in between the public road and the beach. The sea walls required between Corpach and Kinlochail are 17 in number; they are each 9ft. from centre line of railway to the wall face. At 6½ miles the Fassfern stream is crossed on a double-span concrete bridge. From Banavie up to Kinlochail the railway is virtually level, and is completed to formation. At 10 miles the Fionn Lìghe River is crossed on an iron double-span bridge. For a mile and a half beyond Drimsallie the track is carried over low-lying peat exceeding 7ft. in depth. Where the railway is in cutting the moss is excavated below formation to a depth of 4ft., after which a layer of brushwood is introduced and the track raised to formation level again with dry filling. On this section there are in all 90 culverts, all of which have been constructed of concrete. A viaduct, also of concrete, is carried on a sharp curve over the Finnan Valley at 14½ miles. It is 416 yards in length, and 100ft. high, and has 21 spans of 50ft. each, with semicircular arches 2ft. 6in. thick at the crown. The piers, with the exception of two, are 20ft. long and 6ft. thick at top. Six of the piers and the east abutment are founded on rock, while the others are on compact gravel and boulders. Near 18 miles the line will span a stream on a viaduct extending to about 300ft., and 60ft. in height, while close at hand a second viaduct, having three spans of 50ft., is nearing completion. For about 1½ miles in this vicinity the railway descends rapidly, and skirting the southern shore of Loch Eil, gets to the level again at 20 miles. At Arienskil the river Ailort is crossed on a concrete viaduct, and at 24 miles Kinlochailort Station is reached, and here a tunnel 420ft. in length and 75ft. underground level is entered upon. A mile or so further two other tunnels, 75ft. and 180ft. in length respectively have been formed. The track then passes through a shallow part of Loch Dubh, the lake being utilised by the contractors as a means of supplying power for driving rock drills. Leaving Loch Dubh, the railway passes on to a viaduct 53ft. high, which crosses the Arnaboll Burn. This viaduct, which is of concrete, has six spans, each of 50ft. The line now follows the shores of Lochannuagh. At 27 miles Lochannuagh Viaduct—eight spans of 50ft. each—is crossed. Beyond this viaduct the track is carried through four tunnels, all of which are nearing completion. Their lengths are 150ft., 270ft., 195ft., and 490ft. respectively. At 29 miles Beasdale Station is reached, and at Borrodale another tunnel, 350 yards in length—which is the longest one on the line—is entered, after which the railway is carried over the Borrodale Burn on a concrete viaduct of three spans (two of 20ft. and one of 127ft. 6in.), with stone facings. Crossing the Laisiche Burn on a three-span bridge, the railway soon reaches Arsaig at 32 miles. Near 36 miles the river Morar and public road are crossed on a concrete viaduct of four spans—viz., 20ft., 90ft., 50ft., and 20ft. respectively. From this point and until Morar Station is reached the line is formed through light moss and rock cuttings, and the line afterwards clings to the rocky shore of the Sound of Sleat, and, after passing through a number of minor rock cuttings, reaches Mallaig on the seaboard. The pier and breakwater to be constructed here are not included in the present contract, and are to be let out separately.

**CALAIS.**—The Calais Chamber of Commerce on Saturday entertained a number of English visitors at a luncheon given in celebration of the com-

pletion of the extensive system of docks, which are capable of receiving vessels drawing 29ft. at high-water neap tides, and 34ft. at high-water spring tides. In 1875 the French Government sanctioned a scheme for the construction at Calais of a modern deep-draught harbour. The first work undertaken was the erection of a floating dock and the extension of the eastern tidal basin, giving together a water area of over 400 acres. This part of the improvement was completed early in 1889, and officially opened in that year by the late President Carnot, whose name the dock received. This dock covers an area of 23 acres, and the total length of the quay space is 6,393ft., the maximum width being 690ft., and the minimum width 393ft. It is entered from the eastern tidal basin by two locks each 436ft. long, fitted with four pairs of gates. The depth of water on the sills is 28ft. 8in. at ordinary spring tides, and 24ft. 5in. at neap tides. The eastern tidal basin, from which the Carnot Dock is approached, is 558ft. broad, and its north quay, 1,800ft. long, is specially designed for steam packets. Alongside this quay the depth at high water of spring tides is 23ft. 8in., 29ft. 4in. at high water of neap tides, and 26ft. 5in. at low water of spring tides. The south quay of the same tidal basin is 820ft. long, the maximum depths being 46ft. at spring tides and 41ft. 8in. at neap tides, while at low water of spring tides there is a depth of 26ft. 2in. Extensive warehouses, sheds, and hydraulic cranes are provided. There is also to the westward a tidal basin, on the quays of which, covering 34,600sq. yds., coal, pig-iron, and wood can be stored, and a floating dock for petroleum, with quayage 600 yards in length. The Chamber of Commerce propose to enlarge the latter dock, and to make a new entrance, which will permit the entry at all tides of ships with a draught of 20ft. At the southern end of the Carnot Dock there is a dry dock, the dimensions of which are:—Breadth at entrance, 69ft.; length on blocks, 426ft.; length at half height, 500ft.; depth on sill, spring tides, 28ft. 8in., neap tides, 24ft. 5in. After the completion of the Carnot Dock attention was concentrated upon the second part of the improvement scheme sanctioned by the Government—viz., the demolition of the old east pier, and the substitution of a new structure, which has given a width of 430ft. at the entrance to the port. In 1896, just after the enlarged entrance had been completed, the Chamber of Commerce inclosed a plot of land on the west side of the Carnot Dock, and erected thereon pens and sheds fitted for carrying on over-sea traffic in cattle.

**COLLAPSE OF A RAILWAY BRIDGE IN ONTARIO.**—Two spans of the New York and Ottawa Railroad's bridge, across the St. Lawrence River, at Cornwall, Ont., collapsed on September 6, killing 14 men outright and injuring 17 more. This bridge, says the *Engineering Record*, which is located just below the famous Long Sault Rapids of the St. Lawrence River, consists of three divisions, and, beginning at the north end, includes an approach viaduct, a draw span over the canal, a long span cantilever across the north channel of the river, and three 370ft. spans across the south channel of the river. The superstructure for the bridge had been completed, and the erection of the superstructure had been commenced at the south end. Two of the three 370ft. spans had been swung, and were nearly finished, and the third was nearly assembled at the time of the accident. The river at this point has a depth of nearly 40ft. and a current of about eight miles per hour. The two piers for the south channel were built with timber cribs about 16ft. by 62ft., and 40ft. high. The hard rocky bottom was prepared by a diver. The piers were sunk by temporary loads, and filled with concrete deposited under water by a bucket, which discharged its contents upon contact with the bottom. The monolithic concrete masonry, entirely filling the different compartments of the crib, extended up to four feet below the water level, and above it a coffer-dam was built and pumped out. The concrete appeared to be in perfect condition, and on it was built the solid limestone masonry to a height of about 37ft. The pier was completed to the top of the concrete last autumn, and showed no evidence of settlement or imperfection when operations were resumed this spring. The 370ft. spans were erected on timber falsework extending nearly to the water-level, below which it was supported on iron piles. The first pier from the south shore and the two spans which were partly supported by it collapsed suddenly, carrying down about 50 men at work on

the bridge. The specifications were written and the working drawings made according to the direction of Mr. F. D. Anthony, chief engineer of the New York and Ottawa Railway Company, and were approved by the Canadian Government engineers and by Mr. Stewart, consulting engineer to the railway company. The superstructure was built by the Phoenix Bridge Company, and the substructure by SooySmith and Company, of New York.

### CHIPS.

A stained-glass window has been placed in St. John's Church, Brooklands as a memorial. The window has been prepared from cartoons drawn by the late Sir Edward Burne-Jones. The design is symbolical of the Ascension.

A new hotel is about to be built on Coverack Headland, Falmouth Bay, from plans by Mr. Sampson Hill, of Redruth. The estimated outlay is £7,000.

The peal of four bells in Barnack Church was rehung last week, after having been recast by Messrs. John Taylor and Co., of Loughborough, who have added a new tenor.

The Glasgow and South-Western Railway Company are prepared to expend, during the coming half-year, some £300,000 on the extension of St. Enoch Station at Glasgow, and the widening of their line from St. Enoch Station to Port Eglinton-street Junction.

A memorial plaque to the third Marquess of Exeter, grandfather of the present Marquess, was unveiled last week in the Church of the Holy Sepulchre, Northampton. The memorial, erected by past and present officers of the Northamptonshire Militia, records his connection with their regiment, and bears the regimental and family mottoes.

The new Unionist Club at Wellington-on-Tyne will be opened on the 5th of October by Lord Londonderry.

An additional supply of water for the East End of London became available on Monday, the connection between the mains of the Southwark and Vauxhall Water Company and those of the East London Waterworks Company having been completed. The work has been executed in little over a fortnight, the men working day and night in laying about two miles of pipes, some of which run through the Tower Subway.

The first section of the Jungfrau Railway—that from a junction with the Interlaken-Grindelwald line at the foot of the Scheidegg to the Eiger Glacier—was opened on Monday. When the line is completed, it is intended to build an observatory at the summit of the Jungfrau. At the banquet given to celebrate the opening of the line, President Guyer-Zeller stated that the summit of the Jungfrau would be reached in 1904. The next section will carry the line as far as the Mönch.

Mr. Joseph Rookwood, surveyor, of 47, Museum-street, Bloomsbury, London, W.C., asks us to correct a statement made in the list of tenders published last week in reference to the erection of factory premises at Chingford. Mr. Rookwood is not the architect, as stated, but merely the quantity surveyor.

The urban district council of Newmarket have adopted a scheme by Messrs. Beasley and Sons, of Westminster, for providing a main sewer for Newmarket and Epping, the sewage to be disposed of by bacterial treatment. Application is to be made to the Local Government Board for sanction for a loan to carry out the works.

Mr. Edward Sweny, senior plan examiner of the 8th Division Ordnance Survey, Redland, Bristol, having been appointed by the Government of the Straits Settlements to the post of district surveyor for the State of Negri Sembilan, left London yesterday to take up his new appointment.

Mrs. Randall Davidson, wife of the Bishop of Winchester, laid at Portsmouth, on Tuesday, the foundation-stone of St. Stephen's Church, which is to be erected to meet the needs of a new and rapidly-increasing working-class parish.

It is in contemplation to demolish the modern part of Whitgift's Hospital of the Holy Trinity, in North-end, Croydon, in order to improve the thoroughfare at that point. Mr. Alderman Rymer, chairman of the Whitgift Governors, states that the modern part is in a very dilapidated and unsatisfactory condition, while the original building is "as sound as a rock." The latter will in no wise be affected by the proposed demolition, nor will any injustice be done to the alms-people.

The foundation-stones of the new Meersbrook Park Congregational Chapel, Sheffield, has been laid. The style adopted is Renaissance. Messrs. Hemmell and Paterson, of Norfolk-row, Sheffield, are the architects, and the contract price is £3,100.



## TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the BUILDING NEWS, 332, Strand, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

Cheques and Post-office Orders to be made payable to THE STRAND NEWSPAPER COMPANY, LIMITED.

## TERMS OF SUBSCRIPTION.

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## ADVERTISEMENT CHARGES.

The charge for Competition and Contract Advertisements, Public Companies, and all official advertisements is 1s. per line of Eight words, the first line counting as two, the minimum charge being 5s. for four lines.

The charge for Auctions, Land Sales, and Miscellaneous and Trade Advertisements (except Situation advertisements) is 6d. per line of Eight words (the first line counting as two), the minimum charge being 4s. 6d. for 40 words. Special terms for series of more than six insertions can be ascertained on application to the Publisher.

Front-page Advertisements 2s. per line, and Paragraph Advertisements 1s. per line. No Front-page or Paragraph Advertisement inserted for less than 5s.

Advertisements for the current week must reach the office not later than 3 p.m. on Thursday. Front-page Advertisements and alterations in serial advertisements must reach the office by Tuesday morning to secure insertion.

## SITUATIONS.

The charge for advertisements for "Situations Vacant" or "Situations Wanted" is ONE SHILLING FOR TWENTY-FOUR WORDS, and Sixpence for every eight words after. All Situation Advertisements must be prepaid.

GERALD McMILLAN. (The purlin should always be fixed at right angles with the rafter, as shown in your second sketch. That is much the more scientific way.)

RECEIVED.—T. C. J. and Co.—M. R.—L. and Son.—W. Q.—N. G. C.—C. B. R.—F. S. S.

## Correspondence.

## ADVERTISING ARCHITECTS.

To the Editor of the BUILDING NEWS.

SIR,—Mr. Swaine, in his letter last week, asks if architects often advertise. I am afraid they do. It is no uncommon thing to see boards containing the names of members of the Royal Institute and the Society of Architects fixed to the scaffolding of buildings in course of erection, and yet these two bodies profess to put down this kind of thing with a strong hand. I heard a well-known architect remark some few months back that any man who could afford a brass plate to engrave his name on could call himself an architect. This is certainly the case, and will be so until some form of registration is brought about. The following is copied from the advertisement column of a local paper:—

Architect and Surveyor.  
Auctioneer and Valuer.  
House, Land, and Estate Agent.

Sales by Auction in Town or Country on all kinds of property, and at sale-rooms and yards every month. Cash advanced to any amount on goods sent in for absolute sale.

The above is not the kind of thing to induce the public to look upon the architectural profession with respectful admiration.—I am, &c.  
London, Sept. 20. R. R.

## RIDGE TILES AND SLATE ROOFS.

SIR,—Reading the "B.N." on my way home, I felt so thankful, when I arrived, that I had used Broseley tiles and a tile ridge, and had not committed the great sin of putting a red ridge on green slates; but I felt my shortcomings in having so planned the roofs as not to require large buttresses at the angles of the building, so suggestive of a settlement, and subsequent underpinning. I observed in a building recently illustrated in your pages that such buttresses were shown, and I was puzzled why they were. Lead ridges in or near London get a nice dirty grey very soon, and I cannot think that there is anything very dreadful in red and green, as I observe those colours prevailing in my garden.—I am, &c.,  
OBSERVER.

## Intercommunication.

## QUESTIONS.

[12049.]—Sketch Plans.—For making above by an architect, and submitting probable cost. I am a-ked to pay 1½ per cent., to which I am agreeable, only the architect will not give up the plans, saying they are his tools. The work is not to be gone on with. If he is paid, are the plans not mine? Otherwise, what am I paying him for? By stating what is legal or customary you will oblige.—INEXPERIENCED.

[12050.]—Adjoining Walls.—I have built a house, gable end adjoining another building plot, and should like to know if another person could build up and plaster on to my gable either a 4½ in. or 9 in. wall? Having no knowledge of the regulations as to adjoining walls, any information would be thankfully received.—D.

[12051.]—Imitation Timberwork.—Many of the newer villas and residences at Folkestone, Eastbourne, and other places have their upper stories finished with a rough-cast face, but divided into panels by projecting cementwork, representing half-timber framing. Can any of the readers of the "B.N." inform me how this is done, and what are the proportions of the cement, lime, sand, and shingle used?—KENT.

[12052.]—Water Delivery of Pipes.—It is desired to know what quantity of water per hour would be delivered by pipes respectively 1 in. and ¾ in. internal diameter, the cistern being 30 ft. above orifice of pipe. If quantity of water deliverable depends on greater or less pressure, it would be useful further to know what difference it would make in respective delivery of these pipes if cistern were raised to 60 ft. or lowered to 15 ft.—AMATEUR PLUMBER.

[12053.]—Dousing.—Will any of your readers kindly say if the practice adopted for finding water by water magicians has proved successful in this country, and if so, the best professionalist to employ? Can the art be easily learned?—HYDROLOGY.

## REPLIES.

[12044.]—Book-keeping Under Contracts.—Many public bodies insist on the regulation rate of wages being made, and require contractors to keep such books as will prove that the proper wages are paid. Many builders object to this; but, I conclude, have to submit.—H. L.

[12044.]—Book-keeping under Contract.—A clause to the effect that the contractor is to provide and keep proper books open to inspection is very unusual; but in a few recent corporation contracts it has been inserted. I am sure few contractors would sign any contract with this condition, as it seems to me that it is unduly inquisitorial. Why should the wages and the hours of labour be under the control of the owners or authorities who accept a tender?—It may be, a low one. It seems as unreasonable as to inquire of one's baker, or grocer, or tailor whether he is paying the usual wages or obtaining his goods at a fair price.—A. G.

[12045.]—Glass for Skylights.—If ornamental glass is not required, use ¾ in. rolled plate, laid smooth side up.—H. L.

[12045.]—Glass for Skylights.—Hartley's rolled plate can be had in different thicknesses, and is suitable for skylights. Send for particulars to manufacturers.—LOUIS ERWOLD.

[12045.]—Glass for Skylights.—Why does not "Top Light" try "Besto" glass, a description of which appeared in last week's BUILDING NEWS? It is a semi-transparent glass made in several forms, in the substance of which a wire-netting covered with asbestos is imbedded. It is strong, and artistic in appearance, and, if broken, the glass does not fall, which is a great advantage. Particulars can be obtained at the company's offices, 41, Eastcheap.—G. H. G.

[12046.]—Shutters.—Many shops have no shutters, but "A. J." will find revolving shutters the best.—H. L.

[12046.]—Shutters.—Movable shutters are fast disappearing from use in protecting shops, only being used as a rule where it is impossible to provide room for the box to contain the revolving shutters when rolled up. Revolving shutters are a better protection than lifting shutters, and are fixed under the breastsummer in a space varying in dimensions according to the height of the shop front covered by the shutters. Messrs. Francis and Co., of Gray's Inn-road, provide the necessary details for fixing the shutters, so as to take up as little room as possible, this being required in most shop-fronts nowadays.—L. E.

[12046.]—Shutters.—There are no advantages in using movable shutters: they are cumbersome, take room for storage, entail labour in putting up; while the metal lath revolving shutters of a good firm are more proof against burglary, and are infinitely cheaper in the end, and more speedily used.—G.

[12047.]—Church Seats.—In most of the newer churches I have visited the seats have slightly sloping backs, and they are certainly more comfortable than those with upright backs.—L. E.

[12047.]—Church Seats.—The back of the seat described by me should slope about 3 in. Have a specimen seat made.—H. L.

[12048.]—Intercepting Manhole.—Get a catalogue from one of the "B.N." advertisers, and get a sanitary inspector to allow you to see a well-constructed manhole.—H. L.

[12048.]—Intercepting Manhole.—I should advise "Builder" to apply to any well-known maker of manhole covers—such as Messrs. Stone, of Deptford—stating his exact requirements, when doubtless they will be able to supply him with all the necessary information he requires.—A. A. M.

[12048.]—Intercepting Manhole.—"Builder" cannot do better than form his inspection chamber as follows:—Build a chamber 3 ft. square, one brick thick,

laid in cement mortar, with a cast-iron cover with airtight joints, and it should be ventilated by a 4 in. pipe inlet carried up to any convenient height. Form the bottom of chamber with Doulton's, Duckett's, or any other good invert glazed channels. These channels are half pipes, and are to be bedded in a layer of cement concrete, 6 in. thick, floated at the surface of pipe, and properly rounded into them. The inverts of the half-pipes are, of course, laid to proper falls, say, of 3 in. from inlet to outlet, and of curved pipe. The half-pipes should be about 6 in. diameter, and the surfaces smooth. Manhole covers are made for these chambers by any of the above firms. The above is the most convenient for an inspection chamber, as it allows the socketed 3 ft. bamboo rods used for cleaning to be easily pushed up the drains. There are other kinds of chambers made in glazed stoneware which can be fixed to the line of drain, but these are not suitable for several branches.—SANITAS.

## CHIPS.

The Local Government Board have sanctioned the borrowing by the Southend-on-Sea Corporation of £3,845 for the tramway passing place and new buildings on the pier.

At a municipal bye-election held at Burnley on Saturday, Mr. William Whittaker, builder, the Conservative candidate, was elected a member of the town council by a large majority.

The Liverpool City Council recently passed the scheme for an "experimental" electric tram-line between St. George's Church and the Dingle on the distinct assurance that the cost would be £50,000. The Tramways Construction Committee, however, have already "outrun the constable," and are coming before the next council meeting with a supplementary estimate of £35,000, bringing up the total to £85,000.

The new Jubilee schools, erected at the cost of Messrs. Lloyd and Lloyd, of the Coombs Wood Tube Works, at Gorsty Hill, were opened on Tuesday. The buildings, which can be used as day-schools and a mission church, have been erected at a cost of about £2,000, in commemoration of the Queen's long reign, and will accommodate over 400 persons. The builder was Mr. W. Willets, of Old Hill, and the architects were Messrs. Prothero and Phillott, of Cheltenham.

The Urban District Council of Matlock have decided to apply to the Local Government Board to borrow £5,500 for further extensive improvements. The scheme comprises the provision of open spaces, promenades, and other works to make the place attractive.

The town council of Bristol, on Tuesday, after a long discussion, rejected the scheme for providing docks at Portishead, at the estimated cost of £360,000. The result of this decision is that Bristol is, officially speaking, once more without a policy of docks extension, and that a further period of twelve months must elapse before steps can be taken for depositing a Bill in Parliament.

The corporation of Aberdeen have entered into an agreement with the Rubislaw Granite Company to widen Queen's-road, at an estimated cost to the ratepayers of £1,640.

The general committee having in hand the recasting, rehanging, tuning, &c., of the bells of the Parish Church, Tenbury, has given the contract for the work of rehanging and tuning to Mr. W. Greenleaf, Hereford, while the recasting of the bells has been intrusted to the firm of Barwell, Birmingham.

At last week's meeting of the Dancon Commissioners, it was agreed to borrow £17,800 for the purposes of water extension, hospital, special sewers, roads, and pier.

The Bath Town Council decided, after a long discussion, on Tuesday, to adopt a scheme of rehousing submitted by a committee. This is that 36 houses with four rooms each, and four with five rooms each, be erected on a site in the Dolemeads, Widcombe. The committee pointed out that, though this district was below flood-level, it was obligatory on the council to erect 17 dwellings in place of those demolished to carry out the river wall improvement. The Local Government Board demanded their erection. It was proposed to raise the ground, so that the new dwellings would be 9 in. above the highest flood-level. The cost of purchasing the site, raising the land, and building the houses will be £8,457.

The three central windows, as well as the gable window of the western façade of Llandaff Cathedral, are about to be filled with stained glass. The windows are the gifts of four several donors, whose names have not been made public. The dean has selected one of the best available spots in the building for the site of a brass tablet, which will bear Archdeacon Bruce's portrait. The space chosen is situate under the window next to the south doorway. The designing of the brass has been intrusted to Mr. C. B. Fowler, architect, Cardiff, the design being of a Celtic character. It is now an open secret that it is intended to present to the cathedral a brass cross and pair of stately candlesticks designed by Mr. J. P. Seddon, F.R.I.B.A., of Westminster. They are the gift of Colonel Sir Edward Hill, M.P., Rookwood, Llandaff.



## STATUES, MEMORIALS, &amp;c.

**WHITBY.**—The Cedmon Memorial Cross in the old churchyard was unveiled by Mr. Alfred Austin, the Poet Laureate, on Wednesday. It has been erected from designs by Mr. C. C. Hodges, F.S.A., of Hexham, the sculptor being Mr. Beall, of Newcastle-on-Tyne. The four great contemporary crosses of Bewcastle, Ruthwell, Rothbury, and Hexham—erected towards the end of the 7th century—have been taken as the basis of the design. Upon the front of the Cross there are carved panels of The Christ in the act of blessing, of David playing the harp, of the Abbess Hilda, of Cedmon in the stable inspired to sing his great song, and beneath runs the inscription, "To the Glory of God and in Memory of His servant Cedmon. Fell asleep hard-by, A.D. 680." On the obverse is carved a double vine, symbolical of Christ, and in the loops are figures of the four great scholars trained at Whitby in Cedmon's time, under Abbess Hilda—namely, Bosa, Aetla, Olfson, and John. Beneath there are inscribed the first nine lines of Cedmon's Hymn of the Creation, as preserved to us on the fly-leaf of the Moore Bede in the Cambridge Museum, and which have been rendered into English by the Anglo-Saxon Professors at Oxford and Cambridge. The runes of the same nine lines are also carved upon the border of one of the sides of the cross, as in the case of Ruthwell, and the same inscription appears in Saxon Minuscule on the border of the opposite side. The two sides of the cross contain respectively a conventional English wild rose with birds and animals, and an apple-tree, emblematical of Eden, conventionalised also, with other birds and animals. A harp is seen at the foot of the tree of life, and the wild roses spring from an old Iona cross. The head of the cross contains the Agnus Dei, and the symbols of the Four Evangelists on one side; on the other side, bosses and knot-work. The cross stands up out of a solid base of stone, to the height of about 20ft.

A new Established church is about to be built in Walker-road, Torry, Aberdeen, from plans by Mr. A. H. L. Mackinnon, architect, Aberdeen.

The special committee of the Monmouthshire County Council which was appointed to consider the question of acquiring Tintern Abbey and Raglan Castle from the Marquis of Worcester (the properties being in the market) is giving attention to the matter. If it is decided to acquire the ruins, an Act of Parliament would be necessary for the purpose.

The foundation-stone of a mission-room and parish house in connection with the church of the Holy Name, in the parish of All Souls', Leeds, was laid last week. The mission-room is being erected in North-West-road, Woodhouse-street, and the parish house will be situated in Sagar-street. The estimated cost of the buildings is about £2,000. The mission-room will be a plain brick building, with stone dressings. The large hall, which will accommodate 400 people, will be so constructed that when necessary it can be partitioned off into four class rooms. The architects are Messrs. Bulmer and Perkins, and the contracts for all the work have been placed in the hands of Mr. Thomas Hannam, all of Leeds.

The town council of Edinburgh have again discussed in committee the relative merits and disadvantages of various suggested sites for the long-talked of Usher Town Hall, and on a vote being taken the following were recommended for further consideration:—(1) High-street from the Council Chambers to St. Giles-street; (2) Atholl Crescent, with back to Canning-street; (3) George-street and Castle-street corner; (4) Chambers-street corner; and (5) Melville-street and Stafford-street. A remit was made to get particulars regarding these sites against another meeting to be shortly called.

Messrs. Douglas Young and Co., of Coleman-street, held a sale of some of the Liberator estates at Bembridge, Isle of Wight, on Tuesday. The property sold comprised several building plots and 520 acres of land which was reclaimed from the sea about twenty years ago, and is now principally used for grazing purposes. There was a brisk competition for every lot, and the total realised amounted to £13,890.

General Crozier, R.E., held an inquiry at the town-hall, West Ham, on Tuesday, on behalf of the Local Government Board, into the complaints made with reference to the polluted state of the Channelsea River in the crowded parts of Stratford. The Channelsea River is an offshoot of the Lea, and runs through one of the most populous districts of the East End. Evidence was given to show that the pollution was caused in Walthamstow and Leyton, as well as West Ham. Mr. Lewis Angell, the borough engineer of West Ham, stated that the corporation were spending £80,000 upon connecting the West Ham Sewage Works with the Metropolitan Sewer. The inquiry was closed, and on the following day the inspector made a personal survey of the river and surrounding district.

## WATER SUPPLY AND SANITARY MATTERS.

**NEW METHOD OF DISINFECTION.**—No sanitary subject has received more attention lately than that of disinfection. Drs. Walther and Schlossmann give the following details of a new method of disinfection: By means of a specially-constructed apparatus a mixture of formaldehyde and glycerine is sprayed into a room which is to be disinfected, until a thick fog results; about 4lb. of the mixture are needed per 1,000c.ft. The room need not be hermetically closed during the operation, as the ordinary circulation of air assists in spreading the disinfectant, and in enabling it to reach remote corners. Three hours' exposure was found sufficient to kill all germs in the rooms experimented on, though the test objects were purposely chosen of the most refractory nature. For example: Pieces of linen thickly coated with a paste of white of egg and garden soil, dried in an incubator; layers of soil 3 or 4mm. thick with potato skins under and above them; potato skins alone. These were placed, open and covered, at various heights in the room, in recesses in the wall, on the floor, under pieces of furniture, in tall glass cylinders, or in shorter cylinders under a layer of wadding, in the pockets of thick winter clothing. Fæces were also sterilised by this exposure. Live guinea pigs and rabbits were also found to be freed from bacteria in their skins and bedding straw. The authors attribute the very advantageous effect of adding glycerine to the formaldehyde, to its hygroscopic character, and its power of adhering to and penetrating most of the ordinary porous materials found about a household. They anticipate that it may be found possible to diminish still further the necessary duration of the period of disinfection, and that their method will become a much more powerful agent than any yet known against the spread of infectious diseases, not only in man, but in the lower animals.

**OUSEBURN SEWERAGE SCHEME, NEWCASTLE-ON-TYNE.**—At the last meeting of the Town Improvement Committee of the Newcastle Corporation, it was reported that a communication had been received from the Local Government Board, sanctioning the loan of £6,500, to enable the corporation to carry out the work for the extension of the Ouseburn sewerage scheme. It was agreed that the city engineer, Mr. Law, should take steps to have the scheme carried into practical effect as soon as possible. About five years ago, the scheme was first initiated, and the proposal was that the sewage discharged at the bridge, Byker Bank, from Byker, Heaton, Benton, and Jesmond, and also that from Gosforth, should be discharged into the river at low-water mark. The carrying out of the sewerage scheme will remove a grievance complained of by the residents in the neighbourhood of Byker.

**PLYMOUTH.**—A capacious storage reservoir at Burrator, on Dartmoor, constructed at a cost of £175,000, to make the water supply of Plymouth, originally brought to the town by Sir Francis Drake, equal to modern requirements, was opened on Wednesday. The reservoir, which will have the appearance of a natural lake, will be a mile and a third long, its greatest width being half a mile and its greatest depth 77ft. It has been obtained by constructing a dam across the bed of the Meavy in a wooded gorge at Burrator, and a smaller structure in a valley near Sheepstor. The Burrator dam, which has occupied five years in construction, is built of grey granite, found on the site. Its greatest length is 410ft., its height from the river bed to the overflow is 77ft., and from the bottom of the foundation to the top of the parapet 145ft. A thickness of 77ft. at the base is reduced to 62ft. at the river level, and to 21ft. at the top. Although at the Sheepstor dam the depth of water will only be 17ft., the work, owing to the treacherous nature of the ground, necessitated the excavating of a trench 700ft. long and 108ft. deep in the middle. The gathering area is nearly 5,500 acres, the reservoir will cover 116 acres, and will contain 650,000,000 gallons. Six inches of rain over the whole gathering area, if it could be collected without shrinkage, would fill the reservoir. The annual average rainfall on this side of Dartmoor is about 60in., and, allowing for absorption and evaporation, about 45in. are available. Plymouth now uses about 5,000,000 gallons of water a day, and, when the reservoir is full, it will contain about 130 days' supply, even if every source of gathering were shut off. It is hoped that by Christmas the reservoir will be filled. The work was designed by Mr. Edward Sandeman, the corporation's water engineer, and Mr. James Mansergh, consulting engineer, and it has been carried out by the Plymouth Corporation under the supervision of these engineers.

**PORTADOWN.**—For some time past Messrs. R. H. Dorman and Henry Shillington, civil engineers, have been conducting experiments at Portadown in the treatment of sewage by a novel system of filtration. It is now about twelve months since the first experimental filter in connection with the septic tank at Obin-street depot was laid down. During dry weather nearly the whole of the sewage

reaching the works is passed through the septic tank, when the solid matter contained in the sewage is thrown into solution by the agency of micro-organisms, and the sewage is thus brought into a suitable state for passing through the filter-beds. These beds are, however, very small and shallow, while the material contained in the bottom layers is too coarse, and, as a consequence, the best results are not produced, the filtrate discharged from the beds being faintly coloured, while there is a perceptible smell from it. Still, the results obtained from this simple process are described by local journals as wonderful. The sewage is delivered daily into the tank, and the effluent discharged into the two small filters alternately, and finally discharged into the Corcain River in a clarified condition, and in a totally different state from the crude sewage which formally entered the river. These experiments have been carried out at a very small cost, and for a very little further expenditure the works can be made capable of dealing with the whole of the dry weather flow, and a filtrate discharged into the river nearly equal in quality to the river water itself. A committee of the town commissioners has been appointed to watch the results that are being obtained, with power to expend a small sum on the laying out of the ground and the enlargement of the filter-bed area.

## CHIPS.

The Maidstone Town Council decided on Wednesday to promote a Bill in the next Session of Parliament for the compulsory acquisition of the Waterworks Company, and the extension of the present sources of supply. The undertaking will cost the town about £120,000.

The new laboratories of physiology and pathology which University College, Liverpool, owes to the generosity of the Rev. S. A. Thompson Yates, will be opened on Saturday, October 8, by Lord Lister, President of the Royal Society.

There was a large attendance at the Mart, Tokenhouse-yard, on Wednesday, when Messrs. Chancellor submitted for auction the freehold property known as Glover's Island, situated on the Thames near Richmond Bridge. The island has for many years past been utilised for boatbuilding and storage of boats, for which it is well adapted, and the catalogue described it as "affording a splendid site for the erection of a boating club or hotel." The bidding started at £1,000, but after several advances the auctioneer announced that the property was withdrawn at £4,000.

The Sunderland Corporation decided on Wednesday to obtain powers to work the tramways in the town, which are at present worked by a company. They also decided to establish the electric overhead trolley wire system in lieu of horse-power.

Mr. Sandford Fawcett, M.I.C.E., held an inquiry at the Club-room, Downerry, Cornwall, on Tuesday, relative to the proposal of the St. Germans Rural District Council for sanction to borrow £933 for works of sewerage for the village of Downerry. Mr. S. Jenkin, C.E. (engineer for the works), explained the plans.

Alterations are being made to the Congregational Church, Yeovil, under the direction of the architect Mr. J. N. Johnston. Special consideration has been given to the ventilation, which will be carried out on the Boyle system.

The Lord Chief Justice will open the Passmore Edwards Public Library, St. George-in-the-East, on Saturday, October 29, and Lord George Hamilton, M.P., is to lay the foundation-stone of the Passmore Edwards Public Library at Acton early in November. The architect of both these buildings is Mr. Maurice B. Adams, F.R.I.B.A.

The ancient parish church at Oakbrook, Derbyshire was reopened on Sunday by the Bishop of Southwell, after repairs. The fabric has not been touched, but in the interior there has been a renovation, including reseating, reflooring with concrete over the vaults, a new pulpit, and the whole of the chancel has been refurnished, new candelabra have been provided, and there is a general renewal, the organ having been also enlarged by four additional stops.

The alabaster pulpit which has been given to St. Peter's Church, Highgate-hill, was dedicated and used for the first time last Sunday. The work was executed by Mr. Sheppard from the plans of Mr. E. Hoole.

The completion of the new stone bridge over the Irthing at Gilsland was the occasion of some festive observance on Tuesday on the part of members of the Cumberland County Council. The bridge is built on the skew principle, and has cost £1,400, including road diversions. The erection is in substitution of a narrow bridge with a square span and a very awkward approach on the left bank of the river. The bridge has been designed by Mr. G. J. Bell, Cumberland county surveyor, and built by Mr. Thos. Telfer, Langholm.



## LEGAL INTELLIGENCE.

**A NEW POINT IN EMPLOYERS' LIABILITY.**—At the Salford County-court, on Monday, before Mr. W. Goldthorpe, the deputy judge, James William Griffin, bricklayer, of New-lane, Winton, claimed compensation for injuries from his employer, William Dixon, contractor, of Worsley-road, Winton. Mr. Acton appeared for the plaintiff, and the defendant was represented by Mr. Jordan. At the outset of the case Mr. Jordan raised an objection to the claim, on the technical ground that the proper notice of injury had not been given to the defendant within the time and in the form required by the statute. According to the seventh section of the Act, notice must be given of the name and address of the person injured, the cause of the injury, and the date of the accident. If these particulars were wanting, but if the notice could be incorporated with some other written communication, the two together furnishing all particulars, it would not be an incurably bad notice. In this case not only was the notice itself bad, but there was an absence of any other communication which could be read with the notice, and, therefore, it was a hopeless failure to meet the requirements of the Act. He admitted that judges did not care for technical objections; but he submitted this one in the interests of his client and the law. Mr. Acton admitted the defects of his notice, but quoted cases in which a deficiency of this sort had been overlooked by the judges. If the defect was not prejudicial to the defence, and if it was not intended to mislead, it would be overlooked. The Judge, while expressing his want of sympathy with technical objections as a class, ruled that this one was good. The notice given was invalid. Mr. Acton intimated that if the judge found in favour of his client on the merits, the point would be taken to a higher court. If the decision on the facts was against him, there would, of course, be an end to the case. The facts were then heard. It appeared that the defendant was engaged in erecting brickwork at the works of Messrs. Crossley, of Openshaw. The plaintiff was engaged as a bricksetter, and, as a consequence of alleged carelessness in the erection of a scaffold, he fell a distance of 20ft., fractured his ankle, and was so much injured that he had to remain out of employment for eighteen weeks. The cause of the accident was stated to be the narrowness of the platform on which the defendant was working. Mr. Jordan argued that the platform was not too narrow, and called witnesses to prove that the accident might have been prevented if the man had taken reasonable precautions in moving about. The judge came to the conclusion that the accident was not caused by the narrowness of the scaffold, and gave judgment for the defendant.

## CHIPS.

A new girls' school and pupil teachers' centre, erected by the Smethwick School Board in Crockett's-lane, were opened on Friday. Mr. F. J. Gill is the architect of the school, which has cost £6,678, or £8 15s. 9d. per head. The builder was Mr. J. Harley.

Harlow Moor, an open space some 52 acres in extent, has been rented hitherto by the Corporation of Harrogate at a nominal rent from the Earl of Harewood, but last week-end the consent of the Local Government Board was received by the corporation for the purchase of the moor and the loan of £30,500 for the purchase and laying out of the same has been sanctioned.

A Diamond Jubilee drinking-fountain at King's Norton was unveiled on Saturday. It has been erected by Messrs. Roddis and Nourse, sculptors, Aston-road, North Birmingham, from the plans of Mr. W. De Lacey Aherne, architect.

The new sewage purification works at Chadderton, constructed from the designs of Mr. James Diggle, C.E., Heywood, were formally opened on Saturday by the chairman of the sewage committee of the Chadderton Urban District Council. The site, situated at Slacks Valley, contains 15 statute acres, and the total cost of the disposal works and the sewerage scheme has been £80,000, of which £50,000 has been expended on sewerage.

On Saturday afternoon in Gerald-road, Pendleton, Salford, the laying took place of the foundation-stone of the new Dominican Church of St. Sebastian. The church is being built with a sum of £10,000 which has been sent anonymously to Father Proctor, the head of the Dominican Order in England.

Falmouth Corporation are proceeding with their scheme to purchase the gas and water supplies of the town. Mr. A. Silverthorne has been engaged as engineer, and the town clerk (Mr. J. H. Genn) will conduct the legal negotiations.

A carved-oak lectern, the gift of the Duke of Richmond and Gordon, chairman of the committee of visitors of West Sussex Asylum, has been placed in the chapel of that institution.

## Our Office Table.

WE are not surprised that an order should have been made on Wednesday by the London County Council for the removal of Abbey Mansions in Victoria and Orchard-streets, Westminster, because, when we made a personal examination of the building at the time the rear buildings fell in the spring, we noticed unmistakable evidences of the serious settlements which had occurred, and were then still in progress. Since then a large quantity of peat-like earth has, we believe, been excavated from below the original foundations of the ruined part of the premises at the back, preparatory to the erection of the new ironwork to be carried up through the building as the basis of the reconstruction. The exceedingly treacherous character of the ground in this part of London is familiar enough to all who have had experience of building in Westminster. The greater part of Queen Anne's Gate is built on piles.

ABBEY MANSIONS, which were illustrated in our pages on the 22nd April last, the day after the lamentable fatal accident, are nine stories in height, and were built by Mr. W. R. Rickard from plans by Mr. C. J. C. Pawley, at a cost of about £95,000, for H.M. Commissioners of Works, by whom the block of offices was leased for 21 years to the Civil Service Commissioners. Throughout Wednesday evening the whole of the roadway in Victoria-street between Westminster Palace Hotel and Strutton-ground was closed to carriage and pedestrian traffic, on account of a subsidence affecting the frontage of the Abbey Mansions. The buildings were being completed, but have been shored up during the past week under orders of the County Council. At the Westminster Police-court on Wednesday, Mr. Seager Berry applied to Mr. Marsham, on behalf of the County Council, for a peremptory summons against the owners of Abbey Mansions, the North Block, in respect of the very dangerous condition of the turret (at the corner of Orchard-street and Victoria-street) some 88ft. high. Mr. Berry reminded the magistrate that certain dangerous structure summonses in respect of the same building had to be dealt with about two months ago, it being decided that the building was exempt as being vested in, and in the occupation of, the Government. There were facts now within the knowledge of the Council that it was hoped would enable them to show that this exemption no longer applied. Mr. E. Dru Drury, the district surveyor, was sworn, and gave evidence as to the urgency of the danger, and Mr. Marsham granted a summons returnable yesterday, when the case was gone into, and an order for the removal of the turret was granted.

The seventeenth annual congress of the Sanitary Institute will be held at Birmingham next week, from Tuesday until Saturday inclusive. The proceedings will open on Tuesday morning with a reception at the Council Chamber, to be followed by a public luncheon, and in the afternoon the inaugural address will be delivered at the Midland Institute by Sir Joseph Fayrer, and the exhibition in Bingley Hall will be opened by the Lord Mayor. Conferences in the various sections will be held on Wednesday, Thursday, and Friday at Mason University College. Section No. I., "Sanitary Science and Preventive Medicine," has as its president Dr. Alfred Hill, the medical officer of health for the city; Mr. William Henman, F.R.I.B.A., the architect of the General Hospital, presides over Section II., "Engineering and Architecture," while Section III., "Physics, Chemistry, and Biology," has as its chairman Dr. G. Sims Woodhead, director of the research laboratories. The popular lecture will be given on Friday evening by Dr. Alexander Hill, and various excursions will be arranged for the Saturday.

"W. L." writes to the *Times* of Wednesday in reference to a letter from Mr. Edwin Drew respecting Shakespeare's house at Stratford-on-Avon, quoted by us last week, page 411:—"Regarding Shakespeare's birthplace, in addition to the danger pointed out by Mr. Drew, there was when I last saw the place the greater danger of the house itself being burnt in consequence of the hot-water pipes resting on the very old and very dry timber. In careful building no hot-water pipes should touch wood in any place. I wrote to the secretary of the trustees on the subject, but got no reply."

SIR ARTHUR HODGSON, as chairman of the

Birthplace Committee, says that the suggestion of "W. L." was unacknowledged because it was never received by the secretary. Sir Arthur explains that the boiler which feeds the hot-water pipes is fixed in a separate building at a distance of 80ft. from the birthplace, and is worked by low pressure, seldom or never at boiling-heat. Iron rollers are used for the hot-water pipes: they avoid the woodwork made of solid oak. Last year the pipes were thoroughly overhauled, and the circulation perfected by an experienced tradesman. The lightning conductors were at the same time tested and put in order. In answer to Mr. Drew, Sir Arthur adds that the hot-water pipes do not affect the plaster, upon which some thousands of visitors' names have been pencilled (this custom no longer is permitted). It is true that the lime-wash on the plaster surface is liable to peel off with age, but the equal temperature produced by the hot-water pipes assists to preserve it.

THE London County Council has recently addressed to the Local Government Board a request that the Board should consider the expediency of securing such an amendment of section 105 of the Metropolis Management Act, 1855, and section 77 of the Metropolis Management Act, 1862, as would provide that all churches or chapels exclusively appropriated to public worship shall be exempt from charges for the paving of new streets. The Council was invited to take this course by the Wandsworth District Board, which urged that the attention of the Local Government Board should again be drawn to the fact that, whereas places of worship of the Established Church are exempt from contributions to the cost of paving new streets, Nonconformist places of worship are liable to such contributions. In 1889 and again in 1895 the Council had this matter under its consideration, and on each occasion approached the Local Government Board with a view to securing an amendment of the law so as to remove the injustice in question. The vestries and district boards of the Metropolis are practically unanimous in desiring that in this matter there should be uniformity of treatment. The lines upon which amendment is now sought are that buildings to be exempt should be required to be exclusively appropriated to public worship, as in the case of exemptions from rates for the relief of the poor, and that the deficit on account of the exemption of such buildings should be chargeable against the general rate of the parish or district concerned, and not upon the owner of other property in the same street.

THE opening meeting of the Glasgow and West of Scotland Technical College Architectural Craftsmen's Society will be held in No. 4 Room, 204, George-street this (Friday) evening, at 8 p.m., when a lecture will be given by Professor MacLay, B.Sc., C.E., entitled "Hamburg, Berlin, and Dresden," illustrated with limelight views specially obtained by the lecturer for the meeting. An exhibition of students' works will be on view in the college from 7 to 8 o'clock. A prize has been offered to the members by one of the patrons, the subject being "My Impressions of Glasgow Cathedral."

THE Rev. T. H. Le Boeuf, rector of Croyland, makes a fresh appeal for financial assistance in repairing and rendering secure the fragment of the magnificent abbey church, of which he is the incumbent. On Wednesday in last week the whole north wall of the eastern chapel moved, he says, 3in. to the north, and must be speedily taken down and rebuilt from the foundations, as in the case of the two bays next the tower. The sum still required is about £1,100. During the present year not only have the two bays just named been rebuilt, but the north wall of the north aisle or present parish church has been underpinned on the outside face; a cross wall between two chapels rebuilt, and the east window in the tower repaired and cemented. The portion of the abbey which has caused so much work this year was built by Abbot Ulkelyt in 1061. In 1091 this portion suffered from fire during the abbacy of Ingulphus the Historian. There are many reasons for this decay to the fabric beside age and the drainage of the Fens. The abbey has suffered from fire on three occasions, from earthquake (1114), and the walls were built on the peat bed, having no spreading footings. The foundations are perfectly rotten, and how the building has held together for so many centuries is, the rector remarks, a mystery. One relieving arch was imbedded only about 1in., having a projection of 6in. In the peat bed last



week a cluster of oysters was found unopened. The underpinning of the abbey proves the statements by Ingulphus to be perfectly correct, and the oak piles may be seen by visitors which have been since 947 A.D. the stay of the foundations.

Through the collapse, on Monday, of a building in Govan, near Glasgow, five men were killed and three injured. A year ago a building of four flats was erected with frontages to Govan-road, Napier-street, and Main-street. The upper flats are being converted to be used as a model lodging-house, and the street flat was occupied by Messrs. Cooper and Co., grocers. The building was of fire-resisting construction, all the floors being laid with concrete. The work of laying the concrete on the fourth floor was being proceeded with on Monday afternoon, when, without any warning, the floor collapsed and fell right through to the ground, crashing through and wrecking the grocer's shop. No cause can as yet be assigned for the accident, as the building appeared to be perfectly sound and substantial. In Messrs. Cooper's shop all the assistants, with the exception of one man, escaped. The five men who were killed were all suffocated in the ruins of the fallen building. Their names are—Andrew Davidson, foreman mason, York-street; Thomas Christie, joiner, 24, Dumbarton-road; Thomas Mossman, joiner; Patrick Gallacher, labourer, Cross-street, Partick; and William Rankin, labourer.

At the meeting this week of the Newington Vestry the electric-lighting committee reported that they had during the recess accepted the tender of the British Insulated Wire Company for the insulated electric mains, conduits, junction boxes, &c., at £9,081 19s. 6d.; the tender of the General Electric Company, Limited, at £1,457 for the main switchboard and instruments; and the tender of Messrs. Pritchett and Gold, for £900, for the battery of accumulators and accessories, which now covered the whole of the work to be let under contract. The following was a summary of the contracts—namely, the station, £12,928; supply and fixing engines, generators, and public lighting plant, £8,975; supply and erection of boilers, £9,348; electric mains, conduits, &c., £9,082; main switchboard and instruments, £1,457; accumulators and accessories, £900. To this had to be added 7½ per cent.—£3,002—for engineer's commission, clerk of works salary, and contingencies, which brought the total up to £45,692. In view, therefore, of the necessity of further extension of mains down Westmoreland-road and East-street, the committee advised that the application to the London County Council for a loan be increased to £50,000. The report was adopted.

AFTER lying neglected and almost forgotten in a house at Maidenhead for over twenty years a remarkable collection of intaglios, brought together by Alderman Boydell, the famous printseller of Chesham, who occupied the Lord Mayor's chair in 1790, has come to light, and is now in the possession of Mr. Max Ailion, of 56, Holborn Viaduct. The collection embraces nearly two thousand "impressions" of busts in cameo work, the material on which the impressions have been made being red sealing-wax. The collection is contained in twenty oak cases, each specimen is numbered, but no catalogue is known to exist.

THE Medical Officer of Health for Devonport (Dr. J. May, jun.) in his annual report, refers to the question of the housing of the working classes. In Portsmouth and Chatham, he points out, one house for one tenant is the rule, such houses being obtainable for 5s. 6d. a week, including taxes. In Chatham and New Brompton good four-roomed houses are to be had for from £12 to £14 a year. In New Brompton there are 5,000 houses for 28,000 people; the whole borough consists of 4,000 acres for 60,000 people. Devonport has 1,760 acres for a similar population. In Richmond, Surrey, the corporation has bought Crown lands at £700 per acre, and built houses for £250, £35 being the cost of each site, and they let readily at a profit. Six-roomed houses let at 7s. 6d. a week. The causes which seem to account for the difference between there and in Devonport, Dr. May points out, are many, the chief being that there was not that discrepancy between supply and demand which obtained in the three towns. Another cause is that back lanes are gravelled instead of being paved, and that the back yards are separated by wooden railings instead of stone walls. The medical officer considers that some relaxation of by-laws regarding back lanes,

and of the specifications insisted on by the manor authorities, would result in increased cheapness, and not interfere with solidity of building. The number of families obliged to live in two rooms is at Devonport lamentably large. There is a spirit of dissatisfaction amongst workmen at the absence of proper provision for their needs in this respect. The house cannot be called a workman's dwelling whose rent is over £20, as is the case with the smallest four-roomed house now being built in Devonport or Plymouth.

The other day the foundation stone of the Eastleigh town-hall and council offices was laid by Mr. W. S. Portal.

Mr. R. O'Brien Smyth, C.E., Local Government Inspector, held an inquiry on the 15th inst. at the City Hall, Dublin, in reference to two applications by the corporation for loans of £9,000 for the purpose of adding workshops and classrooms to the Technical Schools in Kevin-street, from designs by Mr. William Mitchell, and £2,500 for erecting additional pens at the Cattle Market, North Circular-road.

Aspinall's enamel works in New North-road, New Cross, were destroyed by fire on Saturday. Nothing but the bare walls of the big four-storied factory, which covered an area of 120ft. by 60ft., remain.

The Bishop of Wakefield dedicated on the 15th inst. St. Hilda's Mission Church, which has been erected in Parkinson-lane, in the parish of St. Paul's, King Cross, Halifax. The church, which has sitting accommodation for about 300 persons, has been built from the designs of Mr. H. Hulton, architect, London, the contractors being Messrs. J. Charnock and Sons, Pellon-lane, Halifax. The cost of the building and furnishing is about £1,200, and an additional £800 has been expended on the purchase of the site.

St. George's mission-room at Camberley was dedicated by the Bishop of Winchester on Friday. The hall adjoins the church, and is 67ft. by 30ft.; the walls are of local brickwork and the floors of wood-blocks. Mr. W. J. Hodgson, of Camberley, was the architect, and the builders were Messrs. Field.

The new high school at Keswick was formally opened on Friday by the Bishop of Hereford. The school and hostel have been built in Wilkinson's Close, in near proximity to Greta Hall, the residence of the Poet Laureate Robert Southey. The cost of the buildings amounts to over £6,000. The school has been constructed for 104 scholars, and the hostel will provide accommodation for the master and 24 boarders. The architects are Messrs. Austin and Paley, of Lancaster, and Mr. Isaac Hodgson was the builder.

Princess Louise penned a remonstrance recently as to the undesirability of pulling down the old front of the Capital and Counties Bank at Guildford, addressed to Viscount Middleton as president of the Old Guildford Society. Lord Middleton wrote to the directors of the Capital and Counties Bank, and has received a reply from the chairman, stating that the directors have no intention of altering the existing elevation to the High-street, which would be preserved intact.

On the River Wear, at Southwick, on Saturday evening, a party of young men were having a trip in a steam-launch, when one of them, named Bertie Wake, son of Mr. H. H. Wake, engineer to the River Water Commissioners, overbalanced himself and fell overboard. He did not rise again, and his body was found shortly afterwards.

The members of the Institution of Junior Engineers are to be received by Sir David Salomons, at Broomhill, Tunbridge Wells, to-morrow (Saturday). He will show them his workshops and scientific laboratories.

The barracks at Plymouth Citadel are being reconstructed on modern lines. The officers' quarters are completed; they occupy the site of an old magazine, are three stories in height, and are constructed of local limestone with Portland stone dressings. On the site of the old quarters for officers and adjoining land, barracks for 250 single men with recreation yards are being built. Mr. H. Kerswill is the contractor for both blocks, and Mr. Saunders the clerk of works.

Operations have been commenced by Messrs. Perry and Co., of Tredegar Works, Ordell-road, Bow, the contractors for the Waterloo and Baker-street underground railway. A site immediately to the south of Waterloo Station has been cleared for the terminus buildings, and just west of the Embankment end of Charing-cross railway-bridge a massive timber structure supported on piles is being built to contain the caisson, from which, as was done near Blackfriars Bridge in the case of the recently completed Waterloo and City Railway, the principal operations will be carried on.

## MEETINGS FOR THE ENSUING WEEK.

WEDNESDAY. — Edinburgh Architectural Association. Address by Hon. President. 8 p.m.

## THE ARCHITECTURAL ASSOCIATION.

THE COURSES OF LECTURES AND CLASSES COMMENCE on MONDAY, October 10th, at 6.30 p.m., and the Studio opens on TUESDAY, October 11th, at 6.30 p.m.  
A Pamphlet giving full information may be obtained on application to the Hon. Secs., at 56, Great Marlborough-street, W.  
E. HOWLEY SIM, Hon. Secs.  
G. B. CARVILL

## ORIPS.

The foundation-stone of a joint infectious diseases hospital for Chorley Union was laid on Saturday at Heath Charnock. The cost, including furnishing, will be £17,000.

The Girls' Intermediate Schools, Cardiff, are being warmed and ventilated by means of Shorland's patent Manchester grates, the same being supplied by Messrs. E. H. Shorland and Brother, of Manchester.

The consecration of the new chancel which has been added to the Rawmarsh (Rotherham) Church was performed on Monday by the Archbishop of York. In addition to the new chancel the building has undergone restoration, the works including the enlargement of the chancel, the refixing of the old stained-glass window, the removal of the gallery, and re-seating, the provision of new windows, the tiling of the floors of the aisles and chancel, the building of a new organ-chamber, and choir and clergy vestries. The total cost of the alterations and restoration is £2,000. Mr. Joseph Platts, of Rawmarsh, in Rotherham, was the architect, and the chief contractors were Mr. G. Pugh, of Rawmarsh, for masonry, and Mr. John Tradewell, of the same place, for joinery.

Mr. Wynne E. Baxter held an inquest on Tuesday at Poplar concerning the death of Thomas Sootney, 43, a contractor, late of 22, Ida-street, Poplar. Deceased retired to rest on Sunday night apparently in good health. At three a.m. on Monday a fall was heard in his room, and he was then found lying on the floor dead. A medical man stated that death was due to syncope. Deceased had been greatly worried on account of financial trouble, and this, combined with the intense heat, had caused heart failure. A verdict to that effect was returned.

The River Pollution Commissioners standards of permissible composition of sewage effluents are:—Organic carbon, 2.0; organic nitrogen, 0.3; albuminoid ammonia, nil; absorbed oxygen, nil; in parts per 100,000. The commissioners also require that a certain degree of alkalinity or acidity is not to be exceeded three parts per 100,000 of dry mineral matter, nor one part of dry organic matter; that there shall be no visible colour in a stratum lin. deep when viewed in a white dish, nor any metal except calcium, magnesium, potassium, or sodium present to a greater extent than two parts per 100,000; while a limit is also set to free chlorine, arsenic, and sulphur as sulphuretted hydrogen or free sulphuric acid. The Thames Conservancy in the upper reaches of the river recognise as a "good effluent" any effluent which gives less than 0.2 parts per million of albuminoid ammonia.

The reopening of St. Nicholas Congregational Chapel, Ipswich, took place on Wednesday week. The chapel has been closed since August 14, during which time a new organ, the work of Messrs. Peter Conacher and Co., of Huddersfield, has been erected, taking the place of the small choir-gallery behind the pulpit. Mr. G. A. Kenney, of Ipswich, carried out the structural alterations.

Under the amalgamation scheme for the joint management of the South-Eastern and London, Chatham, and Dover Railway Companies, Mr. Percy C. Tempest has been appointed engineer, and Mr. R. Barker assistant engineer.

Last week the Auction Mart was again a very quiet one, the few important properties submitted having failed to find purchasers. The aggregate realisation, as registered at the Estate Exchange, amounted to £26,001, as against £28,688 recorded for the corresponding week of last year.

The town council of Cardiff have under consideration a report by the borough surveyor, Mr. W. Harpur, as to the space required for the town-hall, law-courts, technical college, Welsh University buildings, museum, and other institutions to be provided for on the site of Cathays Park. They have instructed Mr. Harpur to define the several sites provisionally with flags, and all the members are then to meet the architect, Mr. Lanchester, of London, on the site.

On Wednesday week the members of the Bradford Corporation, with the officials, visited Pateley Bridge, for the purpose of inspecting the extensive water-works now in progress in the valley. The party, which numbered seventy, were shown over the works by Mr. J. Watson, the engineer.



# THE BUILDING NEWS

## AND ENGINEERING JOURNAL.

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### IGNORING THE ARCHITECT.

IT is not unusual to read descriptions of new buildings published in newspapers without any reference to the name of the architect. The names of the builder, the decorators, the firm who fitted up the electric-lighting installation, even that of the upholsterer, are mentioned; but the man who conceived the whole structure—who has thought out every detail in plan and decoration—is kept in the background. In no other occupation do we find this disregard of the real artist. The musician or dramatist, the sculptor, the painter are each acknowledged; and no account of a musical composition, a play, a piece of sculpture, or a painting would be deemed complete without the name of the composer or the painter. Imagine an oratorio or an operatic performance described without the name of the composer or principal artist! The idea would be absurd; yet the ordinary man describing a handsome or beautiful building scarcely thinks it necessary to give any credit to the designer, or to mention the architect's name. It is a building only of stone or brick put together in the usual way, and its beauty or effectiveness is looked upon as a matter of chance or accident; its design is more or less like other buildings. This strange forgetfulness of the architect's function amongst the average public, or the "man in the street," is almost unpardonable, if it were not that buildings surround us everywhere, that we dwell in them, and that they are as common as the bread we eat or the garments we wear, and being thus an everyday commonplace matter, it seems superfluous to recall the existence of their designers. In this respect the painter, dramatist, and sculptor are much more fortunate in being associated with their works, which constantly recall the talent of their artists. Unfortunately, in the case of the architect his work is associated with others: the builder takes all the credit if it turns out a convenient and comfortable edifice. Of course, a great deal of the success is attributable to his care and watchfulness; the engineer who does the constructional part gets his meed of praise, and the decorator or sculptor receives all the credit for internal decorations and sculpture. We do not begrudge them their share in the result. Co-operation of skill is right, and to be encouraged; but very often the architect gets less than his due, and, what is worse, more than his share, if the building is a failure. Everyone then blames the poor architect, who has probably had to contend against an obstreperous builder, who has tried to evade the contract in every point, and has only finished the work under threats. But the architect's work, like that of all artists, lives after him. Posthumous honours are paid to him which are denied during his lifetime.

If we attempt to trace the cause of this neglect or forgetfulness on the part of the public, we shall find that it is mainly due to the ignorance of most people of the architect's work. His ability is neither appreciated nor understood. He is regarded too much in the light of a kind of professional agent or supervising builder who receives a percentage for doing something that is not very clear to the ordinary mind, or it may be a draft of the building. Persons who quite understand what a painter or a musician does, fail to grasp the architect's function. His particular skill is hidden or concealed

from them. They imagine they can do without a man who adds to the cost by indulging in ornament, or who, as a superior builder, is an unnecessary personage. And it is extraordinary that the same persons are ready to pass criticism or censure on any building or design whenever the occasion arises. The very men who do not appreciate the architect's work because they do not understand it, are the first to call in question the design of an architect, and set themselves up as censors. We have only to take the correspondence that has been lately going on in the *Times* on doctrinal matters to illustrate how many people are ready to rush into print on theological questions they are supremely ignorant of, thinking that such matters which concern everybody, more or less, require no special or accurate knowledge of the subjects. They assume an authority on questions which have occupied the minds of theologians for centuries without any other preparation than that of holding an opinion of their own, and of being able to write a letter. And it is precisely the same in regard to architectural questions: these have grown up from the earliest ages, have become formulated and condensed into certain rules and canons or dogmas, till their matter forms a body of accurate and precise knowledge. The architect is supposed at least to know his business, and to understand this specific science, and to put it into concrete form whenever he designs a building. And it is remarkable, and has been noticed, that those who know nothing about a subject generally disapprove or oppose it, while those who have knowledge and experience of it defend it. Applying this dictum to architectural matters, to such subjects as arrangement, design, elevation, decoration, just those subjects of which the ordinary individual imagines he knows a great deal because they are matters of opinion and taste, but which in reality he understands very little about, we shall find they are just those questions that exercise his mind. But in questions such as construction, details, plumbing, &c., and such like, depending on expert technical skill, he consents to be silent, and not to interfere. About matters least understood by him, like pure art, he expresses the most obstinate and clamorous opinion. In short, we find him perfectly dogmatic in laying down his reasons for preferring one design to another, as he generally does if on a committee on competition designs; though if we inquire his reasons for his preference they are found to be nothing more than his ill-formed and uneducated opinion, which he can assert with the greatest vehemence. He likes it. Why? Because "I think so and so," is the answer. In short, we generally find that the assumption of authority is in direct proportion to the vague and indefinite knowledge of the subject. The assumption is easy with those who suffer no direct ill-consequences from their opinion. To believe in the merits of one design, however mistaken they may be, does not entail any evil result: it is a question of taste; but suppose it to be a question of safe construction, or a question of health, then we find the same person less anxious to express his opinion on it. He apprehends with some misgivings his own ideas, is afraid of committing himself to results that may prove disastrous, and it is this apprehension of risk entailed that makes him careful in expressing an opinion. Yet how glibly and flippantly he discourses on the merits of the last public competition for municipal baths or offices, on the proposed design for the decoration of the parish church or cathedral or civic chamber! He offers the most unflinching opposition to the scheme of the eminent artist who is engaged upon the mosaic decoration of St. Paul's or the restoration of Peterborough west front. What clamorous opposition has been offered to all public improvements

within our own recollection to street widenings, public park acquisition, and more bridges—questions really which can only be rightly discussed by those who have the means of ascertaining the facts, who have seen such works abroad and in other places and how they have worked, and have facts and figures to verify their conclusions. But in spite of this accurate knowledge of facts and of extended experience, we repeatedly see letters in the newspapers giving crude and half-formed opinions about such matters, even defying the engineer's or architect's experience or training, and boldly contradicting principles which are founded on science. But it is rather on the indifference shown to the claims of the architect we now speak. The Englishman is supposed to be essentially practical in all he does: he is certainly fond of discounting the architect's work and giving all the credit to the builder or some other individual engaged on the work. The obliteration of the architect is certainly one of his weaknesses; and we have generally found that the least practical men are the most unfair in this respect. The clergy are not business men, and perhaps seldom give the architect his due; but we find the ordinary tradesman probably worse in acknowledging the architect. Examples of this may be found in abundance. An architect designs a memorial—a stained-glass window, a reredos, a pulpit, or an organ—the donor's name, even that of the craftsman or builder, is given, but the architect is left out in the cold. The man who paid the money, rather than the man who designed or conceived the memorial, is acknowledged and remembered. The builder or tradesman who carried out the work is better known. He has employed the labour, and has been connected with the production; he, too, is remembered. We cannot, perhaps, expect a fairer and more honest award of real talent or skill till the world alters. Since it began, real talent has gone unrequited and unrewarded, and it will only be restored to its true proportions when knowledge and art are recognised, and when ignorant and flippant statements and vague opinions are challenged. We fear it will be a long time to wait before the evil is redressed.

The professional man is perhaps somewhat to blame for this attitude of public opinion. Is he to popularise his art, or keep it as a secret? His ancestors in the craft kept the craft a mystery, but this is no longer possible. Every art is now popularised by handbooks and schools, so that we must wait for an improved public opinion in matters of art. In every other art but that of building people are beginning to know something. The technical nature of the architect's vocations precludes such a prospect, and therefore it is very possible that architecture will remain to all time a sealed book to the many. By having consented so long to appeal to the taste of the laity on building matters by competing and other ways, the architect has much to blame himself for the indifference shown to his function, and the want of appreciation by the public for architecture. Taste can only be good; a vitiated taste is created by a want of knowledge of the requirements and conditions of art which only education can supply.

### MODEL SPECIFICATIONS.—XXXII.

SHOP-FRONTS, FITTINGS, DECORATIVE  
WOODWORK.

WE give a few more details and clauses for shop-fronts and other fittings. Many ornamental fronts consist of mullions or moulded bars with transoms above, consisting of a series of fixed lights or hinged lights filled in with leaded glazing, which are very effective. These upper lights take off the bareness and meagre appearance of a high shop-window divided by upright mullions,



which frequently are attenuated and weak. The upright mullions may be continuous in one height, framed into sill and bead, and the transom bar doweled to mullion, as in sash windows; but the stronger method is to allow the transom to form a head, into which each bar is tenoned, the upper lights being framed separately.

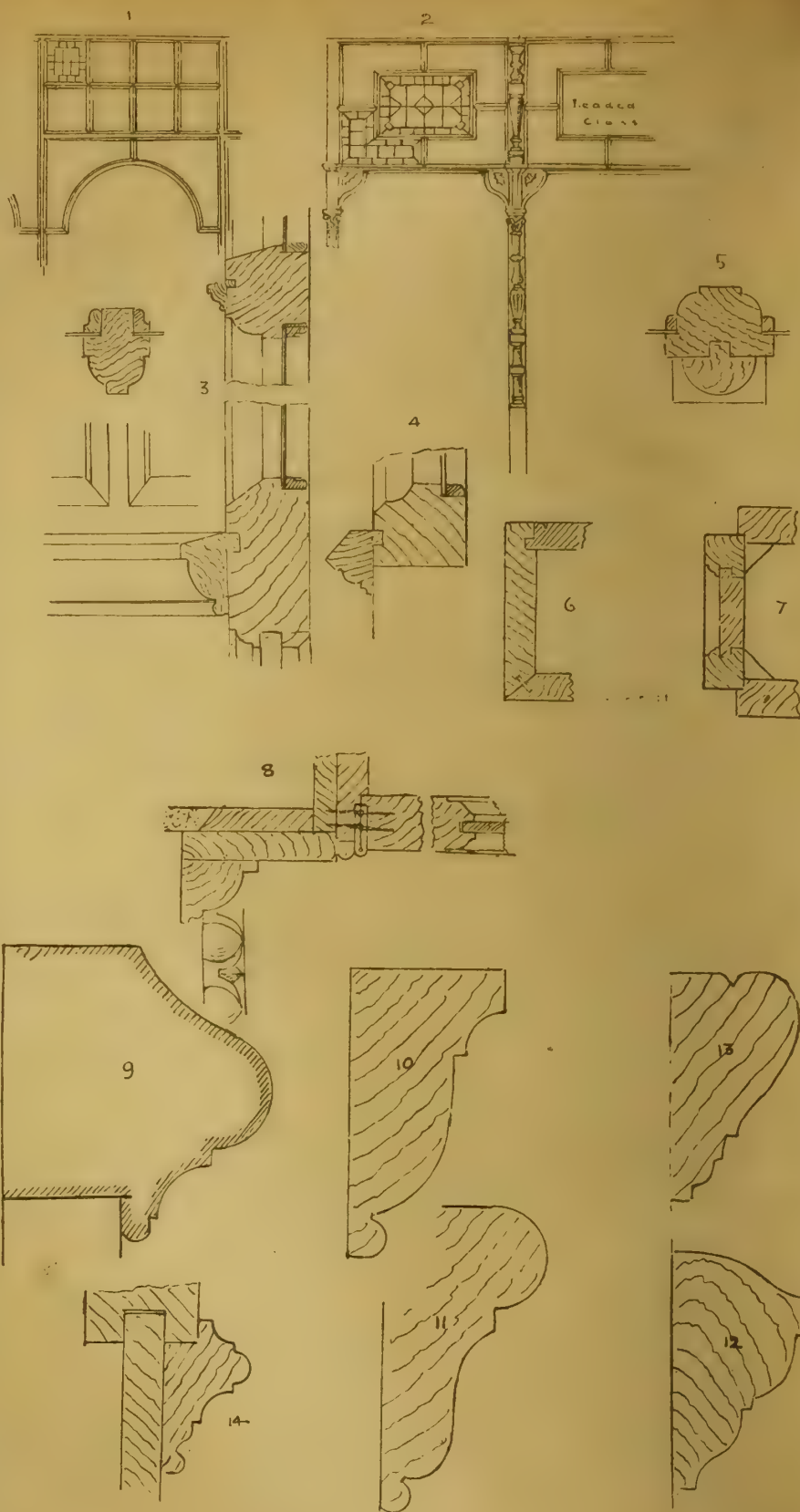
In shop-front work the fascia and cornice should be first fixed in position, having reference, in the Metropolis at least, to the regulations of the London County Council, which provides that in streets of a greater width than 30ft. the shop-front may project 10in. and no more, and the cornice not more than 18in. from the external wall. The fascia and cornice is fixed to cradling or brackets as we have shown (sections 8 and 9, p. 417), these brackets being secured to the wall or bressummer. Sometimes the fascia is inclined outwards at the top. The revolving shutters are supported on strong brackets about 7ft. apart, the usual width. The hollow cylinder round which the shutter coils has a strong spring fixed to a centre spindle, which does not revolve. When the shutter is down the spring is coiled up, and its effort to relax itself assists to lift the shutter. We have shown the vertical iron grooves screwed to sides of shop pilasters, and between these upright grooved movable pieces are placed, fitted with studs and plates, which secure the shutters when down. These are removed when the shutters are lifted. The stall-board must be fixed in the position to receive the shutters. Sections 3 and 4 will explain how the stall-board is fixed, and the kind of moulding on top, which may be worked solid on the sill or rebated to it. Figs. 6 and 7 show methods of framing wood pilasters by rebating and grooving (a), or mitring with tongue (b), or by rebating the side pieces of casing to receive a panelled front. No. 8 is a section of door-jamb with enriched panels, &c.

All joiners' work not framed should be fixed as to allow for free expansion and contraction, as in all woodwork like dadoes, skirtings, wall linings, &c. This may be accomplished by taking care to fix only one edge, the other edge being allowed to move by means of a grooved and tongued joint. Or the boards may be fixed in the centre with both edges free. Thus the dado boarding may be fixed to the battens at the rail and the lower edge tongued to fit a groove in the skirting, which will thus be free to move if the boards shrink. The lower edge of skirting should also be tongued to the floor, the upper edge only being fixed to ground. In a built up or double-faced skirting, made up of two pieces, the shrinkage is divided between the pieces. The lower part is tongued to the floor, and the upper piece fixed to the ground, which is also grooved to receive the lower piece, which is fixed at the top; thus the shrinkage is equal in both, and therefore less than it would be in one deep board.

We give some profiles of dado mouldings (see sketches 9—12). Clauses for this class of work we have given: the great requirement, as we have said, is to avoid any great width of board, which is apt to shrink. Dadoes are formed either of boards, tongued and glued together, or are framed and panelled. In the former, shrinkage has to be prevented by means of screws fixed in slots in the battens to allow the stuff to shrink or expand. Other methods are used, such as dovetailed keys secured by screws through slots, &c. Framed dadoes are less open to shrinkage.

The capping of dado is often formed by a moulded piece being fixed to top of dado, grooved to receive an under-moulding planted on face of dado rail. The capping is scribed to the irregularities of the wall-surface.

We have already given several sections of casements and sills. Rebates and mouldings



should be worked in the solid so as to secure weather-tight casements; the joints are mortised and tenoned. One of the simplest and best joints for the hanging stiles is to form a projecting tongue, which fits into a corresponding groove of mullion; the meeting stiles should have a hook joint, and the tenons of stiles should be double, one on each side of the hook joint. At the sill a patent water-bar may be applied, which is hinged to a metal plate screwed to the sill. As the casement opens inwards, the hinged bar assumes a position which allows the casement to open, and when it is closed the

bar is lifted up and comes into close contact to a guard-plate screwed to outside of casement, and prevents any water from passing between the casement or sash and the sill. At the transom again protection must also be afforded, either by a metal tongue fixed to transom and fitting into a groove in the bottom rail of fanlight, which is hinged to transom, the transom being also weathered and throated outside; or when the fanlight is hung at top, the transom should have a deep channel worked on the top inside, forming a gutter to take off any water that may find an entrance. We shall give a section of



this in our next. There should be a copper tube at one end of channel to convey any water outside.

So much of joiners' work is mixed up with ironmongery that it is necessary for the architect to specify the hinges, locks, fastenings, and furniture. Common four-panel doors may be hung in 3½ in. butts, and are provided with rim (7 in.) locks; while doors of a better kind are hung with 4 in. iron or brass butts, and have mortise locks and brass furniture. For heavy or folding-doors 4½ in. or 5 in. brass butts may be used, or projecting butts if the doors have to clear architraves, &c., and the bolts should be flush with mortise locks. For superior reception-room doors, when thick carpets, &c., have to be cleared, rising butts must be provided, say, 4½ in. rising butts, by which the door is raised gradually as it opens. For closets and light doors, 3½ in. butts may be specified, with brass tumbler locks. For external doors several patent locks and keys are in the market that afford great security and are neat; for ordinary outside doors iron rim locks are used.

In superior work, as in windows, shop-fronts, mahogany glazed partitions, vestibule screens and the like, all hardwood casings, &c., brass cups and screws should be used, as giving a neat finish. For sashes all-steel sash pulleys with smooth wheels are to be preferred; for heavy sashes gunmetal bushed pulleys are the best kind to use.

123. *Shop-Front with Ornamental Lights* (see sketch 1).—The shop-front to be constructed, as shown in details, of selected Honduras mahogany, with 4 in. by 3 in. framed uprights and mullions, rebated and moulded according to detail (or of astragal and hollow section), the mullions being spaced every 4 ft. or 5 ft. apart (or the front to be in three, four, or more panels each of 4 ft.), with transoms framed to mullions or doweled. The upper squares to have the same thickness of bars, rebated and moulded with loose beads, brass cups, and screws prepared for leaded glazing or other ornamental glass. The semicircular heads of lower panels to be formed of bent ribs, rebated and moulded to correspond with mullions, and to be mitred and doweled at joints. The large panels and spandrels to be fitted with the best British plate-glass, secured to the rebates by loose beads, brass cups and screws, and bedded in wash-leather. Frame the cornice and fascia to drawings, not to project more than 18 in. from wall-face, and to be fixed to deal brackets not more than 3 ft. apart, fixed to bressummer and wall. The cornice to be put together in three pieces, rebated and grooved together, and moulded to detail. The fascia to be 2 in. or 3 in. thick, and 15 in. deep, dovetailed—keyed, and fixed securely to brackets, allowing space for cylinder and gearing of revolving shutters, guide rollers, &c.

124. *Show-Board*.—The show-board to be 1½ in. grooved and moulded at joints, laid on three (or more) bearers 12 in. apart, and supported on framed supports according to detail. The show-board to be rebated to groove in sill, and to be moulded on front edge. The panelled framing forming the stall-board to be 1½ in. moulded and square (or the panels to be rebated for thick "Besto" glass for iron grating).

Put a projecting moulded capping above stall-board outside, 3 in. by 4 in. (or more), rebated to groove in sill, and with grooved plate for shutters, and 8 in. moulded plinth ½ in. above paving level, and provide and fix guard beads, and ½ in. iron grooves for shutters in each side pilasters; or on the top of stall-board framing fix the sill, 6 in. by 4½ in., with iron tongue, 1 in. by ½ in., to fit into groove of lower rail of sash frame.

If the head of front is framed as in sketch 2, instead of with semicircular bars, specify, the upper ends of mullions or pilasters to have cut spandrel-pieces to design, to rest on capitals of pilasters, and to be shouldered and tenoned to mullions, which are to be 7 in. by 5 in., the front of mullions to have turned or square-cut pilasters fixed to face of mullion by dowels (or tongued with hardwood tongues). (The other portion of clause will apply.)

125. *Wainscot Doors*.—These may be described as 1½ in. two-panel, square, bead flush and square, bead flush and moulded; or 2 in. wainscot of two panels or four panels, or 2½ in., or they may be moulded on both sides.

126. *Mahogany Doors*.—May be of Honduras or Spanish mahogany (the latter veneered), in two, four, or six panels, 2 in. or 2½ in. thick. These

may be moulded and square or moulded on both sides, have belection mouldings, or with double margins. Mahogany sash doors may be described as 2 in. or 2½ in. Honduras mahogany, astragal and hollow, bottom panel moulded and square (or moulded on both sides), hung folding or with double margin, or with diminished stiles.

127. *Outside Oak Door*.—Fit the entrance with 2 in. or 2½ in. wrought ledged, framed and braced, with stop-chamfered arched heads, stiles, rails, and braces, covered on the outside with ½ in. wrought, tongued, and V-jointed oak boarding hung to solid oak frame (or on hinge-hooks let into stone jambs), with strong wrought-iron Mediæval hinges, and fastened with best rim dead lock cased with oak, and a heavy wrought-iron latch with ornamental drop-handle and plate, key-plate, &c., all wrought to detail drawing, or p.c. stated. The frame to be of oak 6 in. by 4 in., wrought, double rebated, stop-chamfered, and grooved for linings, doweled to stone steps.

128. *Columns and Pilasters*.—Construct 1½ in. (or 1½ in.) deal diminished columns 10 in. diameter, with corresponding pilasters attached to wall in vestibule. Each circular shaft to be built up with eight staves, well-seasoned, with two flutes in each, mitred, and glued and blocked round iron columns. The pilasters to be put together according to detail, with 1½ in. moulded panelled fronts rebated to side pieces, and blocked and glued, with capital mouldings and bases on raised pedestals in dado, as shown in detail. Or—

The pilasters on each side of doors facing hall to be formed as shown, the sides to be 1½ in. (or 1½ in.) rebated to solid frame, and fixed to grounds grooved for plaster, and the outer edges rebated to receive the framed front, panelled as shown, glued and blocked together, with mitred and tongued capital, and base mouldings as shown, mitred and tongued to surbase mouldings.

129. *Entablature*.—To be of wrought deal built up in pieces, as per detail, rebated, glued, and blocked, and fixed with all proper brackets, mitres, and tongues. The moulded cornice to be according to drawings, with dentil course or carved enrichments.

Wooden cornices are always built up with small sections, the mouldings being worked in the solid or "stuck on" as it is called, and these separate rectangular pieces are tongued together. The heading joints are thus made to break joint, one of the members being jointed in one place and the other members in other places. The joints should be butted, doweled, and glued.

130. *Coffered Ceiling*.—The ceiling of hall to be formed into compartments, as shown, by deep panels or coffers, the upper members of cornice to be continued to form the coffers. The ribs are to be built up like the cornice in two pieces, tongued together to form 4 in. or 12 in. soffits, and to be fixed to deal brackets every 2 ft. or 3 ft. apart, fixed to rough grounds. The soffit to be 1 in., housed to side pieces, and framed as a panel below. The panels are to be 1½ in., to rest on the upper member of ribs, and to be fixed along their centre to ground at right angles to their grain, their edges free to expand or contract.

State if the panels are to be carved, or enriched by stencilling, &c.

131. *Dresser*.—Fit up a dresser in kitchen of 2 in. deal cross-tongued top 7 ft. (or 10 ft.) long and 2 ft. 9 in. wide on strong 3 in. (or 4 in.) legs and bearers. House on to end standards five (or six) 1½ in. shelves of an average width of 7 in., a ½ in. pothead on bearers and riser under, and fix 1 in. deal, wrought, beaded, grooved, and cross-tongued back, a 1 in. deal top 14 in. wide, with moulded cornice 3 in. deep below. Under dresser top fit up four (or six) drawers, with 1½ in. bottoms and dovetailed sides of ½ in. deal, a 1 in. or 1½ in. beaded front with pair of oak or brass knobs or drop-handles to each drawer, and a patent tumbler lock, with all necessary bearers, runners, slides complete.

132. *W.C.*—Fit up w.c.'s with 1 in. wainscot (or mahogany) seat, with hole cut, 1 in. panelled and moulded riser, clamped flap, beaded skirtings, with all necessary bearers, brackets, pipe casings. (The open pedestal closet is more clean and sanitary, and has taken the place of wooden casings.)

133. *Cistern*.—Case cistern with 1½ in. (or 2 in.) deal 5 ft. long, 2 ft. wide, and 2 ft. 9 in. deep, dovetailed with all requisite bearers and a ½ in. deal cover.

134. *Church Benches*.—The seats to be framed according to detail drawings, and to be executed in well-seasoned English oak (or pine), wrought, chamfered, and stopped or cut to shape, and moulded. The bench ends to be 3 in. thick, tenoned and pinned to chamfered oak sill. The back to slope 3½ in. (or 5 in.) in the height, and to

have solid oak capping; the seats to be 1½ in. thick, and the back boards to be 1½ in. (or 2 in.) thick fixed flat housed into bench ends with brackets 3 ft. apart with chamfered edges. The seat to have cut brackets 4 ft. apart.

## FAILURES IN MODERN DRAINAGE CONSTRUCTION, WITH SUGGESTIONS FOR THEIR REMEDY.\*

By LOUIS HANKS, Assoc. San. Inst., M.S.A.

NOTWITHSTANDING the high degree of excellence to which the theory and general practice of house drainage has been brought, much remains to be done in certain directions before perfection can be claimed for it. The purpose of this paper is not the recapitulation of details upon which there is already a consensus of opinion, and which have received able exposition at other hands, but rather to elicit a discussion on certain points where practice breaks down, one of the chief difficulties met with in actual work being the absence of the desirable element of permanence in even the most elaborate and costly systems. Let us place ourselves in the position of a householder who, we will suppose, went to considerable expense ten years ago in having his premises re drained in the best manner which the knowledge of the day enabled him to command, but who would to-day in all probability find, on calling in an expert, that the drain failed to stand the water-test, so that it was condemned as obsolete in some respect.

Finding himself now called upon to incur a further heavy expenditure for putting in an up-to-date drain, the householder might reasonably ask for some guarantee that his new drainage system would at all events be in watertight and sanitariously efficient order ten years hence; but it is an unpleasant fact that in few cases, if any, could such an assurance be given, or only with considerable qualification.

Undoubtedly such a guarantee could be given with regard to almost any other constructive works, but not in the case of an underground drain or its connections as usually constructed. This points to the existence of some inherent weakness or defect in either the material or workmanship of the drain-pipe and its joints, and to the need of some more permanently reliable drainage conductor than any at present in use.

For all practical purposes the choice at this moment lies between (A) earthenware socket-pipes in short lengths, jointed with Portland cement; (B) earthenware patent socket-pipes jointed with rings of bituminous compound, either alone or in combination with Portland cement; or (C) cast-iron socket-pipes in long lengths with caulked lead joints. Of these respective types, it is needless to say that the first named is that by far the most generally used, and, indeed, the merits of glazed stoneware as a drain-pipe material are so great that the drawbacks are apt to be overlooked.

In well-made salt-glazed socket-pipes, framed from such tough and homogeneous clays as those of Devonshire and Dorsetshire (not fireclay), we have a material which is in itself so entirely unaffected by moisture, variations of temperature, or chemical action from the foul matters coming in contact with its surface, that it is, in these respects, an ideal material for a drainage conductor. Moreover, the smoothness of the interior favours in the highest degree the passage of the semi-liquid matters which have to find their way along its course, and, if laid to a proper fall, carefully jointed, and cleaned out in process of laying, there is little chance of obstruction occurring. The essential weakness of a stoneware-pipe drain is (1) the brittleness and inflexibility of its material, (2) the shortness of the pipes and consequent multiplication of joints; (3) the difficulty of maintaining the cement joints in a sufficiently rigid condition to be permanently watertight. The failure of a large proportion of old-fashioned pipe-drains, even when well jointed, has been solely due to the fact that although originally supported by a solid foundation of earth, the subsidence or disturbance of this left a part of the drain unsupported or forced to act as a girder, and as neither the pipes nor their joints are competent to support such a strain, fracture occurred at the point of least resistance. The introduction of a continuous concrete bed under the whole course of the drain

\* Prepared for the Sanitary Institute Congress.



effects an enormous improvement, as when properly laid, and of adequate thickness, the concrete acts as a longitudinal girder, and sustains the drain rigidly under all ordinary conditions of settlement in the subsoil. It is, in fact, claimed by many experts that a tested stoneware drain jointed with care in neat Portland cement, resting on and entirely covered by a minimum thickness of 4 in. of cement concrete, is practically proof against fracture or leakage. While admitting this contention in a large number of cases, it is impossible to deny that instances are frequently met with where drains laid and tested with every care but a few years since, are found, on renewed testing with water, to be unsound, and to need replacement.

This is usually attributed to defective material or bad workmanship; but such is not by any means always the cause, and an explanation must in such cases be sought elsewhere. Now, with regard to the stoneware pipes themselves, their material is subject to risk of unsoundness in manufacture, and minute flaws and pinholes which may be undetected in process of making, or when being laid, afterwards develop into serious cracks through the agency of external pressure, frost, the rough treatment with drain rods, and repeated testing under powerful hydraulic pressure, often carelessly applied, and other disturbing influences. The formation of the socket or collar at one end of the pipe distorts the clay so much that injurious contraction is liable to occur behind the socket while the pipe is in process of firing, and a degree of brittleness is occasioned, which may cause fracture of the trunk of the pipe at that point under the influence of pressure from within or without. It may be argued that when the pipe is entirely incased in concrete no external pressure can reach it; but the recent researches of Professor Milne, the celebrated earthquake expert, have demonstrated the fact that the vibrations of the earth, even under normal conditions, are more powerful forces than is usually apprehended. He states that the load of heavy traffic on the surface of a road will cause such pressure and contraction of the subsoil that the houses on either side actually lean towards each other during the day, recovering their perpendicularity at night. If this is so, it is but reasonable to assume that the action and reaction of such forces, however minute, if frequently repeated, may be quite sufficient to eventually disturb a brittle drain and its concrete envelope.

The writer has a case in mind where a modern drain, which was condemned to removal on account of failure to stand the repeated testing with water, was found upon exposure to be uniformly sound except at one point, where a crack, travelling right through the concrete, had severed one of the pipes behind the socket, every cement joint being sound and perfect.

It is very seldom that a properly-made neat cement joint fails to answer its purpose, and where joints are found unsound it usually arises from one of three causes: (A) the admixture of sand with the cement; (B) the use of hot cement containing particles of free lime, which "blow" and cause porosity; or (C) from want of care in forming the joint, whereby there is an unequal thickness of cement in the space within the socket. If the pipe is not properly supported, so that the spigot and socket are perfectly concentric, the weight of the pipe forces down the plastic cement underneath it, leaving a cavity above, and no amount of outside plastering of the joint will make it sound. Various devices have been adopted for overcoming this difficulty, but without entire success, and the making of a water-tight cement joint remains a matter of that skilled and careful personal workmanship which is not always obtainable at the hands of the inexpert men too often intrusted with such work.

To obviate some of the difficulties alluded to, heavy cast-iron pipes in 9 ft. lengths have been largely used in works of the best class, and remain to-day the most advanced mode of house drainage construction. When properly laid on a concrete foundation, and carefully jointed with molten lead well caulked, an iron drain is incomparably stronger and more reliable than a stoneware drain, as it will withstand pressure, shocks, and disturbance in a high degree of resistance, and the risk of leakage is reduced to a minimum. The drawback to iron drain-pipes is the ease with which they become corroded, and the roughness of the interior, which speedily becomes furred with grease and organic filth to such an extent that it is liable to complete

choking. Various protective coatings have been tried to prevent internal and external corrosion, the most generally successful being that known as Dr. Angus Smith's solution. This consists of coal-tar, bitumen, and linseed-oil boiled together at a heat of about 400° F., and into this hot solution the pipes are put, and remain until the mixture cools to 300°. The effect of this treatment is to coat the pipes outside and inside with an impenetrable black varnish. In jointing an iron drain successfully, one secret is to use a little hydrochloric acid to destroy the Angus Smith's solution within the socket, and for a few inches around the spigot as far as it has to enter the socket; otherwise, the lead will not make a sound joint with the iron. Having done this, and placed the spigot in the socket, put two turns of hemp-yarn and a ring of powdered resin well rammed in, and then adjust the clay-band outside the joint, ready for pouring in the molten lead, which should be poured direct from the melting-pot, in preference to using a ladle. However carefully the pipes may be cast and jointed, the very nature of the material and its mode of manufacture prevents the possibility of getting a really smooth inside. Attempts have been made to get a smoother internal surface by casting on a steel core bar instead of using a rough plastered core, also by machine-boring the pipe; but difficulties of some kind have still to be surmounted. Glass-lined pipes have been introduced, but there is a risk that if the least flaw or pin-hole exists in such a glaze, or even in the Angus Smith's solution, corrosion will be set up, and the deterioration of the pipe becomes only a question of time. Cases have come under observation where comparatively new iron drains have become so badly corroded that they have had to be removed, and it is a general complaint that iron drains become choked with grease and filth, owing to their rough interior; and that they require more powerful flushes of water, and more frequent cleansing, than stoneware drains. Even the blue lead joints are not a perfect success, as it is sometimes found that under the influence of frost the lead becomes squeezed out of the socket to an extent, and then, again, lead and iron do not agree in the presence of acid matters, such as frequently pass along the drain.

Under these circumstances it becomes necessary to consider what better material could be adopted for drainage pipes, and the thought suggests itself that drawn lead pipe with soldered joints, so successfully used for the conveyance of the foul matters above ground, should be quite as advantageous if used as an underground conductor. Lead possesses in a high degree the desirable qualities of a smooth, impervious surface, great durability, the long lengths in which it can be used, and the consequent fewness of joints, the facility of making these in a thoroughly sound and lasting manner by plumbers' wiping, which cannot be approached by any iron or stoneware pipe joint, and the supreme advantage that in a lead drain we should have one continuous conductor which would be strong enough to withstand repeated testing and use for year after year without danger of fracture or corrosion. Moreover, although the first cost might be higher than other systems of drainage, the greater advantages and permanence of lead drains would more than repay this.

The objection that may possibly be raised as to the liability of the thin lead pipe being damaged or distorted by external pressure or violence can be easily met by the inclosure of the lead pipe in a continuous surrounding of cement concrete 4 in. or 6 in. thick, as for stoneware drains, which would amply shield it from injurious pressure. If additional protection should still be thought necessary, it would not be difficult to inclose the lead drain-pipe in ordinary unjointed or jointed stoneware pipes before concreting.

A 4 in. drawn lead drain, 8 lb. or 10 lb. per foot run, in 10 ft. lengths, laid to a good even fall of 3 in. in 10 ft. would suffice for any ordinary residence, and will be more self-cleansing than a larger one, as the smooth inside offers a minimum of frictional resistance. For sanitary advantage, as well as economy of cost, the underground drain should be as short and direct as it is possible to make it, and the use of surface channels to receive the discharges of rain-water pipes and other clean wastes may be made to take the place of the needless ramifications of branch drains, and multiplication of seldom used gullies, which are sources of costly weakness in many of our over-drained houses. Shorten the underground drains by every inch that you can, reduce the number

of branch drains and gullies to a minimum, and concentrate the flush of several wastes and rain-water pipes over one gully, and also get the bath water, or a flushing tank, as near the head of the drain as possible, and half the difficulties and dangers of drainage problems will disappear.

A little alteration of the above-ground pipes, by the use of elbows and obtuse bends, will often permit a couple of wastes and several rain-pipes to converge over one gully, which, if sunk below the paving line, may also take the surface water of a yard or area. There is much less chance of a gully becoming unsealed if it receives several pipes than if it receives one pipe only, and the drain will be more effectually flushed.

Finally, it is desirable to make the underground arrangements as simple and direct as possible, so that not only may the foul matters be removed from the premises with the utmost celerity, but that the air currents ventilating the drain may not be impeded.

The forces of nature will not take any trouble to rectify human errors, and it is absurd to expect fresh air to hunt about in a front area to find a stiff mica flap inlet, usually well shielded from all winds under a high wall or under the steps. Even if the air current can find its way through the inlet valve, it frequently finds itself entering the manhole on the same side as the mouth of the drain instead of facing it, and such sudden changes of direction are all inimical to good ventilation. For the same reason the soil-pipe, or extreme end ventilator, should be as near vertical for its entire height as it can possibly be made, every bend, swan-neck, and angle being a point of resistance to be overcome by what is at best but a feeble current of air. The owner of every house should be under legal compulsion to place in an accessible and permanent position a clearly drawn plan and sectional diagram, showing the entire system of drainage and plumbing, including the water supply, and this, although a simple matter, is one too generally neglected.

#### PRESERVATIVE COMPOSITION FOR FURNITURE AND WOODEN WARE.

A COMPOSITION for the preservation of furniture, woodwork, &c., has been patented in France by the Société Allegre and Goillot, says a Continental exchange (*Maler Zeitung*). This composition is said to possess the peculiarity of imparting to the articles upon which it is used not only the desired gloss, but also the appearance and the brilliant colour of perfectly new articles. This distinguishes it from other preparations used for like purposes. The coating leaves no visible layer after the application. The mass is composed of 10 parts pale rosin, 82 parts benzine, 5 parts palm oil, half part mirbane essence, and 1½ part essence of peppermint. The mixture is prepared by the cold process, and the application is as follows: Apply a little of the composition on the furniture, floors, &c., by rubbing with an old soft silk rag, and finish wiping at once with a dry silk rag, pressing down well, whereby an incomparable lustre is said to be produced. The objects remain in this glossy condition one to two months, according to the amount of dust developing in the respective rooms, and are then again treated with the composition. The product must be kept hermetically closed up. If used in summer, it is well to add a few drops of oil.

#### THE NEW METROPOLITAN TABERNACLE.

A SPECIAL meeting of the male members of the Metropolitan Tabernacle Church was held on Friday evening, September 23, in the College Buildings, Newington, to receive the report of the rebuilding committee and to inspect the plans. It was stated that, although no direct appeal had yet been made, there had already been subscribed £1,570 for the rebuilding.

The report of the rebuilding committee stated that Messrs. Searle, Son, and Hayes, of 66, Ludgate Hill, E.C., had been called in by the trustees to assist in connection with the fire claims, and had successfully negotiated with the insurance offices for the payment of the full amount of the policies—in all, £22,000. The committee decided to intrust the preparation of plans and the supervision of the work to this firm. Messrs. Higgs and Hill, Ltd., were then commissioned to prepare the basement for public





NORTH-EASTERN RAILWAY OFFICES, YORK.—FIRST FLOOR PLAN.

worship, and the work is now being carried out. The floor has been excavated and concreted, allowing an extra depth (or height) to the room of 18in. The windows have been considerably enlarged, and the reveals are covered with white opal, all of which will greatly increase and improve the light. The bulk of the ironwork is already in position, and the fireproof ceiling is nearly finished. It is hoped that the basement will be ready for occupation early in November. It was originally intended to complete this section of the work by October; but the founders could not supply the ironwork as rapidly as it was required, and this has impeded the progress of the whole scheme. The committee recorded their thanks to Mr. William Higgs for valuable advice and practical assistance. His professional knowledge and large experience had, they stated, been placed unreservedly at the service of the committee, and he has spared no effort to enable them to secure the very best results in regard to the rebuilding.

The instructions received by the committee from the church were:—"That the Metropolitan Tabernacle shall be rebuilt as nearly as possible upon the same lines as the original edifice, omitting the upper gallery, if deemed necessary and advisable, and subject, of course, to the restrictions of the new Building Act." In deliberating upon the several schemes that have been before them, the committee had given prominence to the following important considerations:—

1. That the building must worthily perpetuate the memory of the founder.
2. That it must meet the requirements of modern times, and be suitable for society anniversaries as well as the regular services of the Sabbath.
3. That any scheme adopted must give effect to the pastor's suggestion that he and his hearers be brought into closer proximity with each other. The building committee had formulated and approved a definite scheme as illustrated by the plans. In this connection the committee are indebted to Mr. W. W. Pocock, the venerable architect of the old Tabernacle, who had kindly lent them the original drawings, for which their grateful thanks were accorded.

Briefly summarised, the scheme comprised the following:—The portico and walls left by the fire are retained, and will be repaired. The construction will, as far as is possible, be fireproof, much of the material that was previously wood being replaced by iron. The auditorium will be of the same width as before, but the length will be reduced to the extent of one bay, which is equal to about 13ft. 6in. This reduced length, while it enables the pastors to get nearer to the audience, and, as the committee believe, improves the proportions of the building, also gives opportunity to add to the number and size of the vestries, and to provide commodious baptising rooms. The committee have not found it either necessary or advisable to omit the upper gallery. The total seating capacity will be reduced by about one thousand. The heating will be by means of radiators. There will be electric light throughout, with reserve gas supply in the roof and at the entrances in case of accident. The seats will be more commodious than in the old building, and the aisles will be wider. The exits will be improved, and the committee are negotiating for the hire of a narrow strip of land at the north side of the Tabernacle in order to widen

the outside passage. The lavatory accommodation will be considerably improved. The working drawings for the whole of the structure have now been prepared, and the architects will at once proceed to take out the quantities. Several weeks will elapse before the committee are prepared to invite tenders. It is hoped, however, that the specification will be issued and the tenders be returned by the time the present contract for the basement is finished, and consequently no actual delay will occur.

This report was unanimously adopted on the motion of the chairman, Pastor Thomas Spurgeon, seconded by Mr. Frank Thompson, Deacon, and the plans were formally approved and adopted.

#### NORTH-EASTERN RAILWAY COMPANY'S NEW OFFICES, YORK.

[WITH PHOTO-LITHOGRAPHIC ILLUSTRATION]

THE drawing herewith reproduced was exhibited at the Royal Academy this year. The architect, Mr. Horace Field, proposes to execute the new buildings in red bricks from Suffolk, with Huddlestons stone dressings, the roofs to be covered with green Ullswater slates. The site is opposite the present offices, and the new board-room and west front will have a view of the cathedral and river. The plan which we give shows the extent of this commanding group of picturesque buildings.

#### SANITARY CONGRESS AT BIRMINGHAM.

THE Seventeenth Annual Congress of the Sanitary Institute was opened on Tuesday, when members to the number of about 800 from all parts of the kingdom were present. The Lord Mayor (Councillor Beale) gave a public welcome to the members at the council-house, and afterwards presided at a public luncheon, at which Sir Douglas Galton replied to the toast of "The Sanitary Institute."

##### THE PROGRESS OF PREVENTIVE MEDICINE.

The opening meeting of the congress was held at the Birmingham and Midland Institute. In his presidential address Sir Joseph Fayrer, the president, surveyed the progress of preventive medicine or hygiene during recent times. In bringing about that progress the Sanitary Institute had taken an important part. He traced the history of that body since its establishment, and referred to the numerous other organisations which had been formed with a similar object in view. He described the conditions under which the people lived 50 years ago, and contrasted them with the present conditions. Public health, he said, was now cared for in a sense which was utterly unknown in the past. Houses were better built, sewerage, drainage, and ventilation were provided for, the land was better cultivated, the subsoil better drained, the absolute importance of pure drinking water was recognised, food was more varied and more nutritious in its character, clothing was better adapted to climate, and, were all the existing official provisions enforced, little would remain to be desired on the part of the executive Government; but as some Acts were permissive, not compulsory, and as others were utterly neglected, much of the benefit they might confer was lost, though educa-

tion had done much. Upwards of 200 millions had been spent on sanitary work with great benefit to the public health. Popular teaching and example and the general diffusion of education were still necessary in order to convince the proletariat of what so intimately concerned their vital interests. The death-rate was susceptible of further diminution, expectancy of life might be enhanced, and the general conditions of living and exemption from certain forms of disease were by no means as perfect as they might be. Tainted water was still drunk, chimneys still vomited forth their smoke and chemical fumes, rivers were still polluted, cesspools and imperfect drains, badly-constructed, ill-ventilated houses, and so on, still defied alike sanitary law and commonsense, and it would perhaps not be until the more complete organisation of the public health administration under a Minister of Public Health were effected that the full benefits of sanitary legislation would be realised, and the people attain to that standard of health and duration of life for which they had a right to hope. Notwithstanding Acts of Parliament and all the efforts of sanitary authorities, serious defects remained. He showed the effect of hygienic measures upon certain well-known diseases, and, with regard to vaccination, said that the evidence seemed to show that there could be no doubt as to its value. The scope and aim of sanitary science in its preventive aspects should not be limited to the consideration of zymotic and other acute diseases, but should extend to the results of abnormal social conditions arising out of the strain and struggle for existence, involving over-competition in various occupations by which life was supported or wealth and distinction acquired, and under the pressure of which so many lost their health or even succumbed. He quoted from the Registrar-General's returns to show the influence exerted on vital statistics by sanitary science. The tendency to migrate to towns no doubt helped to reduce the general health, and should be discouraged. He dwelt upon the beneficial results of sanitary work in India, and concluded by saying that evidently a great future was before preventive medicine, and they might confidently look to the eminent men of science who were now pursuing with such indefatigable zeal their researches into the mysteries of bacteriology for its fulfilment. But those who admired and appreciated their work the most and looked forward hopefully to its results were anxious that progress should not be retarded by hasty deduction and premature generalisation, which might only end in disappointment, however great might be the importance of the study of bacteriology and the various conclusions resulting from it. With regard to the origin, diffusion, and prevention of disease, there were other factors of no less importance to be considered, and it could only be by the study of all these that they could hope to arrive at the complete knowledge which would enable them to fulfil the requirements of sanitary science. Earl Beauchamp moved a vote of thanks to the president for his address, and Councillor Martineau, the hon. local treasurer, seconded the vote, which was carried.

In connection with the congress, there is an exhibition of sanitary appliances at Bingley Hall, illustrating the advance which has been made of late years in various scientific methods bearing



upon the health of the people. There are 209 stalls, and the exhibition was opened on Tuesday evening by the Lord Mayor.

The congress was continued on Wednesday and yesterday (Thursday), when all the five meetings were well attended, over 2,000 members and delegates having reported themselves. Upwards of 30 papers were read. Alderman Cook, chairman of the health committee of the Birmingham City Council, presided over the conference of municipal representatives, and described the sanitary history of Birmingham, which began with the appointment of a sanitary committee and a medical officer of health in 1873.

#### LABOURING CLASS DWELLINGS.

Mr. John F. J. Sykes, medical officer of health for St. Pancras, read a paper upon dwelling accommodation in large cities. Mr. Sykes laid special emphasis upon the great fact that, above all things in providing dwelling accommodation, healthy family life must be encouraged and bettered, and that no amount of collective accommodation for men only, or women only, would touch the question. He made some suggestions as to the construction of houses. Mr. Peter Addie read a paper on the removal of insanitary areas in Birmingham, and the management of improvement schemes under the Housing of the Working Classes Act. Mr. E. Parkes, M.P., the chairman of the markets and fairs committee of the Birmingham Corporation, contributed a paper upon "Municipal Authorities and Public Slaughterhouses." At the conference of medical officers of health the president, Dr. J. C. McVail, dealt with "The Medical Profession and the State: their Relationship, especially with regard Vaccinal Legislation." Dr. J. W. Washbourn discussed bacteriological and clinical diagnosis in relation to some of the notifiable infectious diseases.

Dr. Meredith Young (Crewe), in a paper upon regulations for the burial of persons who have died of infectious diseases, suggested that there should be some regulation of the funerals of persons dying of Asiatic cholera, small-pox, scarlet fever, diphtheria, membranous croup, typhoid fever, and probably also of measles.

#### SANITARY ADMINISTRATION IN IRELAND.

Dr. McVail proposed "that the condition of the sanitary administration in the rural districts in Ireland is unsatisfactory, owing to the want of independent supervision, and that the Government be urgently requested to remedy that defect by introducing a Bill early next Session requiring the new county councils to appoint a medical officer of health for each county with the same tenure of office as the present county surveyors; and the council of the Sanitary Institute be requested to approach the Government on the subject." Dr. Browning (Weymouth) seconded the motion, which was agreed to.

#### MUNICIPAL ENGINEERS' CONFERENCE.

Mr. T. de Courcy Meade presided at the conference of municipal engineers. In his address he took the question of the housing of the working classes as his subject. "By-laws Relating to New Streets and Buildings" was the title of an address by Mr. J. S. Pickering, "Precautions to be Observed in the Ventilation of Sewers and Drains" were discussed by Mr. T. J. Moss Flower, and "Some Sanitary and Allied Advantages Attending the Introduction and Use of Motor Vehicles," by Mr. E. Shrapnell Smith, of Liverpool. Among the advantages attending the use of motor-cars enumerated by Mr. Smith were the sanitary betterment of the streets, reduction in public expenditure under the heads of working expenses and road maintenance, less congested thoroughfares, and better means of communication. He added that the diurnal roar of traffic would be materially reduced, and there would be less damage and loss of life, motors being under better control than horses. He proposed "that this conference of municipal engineers is of opinion that the introduction of motor vehicles should be encouraged by municipal, urban, and other authorities, in view of the fact that the extended use of such vehicles would contribute to the general improvement of the sanitary condition of the streets and towns, and this meeting recommends the council of the Sanitary Institute to make known this opinion as widely as possible."

Mr. John Price, city surveyor of Birmingham, seconded the resolution, and it was agreed to.

Mr. W. W. West presided at a conference of

sanitary inspectors, at which a resolution was passed requesting the institute to support a petition for the appointment of one sanitary inspector at least upon the examination board of the institute.

The Lady Mayoress (Mrs. Beale) took the chair at a conference of ladies who discussed questions of domestic hygiene.

The closing meetings will be held to-day (Friday).

#### "BUILDING NEWS" DESIGNING CLUB.

##### A SMALL MODEL FARM.

A SMALL Model Farm suitable for a gentleman's country residential estate of moderate proportions. The site is practically level, and the front faces the S.E. There must be a stable for four cart-horses, one box for a hack, and one for a pony; a stall-shed for six cows, and a calf-house for two, with a sick-stall besides; a granary and a mixing floor; a covered yard; a set of four piggeries; a boiling-house and meal store; a cart-shed; one closed coach-house, and a harness place. An implement shed is necessary, and a dung-pit. The covered yard must be light and airy, without being draughty. A little feature may be made of a clock turret, and provision must be made for a big water-tank. Picturesqueness is not to be overlooked; but the design is to be simple and suitable, in keeping with farm surroundings. Plan 16ft. to the inch, elevations and sections 1in. to the foot. View desirable. Economy is essential.

These were the conditions issued for the concluding subject in the past session of our Designing Club, and we publish to-day the illustrations of the three designs which we considered the best in order of merit. "Centaur" ranks first, "Pantile" second, and "Swan" third. Experts in farming possibly might take exception to some of the detailed arrangements, and we do not suppose for a moment that either of the plans selected would not be open to improvement. These arrangements, however, must be compared with the instructions, and for students' designs they all have decided merit, and evince an amount of painstaking industry which deserves commendation. As a matter of fact, elementary essays of this description are not infrequently very suggestive to even experienced builders. "Centaur," on the whole, is the best. The plan is convenient, and the exterior is unassuming and suitable. Whether the cow-byre would be warm enough in severe weather, with its open front leading into the covered yard, is a question upon which the situation of the farm would make all the difference. "Pantile" gains a degree of countryside appropriateness by the freehand style of drawing, which he has characteristically adopted. In one sense this is misleading, though there is, of course, a way available in artistic hands, by which new brickwork and tiling may be freely executed, and in the simplest fashion the hard mechanical severity of the commonplace may be avoided. It is, however, perfectly clear that walls must be upright, and openings must be square and true, while ridge lines must in the main be level, though a tilt is permissible at the gable ends. The joints of the brickwork may be wide, the timber scantlings may be rough-sawn, and in oak the natural contour of the stuff may be followed. "Swan's" chief merit is not perhaps so much in his plan. His sick-stall is better isolated than "Centaur's"; but the pig-sties do not seem well located between the two yards, even if they are handy to the mixing place. "Swan's" plan is compact enough, but the arrangement is crowded and lacks airiness. The bird's-eye view displays the group well, making a neatly contrived sheet for illustration. The dormer light over the covered yard is incongruous, while those to the cart-house and meal-store are really not wanted. They do not improve the appearance either. "Hotspur" has a more extended scheme, in which he has displayed a careful study of farming requirements, though, in the interest of economy, there looks to be too ample an amount of passage-way. The buildings are inexpensive, but are lacking in artistic idea, while the drawings are not particularly good. For example, in the elevation of the clock-turret, the only feature with any special detail, "Hotspur" has so carelessly represented it as to show the upper part right out of the centre of the trunk below. It is a pity, when a competitor has evidently taken pains over a con-

siderable part of his work, that it should be spoiled by slips of this needless kind. "McGilligan" comes next; but his design in the perspective looks all gateway, over which there is an important-looking room, occupied only by a tank. It is true we stipulated that provision should be made for a big water-cistern, but not necessarily to be housed in such an expensive contrivance as this. The plan is grouped round a central square yard, but the parts are disjointed and odd. The hack-stall and pony-box are made into a sort of secondary stable, and the cart-horses would have to traverse the cattle-yard to reach their stable, to which there is no other approach. "Umbopa" puts the cowshed and mixing place quite away from the piggeries, to which another meal-store and boiling-house is attached. There is a sort of cloistered passage round the covered yard; but the cloister terminates in a dead end which leads nowhere, so that its use is by no means evident. The covered yard has a spacious roof, which would be ventilated by a cross-draught through the dormers on either side. In several respects the elevations are poor. "Don't Know" is improving, and evidently spends a good deal of time on his work. The waving scrolls which are so painfully introduced to indicate grass in the view are meaningless, and the trouble taken to depict individual bricks in black with white mortar joints is a mistake, and a waste of energy. His scheme is much too ambitious, with a pretentious gateway surmounted by a quasi-tower, and terminating with an octagonal clock-turret of ugly outline. The quadrangle within has a fountain in the centre and a covered yard at the end. "Jeddah" makes a design which might be mistaken for a brewery. The plan is not really a bad one—indeed it is very superior to many like buildings which get built; but the arrangements display no particular skill or adaptation to the working of the farmstead. The drawings are neat and thin. "Datum" breaks the rule as to the size of paper to be used, and, added to this offence, he draws a view on an odd little piece of loose paper. His cow-byre will not do: there is no way of feeding the animals except from the stall itself. The idea of the plan is very faulty, and the design is not improved by the too-pretentious turret at the corner. "Oak" is more business-like, in fact he is purely utilitarian; his buildings are devoid of beauty or any attempt at good proportion. There is no covered yard, and the roof over the cow-byre is needlessly lofty, and correspondingly expensive. "Chess" is not at home with farming, and his plan is as indifferent as his elevations. "Economy" cannot have read the rules of our Club, sending in his design on two long awkward sheets of paper. His design is ill-contrived, with very poor detail.

#### THE GENESIS OF STREET MUD.

IN a letter in Tuesday's *Times* Mr. Gilbert R. Redgrave calls attention to the experiments to ascertain the genesis of street mud recently made at Cardiff under the direction of Mr. Archibald C. Elliott, D.Sc., and which were fully described in our last issue, p. 424. The subject (says Mr. Redgrave) is one of great importance to the authorities of large cities, and the values assigned to the materials tested will, he thinks, cause some surprise, unless due weight is given to the methods in which the tests were conducted. Three sets of tests are stated to have been carried out, and the substances named had to undergo (1) percussive attrition tests; (2) absorption tests; and (3) thrusting tests. The only description given of the first of these tests is that they were carried out by subjecting the specimens to "rapid motion against the ribbed sides of an iron cylinder in a manner calculated to reproduce the action resulting from vehicular and other traffic." The test No. 2 contains nothing novel in character, and it would seem that the test No. 3 was that ordinarily employed to ascertain the resistance to a gradually-applied load on a given surface.

Tests of the same nature of those under No. 1 have, Mr. Redgrave reminds us, long been adopted in America, in order to ascertain the relative durability of substances used for paving and roadmaking purposes, and such tests are applied in a machine known as the "rattler." This machine, as described in the *Journal of the Association of Engineering Societies* of August, 1896, is a species of tumbling barrel, polygonal in form, having 15 staves, revolving on trunnions, and driven at any desired rate by a



constant-speed electric motor. The percentage of loss in weight of the specimens under trial, after a given number of revolutions in the rattle, can be readily ascertained and comparative results can be computed. Without a more detailed description of the machine employed by Professor Elliott at Cardiff, it is difficult to say whether the results he has obtained would equal in uniformity those produced by means of the rattle, but it seems doubtful whether the ribbed side of the cylinder would fairly reproduce the action on the road materials due to wheeled traffic. The tests of Portland cement by abrasion are well known, and are much employed on the Continent in cement testing, but they do not apply in this case. Portland cement is never used neat for road-making, and therefore the value assigned to it in the table is most unfair. If the basalt samples had been crushed and mixed with good Portland cement in the proportion of one part of cement to eight parts of basalt, or other hard aggregate, the cement concrete would have occupied a very different place. Mr. Redgrave doubts, therefore, whether very great reliance should be placed on the results quoted.

#### DANGERS OF FLOOR CONSTRUCTION.

**A**NOTHER serious collapse of a building at Govan, near Glasgow, is reported, by which five men were killed and others injured. It would be difficult perhaps to assign the exact cause of the disaster; but, as the work of laying the concrete on the upper floor was being proceeded with, there seems some doubt as to the means used in supporting the concrete till it was properly set. The late fatal accident at the Westminster Mansions, which was attributed to the fall of a concrete floor, or the removal of the supports before the concrete had become set, suggests an answer to the question. Why are lofty structures of several floors constructed in a manner that leads to immediate collapse if the upper floor or roof falls? Is there any guarantee that the lower floors are secure and properly self-supporting before the upper one is complete? Where they are constructed of concrete, the greatest caution is necessary. The iron joists and ties ought to be tested and securely fixed in position, and the timber centring or core for the concrete well supported before the concrete is laid. We cannot be certain of these precautions having been taken if there is no official inspection to see the regulations enforced for buildings of this kind. There are a few essential points. Iron ties are in every instance necessary to hold the iron girders together, as it is well known cement-concrete slightly expands before setting, and exercises thrust on the walls. The wooden centres should be above suspicion, be well supported from the walls or floor below, which, in turn, ought to be supported. Are these matters attended to? Is not too much left to the foreman or the builder, who is apt to rely on the workmen and the architect? It is reported that in the Govan catastrophe the work of laying the concrete on the fourth floor was being carried out when the floor gave way, and in its fall crashed through the lower floors, wrecking a grocer's shop. We are not informed yet of any details; but we imagine the centring gave way, or was imperfectly supported from below, and the sudden impact of the falling mass broke through the floors beneath. There appears to have been some neglect in shoring the lower floors. If we imagine the centring carried on the floor below, which had no temporary support, we cannot be surprised if the fall of the upper one destroyed it by sudden impact. A concrete and iron floor is not able to resist a sudden blow; it is naturally a rather more brittle kind of construction than a timber floor, and the fall of two floors on a third, and so on, would be enough to carry everything below it. There have been several instances of this kind of floor collapse, where one floor has fallen and broken through the lower ones as if they were so many cards. The utmost caution is required by the architect in buildings of flats constructed with concrete floors. He should insist on seeing the ironwork properly fixed, and the iron ties inserted and screwed up so as to prevent any thrust or extension of the walls, also that the centring is sufficient and securely supported from below. The quality of the concrete ought to be inquired into if made on the works, and a proper admixture of the materials required. We also think it is false economy to employ

ordinary methods of construction and labour in the building and use the fresh concrete *in situ*, when, at a trifle more cost, the "Dennett system," or other of the patented systems of fireproof flooring which have been tested, can be employed. Some of these fireproof floors, like that of B. Ward and Co., can be constructed *in situ* or cast in large blocks and fixed complete, and exercise no thrust on the walls of building. Skilled labour for floors and staircases of this kind appears to be absolutely necessary in the interests of safety and efficiency, and architects would be doing wisely to specify a system that has proved to be sound, rather than provide that the work is to be done by the builder by local labour, and often under inadequate inspection. A concrete and iron floor is not like a wooden one, but demands skilful design and constant supervision in its construction. In the erection of large blocks of flats the one contractor takes the whole work, and the responsibilities are heavy.

#### THE BEST PERIOD TO FELL TREES.

**T**O determine whether a trunk was hewn in winter or in summer is of the greatest importance to buyers of timber, especially as regards building timber, since it is well known that timber cut down in summer represents a lower value than that felled in winter. Timber hewn during the resting period, i.e., between October and April, contains in its cells numerous starch particles which cannot be found in wood cut down in summer. Owing to this presence of starch, the wood is coarse and impenetrable, since the starch closes the pores. For this reason, winter-hewn timber is exclusively employed for staves, because, with staves from summer-hewn wood, the contents of the barrels are subject to evaporation through the pores. The starch contained in the winter wood is given a violet colour by iodine. Hence, if the timber to be examined is coated with an iodine solution and the surface of the felling side appears yellow, it may be assumed with certainty that the respective tree was cut down in summer. The light yellow lines are the moisture rays, while cells, tissue, and wood fibres simply take on a yellow colouring. In the case of winter-hewn timber the amylaceous rays form much darker, ink-coloured, black stripes on the yellow ground.—*Allgemeine Tischler Zeitung.*

#### CHIPS.

New schools at Johnstone-terrace, Keyham, built for the Devonport School Board, are about to be opened. They house 546 girls and 300 infants, are built of limestone with brick dressings, and cost £10,000. The contractors are Messrs. Matcham and Co., and the architects Messrs. Hine and Odgers, of Plymouth.

The sum necessary to justify the U.S. National Academy of Design in beginning work on its new building on Morningside Heights, New York, has been nearly raised through an appeal addressed to the friends of the Academy, and work is likely to start at once. The architects are Messrs. Carrère and Hastings, of New York, whose design was recently selected in open competition.

The Lord Provost of Perth has inaugurated the new manure depot at Friarton, new stables, and a culvert, by means of which a lade, and the sewage of the General Prison and the Craigie district are conveyed direct to the river, leaving a valuable piece of ground to be used for other purposes. The works have been carried out at a cost of upwards of £8,400.

The city council of Carlisle have decided to borrow £2,850 for the erection of artisans' dwellings in Willow Holme, and for the improvement of Bridge-street and the locality.

Mr. W. A. Dueat has held an inquiry at Brighton on behalf of the Local Government Board into the application of the Brighton Corporation to borrow £56,300 for purposes of electric lighting, and £1,750 for street improvement.

The old Wesleyan chapel in Dagnall-street, St. Alban's, is being converted into offices for the proprietors of the *Herts. Advertiser*. The contract, which includes dividing the building into two stories, is being carried out by Mr. W. Sparrow, builder, of Harpenden.

The west window of the Priory Church, Brecon, erected to the memory of the late Rev. Herbert Williams, for thirty-two years vicar of the parish, was unveiled and dedicated on Sunday last. The window is the work of Mr. W. G. Taylor, of Berners-street, W.

#### OBITUARY.

Mr. WILLIAM WILSON, M.I.C.E., a well-known railway engineer, died at his residence in Applegarth-road, West Kensington, on the 20th inst., aged 76. Mr. Wilson, who was born at Alnwick in 1822, was in early life associated with George Stephenson, who on one occasion presented him with a watch as a mark of his esteem, and for some years he was resident engineer on the Manchester, Sheffield, and Lincolnshire Railway at East Retford. Mr. Wilson was the first to suggest the advisability and practicability of bringing the southern railway lines across the Thames, resulting in the construction of Victoria Station as well as the Victoria railway bridge over the Thames, which, in conjunction with Mr. (now Sir) John Fowler, he built in 1859-60, the station being erected on the site of the Old Grosvenor Basin. He it was, too, who gave the station its name, for at a meeting held at the house of the Marquis of Westminster Mr. Cubitt wanted the station to be called "Pimlico," while Lord Westminster wished it to be called "Grosvenor," but Mr. Wilson said, "Why not call it 'Victoria,' after the Queen?" Other works for which Mr. Wilson was responsible were the first Metropolitan Railway, of which he did the pioneer work and prepared the estimates; the Millwall Docks, of which he was the originator, although his original plan was not carried out in its entirety; the Hammersmith and City Railway, the West London Extension, the Aylesbury and Buckingham Railway, the Banbury and Cheltenham Direct Railway, the Neath Harbour Works and Docks, and the Jerez and Algeciras Railway. He was also connected with the erection of Euston Station, and with many other engineering enterprises in various parts of the world. Mr. Wilson was in 1849 made a full member of the Institute of Civil Engineers without passing through any of the usual grades, and received the Telford premiums and gold medal for his paper on "Victoria Station" read before that institution. He was one of the earliest to assist the Volunteer movement, and aided in raising the 1st Surrey Light Horse. He leaves a widow to mourn his loss.

The current issue of the R.I.B.A. *Journal* announces the deaths of three Associates of the Institute. CHARLES EMANUEL EVANS, of Barmouth, elected 1882; SIDNEY ALEXANDER ELL, of Snowdon-road, Bournemouth, elected 1889; and GEORGE MACFIE POOLE, of 4, Buxton-road, Brighton, elected 1896.

Messrs. Hoskins Bros. and Messrs. Mepharm and Fergusson, Australian firms, have secured contracts for supplying the Coolgardie water scheme with pipes. The amount of the tenders offered for the work is £1,025,124.

At the Aldenham Institute, Goldington-crescent, St. Pancras, classes at moderate fees commenced on Monday last in building construction, carpentry and joinery, plane and solid geometry, and drawing.

New police buildings are being erected at Paignton, and will be taken possession of next week. The building faces Palace-avenue, on which it has a frontage of over 70ft., with an additional frontage on a side road of about 100ft. The premises consist of sergeants', single and married constables', and public quarters. The sessions room is 19ft. by 50ft. Messrs. Dart and Pollard are the contractors, and Mr. E. H. Harbottle, F.R.I.B.A., Exeter, is the architect. The contract is for about £3,500.

A Baptist church is being built at Scapgoat Hill, Huddersfield. The building will be 61ft. by 39ft. within. The principal front, which will be in the Renaissance style, faces south, with entrance into a vestibule, from which staircases, east and west, lead to a gallery which runs all round the chapel. There are two vestries and a cloak-room on the ground-floor and a large vestry in the basement. The chapel provides accommodation for 600 people. The whole of the internal woodwork will be of pitch-pine varnished. A recess is provided in the gallery immediately behind the pulpit for the choir.

The new county schools at Llangollen were opened last week. Mr. H. Teather, architect, of Cardiff, has prepared the plans, and the contractor has been Mr. W. H. Thomas, Oswestry. Provision is made for 120 scholars. There is an assembly-hall, which may be extended so as to include two classrooms, which are shut off by folding doors. Two other classrooms, a science lecture-room, laboratory, cookery-room, lecture-room, and workshop complete the accommodation. The total cost of the land has been £1,270, of the building £4,040, and furniture £200, or a total of £5,510.



## Building Intelligence.

**ABERYAYRON.**—This school is the second to be opened in new buildings out of the five established under the Cardiganshire County scheme. Llandysil has preceded Aberayron, and there are to follow Aberystwyth, Cardigan, and Tregaron. The Aberayron school buildings are built on a commanding site near the Feathers Hotel. They are of unpretentious architecture, the local managers preferring commodiousness—having to choose between the two—to architectural ornamentation on the outside. The buildings consist of a central hall, 45ft. by 25ft.; two classrooms, 20ft. by 16ft.; master's and mistress's rooms; workshop, 20ft. by 15ft.; lavatory, 20ft. by 15ft.; music-room, 18ft. by 15ft.; kitchen, 26ft. by 16ft.; two lavatories, and out-offices. The architect is Mr. L. L. Banks Price, B.A., of Lampeter, and the contractor Mr. E. Evans, of Llanybyther. The site has been inclosed within a home stone wall and coping. The entire block, with the freehold site, has cost £19,000.

**BRENTFORD.**—New municipal buildings are about to be built for the Brentford Urban District Council, from plans by Mr. Howell Parr, the surveyor. The site is in the main road, at the corner of St. Paul's-road. At the angle of the two roads a tower will be placed, rising square for two stories, with window openings to the collector's room on the ground floor, and to the clerk's office on the first floor. From the second story the tower breaks on to an octagon, containing eight small openings, and is roofed with a small lead-covered dome, terminating with a circular spirelet. The building, which is estimated to cost £7,000, will comprise a large hall on the ground floor, also a vestry room and offices for collectors and overseers. On the first floor is a committee-room, and here also are the clerks' and overseers' offices, together with rooms for the caretaker. In the basement a soup kitchen has been designed, 20ft. by 30ft., together with stores and strong room. The new fire station, also designed by Mr. Howell Parr, has just been completed. The front elevation is surmounted by two gables filled in with Patra bricks, and separated from the middle story by moulded string-courses. This middle story comprises three windows, lighting the firemen's recreation-room, which have moulded reveals and semicircular arches, with projecting voussoirs and four label mouldings. These openings are filled in with moulded wooden frames, following the arch lines, and glazed with obscured glass; two of the windows have octagonal oriels with wrought-iron railings. These arches have likewise projecting voussoirs and label mouldings. A moulded plinth runs round the entire buildings. On the east side is provided a large drill yard, with an escape projection and hose tower. The materials employed in facing are red pressed bricks and red terracotta. The accommodation provided is as follows:—Engine-room, 31ft. by 25ft.; workshop, cellar, watch-room; firemen's recreation-room, 31ft. by 18ft.; officers' room and store-room, &c. The caretaker's apartments consist of living-room, kitchen, and two bedrooms, &c.

**BUCKLAND, PORTSMOUTH.**—The foundation-stone of the new church of St. Stephen, in Kingston-road, Buckland, was laid on Friday. The church is being erected from plans prepared by Mr. Crowlev, of Croydon (brother of the vicar), by Mr. T. P. Hall contractor. The new edifice will be 93ft. long, the width on nave 31ft., with aisles, on either side 16ft. wide, and will be capable of seating 700. From floor to roof will be nearly 60ft. in height. Heating apparatus is to be fixed in specially built chambers at the back of the church. There will be no gallery. The organ and choir will be in the chancel. The church, square in shape, owing to the shallowness of the site, is to be of red brick, with congreit stone dressings, of which material the columns and voussoirs of arches will be formed. The style is the Perpendicular. The seats will be open benches. The cost of the building (exclusive of the site, valued at £1,000), is estimated at £7,300.

**CARDIFF.**—On Thursday in last week the members of the corporation paid a visit of inspection to Cathays Park for the purpose of finally determining the exact sites of the projected new town hall and law courts. Mr. W. Harpur, the borough engineer, accompanied the members, explaining the sites as staked out by

lines of flags, while the architect (Mr. Lancaster) also waited upon the members with sketches. As the result of the inspection the buildings will occupy the sites as shown on the plans, with the modification that they will both be placed nearer the avenue of trees. This will have the effect of removing the law-courts a little farther away from the noise of the traffic on the North-road, and on the other side will leave a space between the side of the municipal buildings and Park-place of about 100 yards, allowing room for a 50ft. roadway and the erection of another building, probably a museum. The architects, Messrs. Lancaster, Rickards, and Stewart, of London, were also directed to proceed with the preparation of the working drawings, the council thus finally approving of the additions and modifications previously suggested by Mr. Lancaster, increasing the original estimated cost from approximately £198,000 to £233,000. The increase will be chiefly absorbed in the cost of giving the buildings a higher elevation, the remainder being for a few additional offices. Both the town hall and law courts will face Queen-street, their frontages being roughly in a line with the canal lock, separated from one another by the existing avenue of trees and having in front an open space, bounded on the Queen-street end by a broad roadway of 60ft. or more in width, crossing from North-road to Park-place.—The Steam Laundry, Dyeing, and Carpet Cleaning Works, in Marlborough-road, Roath Park, were opened by Lord Tredegar on Thursday in last week. The premises are situated in a plot of ground over an acre in extent. The building has been erected at a cost of £8,300, whilst the machinery has cost another £2,000. The architects were Messrs. Habershon and Fawcett, the contractors Wm. Thomas and Co., Cardiff. On entering the building the first apartment is the sorting-room, whence the clothes are conveyed to the two washhouses, one of which is a lofty room 60ft. in length. In the drying-room, the next department, from 5,000 to 6,000 articles per day can be dried by a hot-air process. Following this comes the ironing and finishing-room, and last of all the packing-room.

**DRAPERS' HALL, E.C.**—Considerable progress has now been made, says the *City Press*, with the alterations being carried out at Drapers' Hall in Throgmorton-street, and the work in the interior of the building is being pushed on rapidly. The façade of the hall has for many years been the only distinctive feature in a thoroughfare possessing nothing but an unbroken line of plain business premises; and even this relief has at last been demolished. The handsome marble staircase that for so long has been the admiration of visitors to the hall has also disappeared. On the site facing the Stock Exchange, Messrs. J. Lyons and Co. will shortly erect a restaurant, and, though space has been reserved for a corridor entrance to the hall, this will seldom be used except on festive occasions, the chief entrance being a new one in Throgmorton-avenue. The western corridor of the hall has been completely transformed, folding-doors having been fitted into the old apertures, and the floor laid in black and white marble. This will be converted into a lounge shortly. On reaching the top of the new staircase the visitor finds himself in what was formerly the small drawing-room. The building at this part has been extended a distance of 7ft. towards the avenue, space being thus obtained for a portion of the new staircase. The balustrade is of Emperor's red marble, while the panelling is set in a casing of alabaster. The bases of the columns supporting the staircase are of Parian marble. Above are the arms of the company. The upper portion of the wall is lined with Capillio marble, in front of which rise numerous Italian columns. Stained glass windows will shortly take the place of those temporarily fitted in the extension. Electric light has been fitted throughout the building, and a new back entrance has been made in Austin-friars. The builders are Messrs. Colls and Son, of 5, Coleman-street, E.C.

**EDINBURGH.**—The Waterloo Hotel, in Waterloo-place, was acquired in the beginning of this year by the North British Railway for the purpose of being converted into offices for the Company. During the past five months this work of alteration has been in progress from plans by Mr. Hamilton Beattie, architect to the Company, and it is now on the eve of completion. Each chief has his staff conveniently to his hand; each of the flats of the large and lofty building is connected by staircase and electric lift; and in a

suite of offices designed to accommodate some 400 people, care has been taken to secure efficient lighting, ventilating, and sanitary arrangements. For the artificial lighting of the offices there has been introduced a large installation of the electric light. The front elevation has only been slightly altered. The west wing has been raised 18in., so as to make it uniform in height with the centre and with the east wing. In the vestibule a great change is observable, consequent on a spacious well having been cut through the several floors, the lighting of it by a cupola on the roof, and the substitution for what was the ball-room staircase of a powerful electric double-decked lift, with a stone stair alongside of it. This lift ascends from the Waterloo-place level 60ft., and descends 70ft. to the Low Calton, where there is a doorway by which access can be had to the Waverley Station. The lift is constructed to carry a weight of 1,000lb. The lower deck will be used for parcels and coal, and the upper for passengers. On the principal or Waterloo-place floor is the board-room, 45ft. by 25ft., and other accommodation for the chairman and directors. On the east side the general manager and his staff will be located, as also a large conference room. On the same level, the Victoria Hall and a hall below it of equal size have been assigned to the audit department. On the first floor is accommodation for the secretary and solicitor's departments. The ball-room on this floor has been practically untouched, and will be utilised for general meetings of the company. The second floor will be occupied by the cashier, accountant, and registrar, and their clerks, while on the top story, to which an addition has been made, the engineer and his numerous assistants have provision made for carrying on their work. On every flat are fireproof strong-rooms for the storage of books and documents, an old staircase having been turned into account for this purpose. The cost of the alterations will be about £10,000.

**INNERPEFFRAY, PERTH.**—The ancient church of Innerpeffray, three miles from Crieff, has just been restored, after having become quite dilapidated and disused. It is 80ft. long by 22ft. wide, with a low roof, and was built early in the 13th century. The interior has been long the burial-place of the Drummond families, and is divided into three portions. Viscount Strathallan's family, however, now have a vault in the ancient chapel of Tullibardine, and no longer inter their dead at Innerpeffray. The roof has been thoroughly overhauled and repaired with stone slates in keeping with the old roof. A great improvement has also been made by the removal of the soil all round the church, and exposing a fine dressed double base-course, which was perfectly hidden before. Some oak doors have been put on studded with iron bolts, and all the windows have been opened up. The floor of the chapel has been levelled, and for the most part gravelled, and turf laid over the graves. The improvements were carried out under the personal supervision of Mr. G. T. Ewing, architect, Crieff.

**LEEDS.**—Oxford-place Wesleyan Chapel, the exterior of which has been reconstructed, was opened on Friday. The old Oxford-place Chapel was built in 1834-5, at a cost of £10,000, and was a plain, square brick structure, free entirely from any architectural adornment. The interior, with its uncomfortable pews, was little more inviting than the outside walls. The old building has been reconstructed from plans by the joint architects, Mr. George F. Danby and Mr. William H. Thorp, both of Leeds. The old boundary wall and entrance gates have been swept away, the ground floor has been raised 15in., and a flight of steps constructed across the whole of the chapel front, giving access to the galleries, and also to two side entrances. The building has been carried up to an additional height of about 24ft. from the main cornice level by a central pedimented gable, and cupolas at either side, crowning corner pavilions. The leading features of the front consist of a rusticated ground-floor stage, with piers, banded alternately with brick and stone ashlar work marking the angles of the corner pavilions and the central gable; a projecting central porch, with a segmental arched canopy carried on rusticated piers, and coupled Ionic columns; and two square-headed side entrances with circular fanlights and carved spandrels. The upper stage is treated with coupled and single columns, with carved Composite capitals of a Renaissance character, carrying moulded entablature, with



projecting cornice displaying modillions. A three-light window in the central gable is surmounted above the cornice level by a moulded, rusticated arch, the tympanum of which is filled-in with a moulded circular light and carved side panels. The cupolas, crowning the angle pavilions, spring from pedestals with carved scroll terminals, and have semicircular arched faces with angle columns, capped by moulded cornices, and with stone dome-shaped roofs. In the interior the walls and ceilings have been treated in light shades of colour. The floors of the vestibules are of marble terrazzo, and have been laid by Mr. J. F. Ebner, London. The cost of the renovation of the chapel will be about £8,500. The work has been carried out by W. Wilson and Sons, brick and stone work; H. Atkinson and Sons, joiners.

**LEGERWOOD.**—Legerwood Church, N.B., was opened on the 25th inst. after restoration. The church was built about 1130. The restoration of the chancel consists in rebuilding the gables, with circular light 3ft. diameter, giving capitals to the four pillars, building a corbelled eaves-course, &c., opening out the old windows, which are about 3ft. by 8in. in the daylight, and opening up the arch. The roof is constructed of the best British oak, with ceiling of the same. The walls, after thorough washing, still retained on the north side patches of the creamy-white pigment which had at first covered them, and in the aumbry recess, one of the circular diapers in red, which had relieved the surface, remains entire. This has been restored in so far as water-glass distemper of the same tint can do it. The work has been carried out from plans by Messrs. Hardy and Wight, architects, Edinburgh.

**LIVERPOOL.**—The redecoration of the Town Hall was all but accomplished when the discovery was made that the roof-timbers over the large ball-room were infected with dry-rot. The consequent necessity of repairing the structure has put back the work of decoration, which is being carried out from designs by Professor F. M. Sampson, of University College, Liverpool. A feature of the renovation is the woodwork in the hall, surrounding the new brass plates intended for the names of future honourable freemen. The dome and staircase have been treated in colour. The heads of amorini, modelled in high relief, have been introduced at the top of the pilasters between the windows, and the civic motto, and the legend of the town hall's architectural vicissitudes, have been inscribed around the base of the lantern beneath the windows. The colour scheme is in tones of blue, cream, and gold, whilst the walls of the staircase are stencilled in red on a cream ground, with an adaptation of an Italian damask pattern. The large dining-room has been relieved of its former plethora of painted foliage, and treated in a quiet scheme of green-and-gold. In the small ball-room the predominant tones are blue and gold. The inscription round the dome sets forth that the building was erected by John Wood, architect, of Bath, in the years 1749-55. It was enlarged by James Wyatt, architect, in 1789-92; and was further altered and restored by him after the fire of 1795.

**MORPETH.**—Lady Joicey, of Longhirst, laid on the 23rd inst. a memorial-stone, in connection with the new Congregational church and schools which are being built in Dacre-street, Morpeth. The buildings are Early English in style, and will be faced with stone. The organ-chamber will be placed in an arch recess at the right-hand side of the rostrum. Accommodation is provided for about 350 persons. Immediately behind the church are the minister's vestries, with separate entrances from the side street, deacons' vestry, and ladies' vestry, with cloak-room and lavatory; and beyond is the school to accommodate 250 to 300 persons, with an infants' classroom adjoining, partitioned off with swivel shutters. The seats and internal fittings of the church are to be executed in pitch-pine. The windows of the church are to be glazed with cathedral leaded lights in subdued tints. Mr. T. Waters, of Morpeth, is acting as clerk of the works, and the whole is being carried out from the designs and under the superintendence of Mr. J. Walton Taylor, F.R.I.B.A., of Newcastle. The cost of the buildings and land is estimated at between £2,700 and £2,800.

**NOTTINGHAM.**—Much progress has recently been made with the erection of the new Great Central Railway Station in this city. The subways connected with the main subway, which will lead from the booking office to the platforms,

have been completed this week. Four platform blocks are in course of construction, but the men will shortly cease working at two of them, and full strength concentrated on the two at the eastern side, as it is anticipated to have that part of the station ready for passenger traffic at the commencement of the New Year. The work of making an approach from Parliament-street to the station was commenced on Monday last. There is to be an imposing entrance to the new station from Mansfield-road. It will have a frontage of 260ft., and the tower will reach a height of about 130ft. The railway hotel will be erected on the side of the entrance nearest Milton-street. At the present time there are 180 men employed on the station site. The whole of the station area is to be covered with a glass roof. It is contemplated that the station will be completed in its entirety by Christmas, 1899.

**OLD TRAFFORD.**—New premises are being erected at Old Trafford for the Deaf and Dumb School, and will be opened next spring. Additional accommodation will be provided for sixty-four children. In the basement or playground floor the present oral boys' dayroom will in future be used by the oral girls, and a new room, 71ft. by 36ft., will be provided for the boys. On the same floor will be provided an elder boys' reading-room, a swimming bath, 48ft. 6in. by 20ft., a hot bath 20ft. by 12ft. 9in., a dressing-room with two bathrooms, and girls' and boys' playgrounds, with a teachers' recreation ground. The principal feature of the ground or schoolroom floor is a general assembly-room, 76ft. by 32ft. connected with the present schoolroom. Entrance is obtained from the present schoolroom, and by staircases from the playground and swimming-baths entrances. A special stone staircase is provided for use in case of fire. The dormitory floor contains four dormitories, each 22ft. by 18ft. 9in., and a bedroom 13ft. by 12ft. The new buildings will cost about £10,000. The architect is Mr. J. Bowden, of Manchester.

**ROTHER.**—The Free Church of Rother, N.B., built five-and-fifty years ago, is about to be replaced by a new structure at a cost of £2,000. The plans have been prepared by Mr. G. Sutherland, A.R.I.B.A., whose design was selected in competition. They show a church seated for 400 on the main area, with accommodation for an additional 100 in an end gallery. At the back there is a hall and session-house. The front of the church will be built of rock-faced rubble work, relieved with dressings of Morayshire freestone. There will be an entrance porch, to the left of which will rise a tower and broach spire. The gable will be filled with a three-light lancet window. The interior woodwork will be of varnished pitch-pine. The roof will have principals of 10ft. centres, carved, stained, and varnished. The style adopted is Early English.

**SHIELDMUIR, N.B.**—St. Patrick's Roman Catholic Church, Shieldmuir, Wishaw, was opened on Sunday. The new building is seated to accommodate a thousand persons. Designed in the Early Decorated style, the church consists of chancel, nave, side chapels, aisles, baptistery, sacristies, confessionals, &c. The nave, which is 97ft. long and 28ft. wide, is divided into seven bays. The chancel, apsidal in form, is divided from the nave by a chancel arch. A feature of the church is the façade, in which are placed two doors, which are deeply arched and recessed. The gable is carried both by buttresses at the sides and one in the centre, in which is placed a niche where a statue of St. Patrick has been put. Between the buttresses are two arched recesses, 39ft. in height, and in these are placed two four-light windows. The gable terminates with a stone cross. The internal length of the church is 125ft. long, 58ft. in width, and the internal height 58ft. Red sandstone is used in the construction of the building and the estimated cost has been £6,250.

**SOUTHAMPTON.**—The foundation-stone was laid in Mousehole-lane, Shirley, on Wednesday week, of the new isolation hospital, which the Corporation of Southampton are erecting at an estimated cost of £27,000. The hospital will provide accommodation for 70 beds, and will allow of future extension to 152 beds. The administrative buildings have been designed proportionate for the future extension. The entrance gates, under the supervision of the porter's lodge, are placed towards the eastern end of the site in Mousehole-lane. The out-building station and mortuary are placed on the opposite side of the entrance roadway, and are

separated from one another by a hearse yard. The administrative block is towards the north-west of the porter's lodge. The ward pavilions are in parallel lines across the northern portion of the site, with their axes running north-east and south-west. The two large scarlet-fever pavilions are placed behind the administrative block, and being of the same plan, are reversed in order to bring their entrances opposite to one another. The two isolation pavilions are placed to the east of the larger pavilions, and space is left between them and the scarlet-fever pavilion for one additional large pavilion in the future extension. The vacant part of the site towards the west is left for future extension, and will admit of two additional pavilions. The laundry block, disinfecting station, and general coal-store are grouped to the south-west of the site. The ambulance station is to be provided by altering the existing stables. It has been decided to warm each block separately with its own small boiler and hot-water system. The large wards are ventilated by means of fresh air admitted behind the radiators, and thus warmed in winter, and a cold fresh air inlet under each bed, in addition to which each window is fitted with a double hopper-casement, the foul air being extracted by the extract flues in the central stoves. The small wards and rooms are ventilated in a like manner, but with an extract flue over each fireplace in lieu of the central stove. The ventilation of the sanitary blocks is achieved by means of the cross ventilation of windows and fresh-air inlets and ventilators as extracts. Messrs. F. H. Greenaway and J. H. Smith are the architects, and Mr. Jenkins is the builder.

#### CHIPS.

Princess Christian will open the Artists' Guild Tenth Amateur Art Exhibition at the Imperial Institute on November 7.

Good progress is being made with a new technical school at Kingswood under the direction of Mr. S. Boulton, and in three weeks the finishing touches will have been put on. The site is at the rear of the parochial offices at Warmley Hill, and abuts on High-street board schools. Pennant stone with freestone dressings is the material used for the main room, which is 32ft. by 24ft.

Lord Ludlow, before whom was held the recent arbitration arising out of the compulsory purchase of the Syrencoat Estate, Salisbury Plain, from Mr. George Knowles, by the Secretary of State for War, for the purposes of a new manœuvring ground, has awarded the claimant £15,431 15s., including timber and plantations. Mr. Knowles, who had rented the property since 1879, purchased it last year for £11,000.

The Local Government Board have sanctioned a loan to the urban authority of Coalville of £22,992 for sewerage and water schemes.

The new church which is to be built for the convenience of the Roman Catholic residents in Higher Tranmere, Devonshire Park, and neighbourhood, is to be proceeded with at once. Mr. Edmund Kirby, of Liverpool, has completed the plans, which have been approved of by the Bishop of Shrewsbury. The church will cost about £5,600, and sitting accommodation will be provided for 600.

Mr. Thompson, who has been for some years clerk to the Haydock District Council, has sent in his resignation, having been appointed a surveyor under the Lancashire County Council.

At the South-Western Police Court on Friday Mr. John Brett, A.R.A., of Daisyfield, West-hill, Wandsworth, appeared to answer the complaint of the Wandsworth District Board of Works, who sought to obtain the payment of £145 17s., being a share of the expenses for paving Putney Heath-lane. Mr. Michael Brett, barrister, a son of the defendant, for the defence, raised the point that the lane was not a new street within the meaning of the Act, and therefore repairable at the expense of the general body of ratepayers. The magistrate considered he had proved his point, and dismissed the summons.

An addition to the Homœopathic Hospital buildings, in East-row, Birmingham, was opened on Monday. It is the first instalment of a series of extensions and improvements, for which a building fund of £4,300 has been raised. It is proposed to extend the hospital itself, replacing the remainder of the old frontage in Easy-row with an elevation similar to that of the new part. The old part, which was originally a factory, will be taken down and rebuilt. The portion opened yesterday is an extension of the small block at the rear, to be utilised for a nurses' home. The extension, the building and furnishing of which have cost £700, provides five additional bedrooms and a nurses' parlour.



## Engineering Notes.

**IMPROVED RAILWAY FACILITIES PROMISED IN MID-KENT.**—Mr. A. Willis, the newly-appointed general manager of the competitive traffic of the South-Eastern and London, Chatham, and Dover Railways, states that the joint working committee of the two companies propose to convert the Maidstone branch of the London, Chatham, and Dover route into a main road to the coast. With this view a connection between the main South-Eastern line and the London, Chatham, and Dover route will be established from Chelsfield, on the one hand, to Duntun-green on the other. In the mean time a disused piece of the London, Chatham, and Dover line between Sevenoaks and Otford is to be opened up for traffic, so that fast trains may be run from Victoria to Maidstone, and thence via Ashford to the coast without change of carriage. Ashford Station, on the South-Eastern line, is to be reconstructed to meet the requirements of the combined traffic.

**GOOLE AND MARSHLAND RAILWAY.**—The formal cutting of the first sod of the Goole and Marshland Light Railway took place on Friday. The line, which will effect a junction with the North-Eastern Railway line between Goole and Thorne at Creyke's Sidings on Goole Moor, will comprise five lines of rails, giving communication to Swinfleet, Reedness, Eastoft, Adlingfleet, and Garthorpe, has a length of 13½ miles. The authorised capital of the company is £63,000, of which £59,600 will be absorbed in construction. The land is for the most part level, and presents no serious engineering difficulties. Several warping drains have to be crossed, but, with the exception of the Swinfleet drain, they are of no great importance. The area which will be served stretches from the North-Eastern Railway to the Trent, with a line running north of Thorne to Eastoft and Garthorpe for an irregular southern boundary, and the river Ouse for a northern boundary. The area is estimated to contain 25,000 acres, of which 15,000 are arable land. Through communication will be established with the Isle of Axholme Light Railway, a scheme for which has already met with the approval of the Light Railway Commissioners. The engineers for the line are Messrs. Mammatt and White, Leeds, and Mr. W. S. Meyer, Leeds.

The spire of St. Michael's Church, Upper Pitt-street, Liverpool, is undergoing restoration and repainting, and the upper 20ft. is being taken down and rebuilt. The spire is the loftiest in the city, rising to an height of 215ft.

Mr. Hugh Stannus, F.R.I.B.A., has been specially engaged to give a course of lectures at the Manchester Municipal School of Art next session on "The Principles and Practice of Architecture." The architectural curriculum at this school has been arranged in co-operation with the Manchester Society of Architects.

The Earl of Derby laid, on Wednesday, the foundation-stone of an extension of the Royal Albert Asylum, Lancaster, and later in the day the Storey Home for feeble-minded girls (built by Sir Thomas Storey) was opened by the Countess of Bective. The extension of the asylum will consist of a new wing to be built at the south-east angle of the Brooke wing. It will be about 150ft. long and two stories high. The ground floor will accommodate fifty cripples, and the first floor, which will be level with the ground floor of the main building, will afford room for fifty epileptic patients. The plan is on the "pavilion" principle. The cost of the extension, without furniture, is estimated at about £15,000. Messrs. Austin and Paley, of Lancaster, were the architects.

The syllabus for the autumn session of the classes held at the Battersea Polytechnic Institute has just been issued. The Polytechnic, which was opened in February, 1894, having been built from Mr. E. W. Mountford's designs at a cost of £65,000, is provided with workshops for engineers, smiths, carpenters and joiners, pattern makers, plumbers, bricklayers, masons, plasterers, and painters and house decorators, and with laboratories for engineering and mechanics, electrical engineering, physics, chemistry, and natural science, and with a art school, cookery school, laundry, needlework rooms, photographic rooms, and with ordinary lecture and class rooms. It also contains separate gymnasia for men and women, a reference library, well-furnished common rooms, reading-room for the use of members, and refreshment-rooms. The principal is Mr. Sidney H. Wells. Among the classes is one on builders' quantities, conducted by Mr. J. Bartlett, M.S.A.

## PROFESSIONAL AND TRADE SOCIETIES.

**GLASGOW ARCHITECTURAL ASSOCIATION.**—The opening address of the winter session was delivered on the 20th inst. by Mr. Geo. S. Hill, president, his subject being "Architectural Tradition and Precedent." The distinction implied between the terms was gone into closely and clearly, noting that the acquaintance of history of any particular branch of work was invaluable for many reasons; but at all times the element important to us, which is entirely absent from the past, was the present and all that it implies. Every young designer was advised to obtain a clear and articulate idea of the position held by these great factors, as by their aid the superficial attractions of quaintness and eccentricity can be evaded when his hand can be laid upon what he knows infallibly to be good. It requires but a lively, if not over-refined, fancy to impart to present conditions a clothing never before represented. This is all that much of the modern work has to depend upon; in it oftentimes lies something analogous to the abnormal, the freak in nature which is never pleasing. The rationale of such architecture is in the designers themselves, and they themselves are the only court of appeal by which it might be judged, taking refuge from outside criticism behind the assertion "But you do not understand." Mr. Hill pointed out that the great epoch-making features and characteristic forms were not the outcome of any feverish desire for something new, but came by the pressure of their own manifest advantages, and concluded his very able address with the truism, "That to advance wisely we must refresh ourselves liberally from the past."

**ROYAL INSTITUTE OF BRITISH ARCHITECTS.**—The following is the programme for the session 1898-99:—Nov. 7, 1898, opening address by the president, Professor George Aitchison, R.A.; Nov. 21, "The Comparative Value of Documentary and Architectural Evidence of English Cathedrals," by Francis Bond, M.A., F.G.S.; Dec. 5, business meeting; Dec. 19 (i.), "The Application of Electric Power to Practical Purposes in Buildings," by H. R. J. Burstall, M.Inst.C.E.; (ii.) "Some Practical Hints on the Production and Use of Electricity for Lighting Country Houses," by Bernard M. Drake, M.I.E.E. Jan. 16, 1899, award of prizes and studentships, preceded by business meeting; Jan. 23, President's address to students, presentation of prizes; Feb. 6, "Public Baths and Washhouses," by A. Hessel Tiltman; Feb. 20, "Municipal and Public Libraries," by J. M. Brydon and F. J. Burgoyne; March 6, "Some Early Christian Churches in Palestine," by A. C. Dickie, preceded by business meeting, including election of Royal Gold Medallist; March 20, "Norman Vaulting in England," by John Bilson, F.S.A.; April 10, "The Application of Colour to Interior Ornament in Relief," under the management of the Art Standing Committee; May 1, annual general meeting; May 15, "Nature and Architectural Ornament," by H. Heathcote Statham; May 29, "Planning and Construction of Board Schools," by T. J. Bailey; June 12, business meeting, annual elections; June 26, presentation of the Royal Gold Medal.

**THE SOCIETY OF ARCHITECTS.**—The anniversary meeting of the society will be held on Thursday, October 27, at 8 p.m. As a practical outcome of the paper read by Mr. A. A. Hudson, A.S.I., barrister-at-law, before the society on March 24 last, on the subject of "The Position of Owners of Property with regard to Rights of Light and other Easements, with a Suggestion for Future Legislation," the council have drawn up a petition which is to be presented to the Lord Chancellor at an early date. The council have, we understand, under consideration a scheme for testing, on behalf of architects and manufacturers, the various materials used in building. It is proposed to publish the result of such tests monthly for the information of members, and to issue them in pamphlet form at the end of each year.

The town council of Southampton have formally adopted, at a special meeting held last week, a revised code of by-laws relating to streets and buildings.

St. Luke's Church, Reddall Hill, Cradley Heath, was reopened last week, after having been closed for seven weeks to undergo renovation and decoration. The major portion of the work of renovation was intrusted to Messrs. H. Wyther and Son, of Dudley.

## COMPETITIONS.

**PLYMOUTH.**—Last Saturday the competitive plans for the Tavistock-road new shops and premises, for which the town council are offering a premium of £250, had to be delivered to the borough surveyor. Altogether only 11 designs have been sent in, the majority of which are from London architects, although firms practising in other towns are also represented. Owing to the dispute which arose between the council and the Three Towns architects on the question of the terms of the competition, the affiliated members of the latter body resolved not to submit any plans for the proposed improvement; but it is stated that one set will be found to have been prepared in a Plymouth office.

## CHIPS.

Halifax Town Council, at a special meeting, have adopted a recommendation of a sub-committee authorising the waterworks committee to carry out at once the works in connection with the construction of the Walshaw extension scheme, at an estimated cost of £157,000.

Mr. Frederick H. Tulloch, M.I.C.E., an inspector of the Local Government Board, held an inquiry at Chard, on Friday, relative to an application by the town council to borrow the sum of £2,500 for works of water supply.

On Thursday in last week, the new Sunday-schools in course of erection in Barnby-gate, Newark-on-Trent, and adjacent to the Wesleyan Chapel, were formally opened. The buildings have been erected at a cost of £2,200 from plans prepared by Messrs. Bottrill, Son, and Bilson, of Hull, and comprise an assembly-hall with accommodation for 600 scholars, together with 14 separate classrooms, secretaries' offices, church parlour, library, lavatories, and kitchens.

At the offices of the Rainford Urban District Council, on Tuesday, Mr. G. W. Willcocks, M.I.C.E., an inspector of the Local Government Board, held an inquiry into an application by the council for sanction to borrow £6,000 for providing the township with a proper water supply.

A special meeting of the water committee of Glasgow Corporation was held on Friday to consider the contract for the supply of 995 tons of water-pipes. It had been decided that two-thirds of the work should be done by Messrs. R. M'Laren and Company, Glasgow, whose offer for the whole was £4,958 7s. 4d., and one-third by Messrs. R. D. Wood and Co., Philadelphia, whose offer was somewhat lower. Messrs. M'Laren subsequently withdrew their tender, which they stated had been given as an overhead price, and they could not undertake a portion of the work at the same rate. The committee unanimously decided to give the whole of the contract to Messrs. Wood, whose offer was £4,892 1s.

Messrs. G. and B. Cousin have now secured a contract for the demolition of the houses facing Princes-street, Edinburgh, from North Bridge-street to the Waverley Steps, and for bringing up the new hotel buildings on that side to the level of the second floor. The various shopkeepers who were dislodged from North Bridge-street have now been reinstated in the new shops on the street floor of hotel. The work of demolition will be immediately commenced.

A small lancet window at St. John's, Perry Barr, has just been filled with stained glass—subject, The Youthful Patron Saint—St. John with the Lamb. The window was designed by Mr. T. W. Canim, and executed at his studio, High-street, Smethwick, near Birmingham.

Colonel Luard, R.E., Local Government Board Inspector, held an inquiry at the Scarborough Town Hall on Monday with respect to the application of the town council for their approval of the disposal by the council of certain corporate land situated in Seamer-road, and of the borrowing of £33,575 for the purchase of the St. Nicholas House Estate for municipal purposes and for purposes of public walks and pleasure-grounds.

On Monday the Bishop of Manchester dedicated a three-light window which has been placed in the Fraser Chapel in Manchester Cathedral to the memory of Mrs. Fraser, the wife of the late Bishop of Manchester. The subjects are the Resurrection and Ascension of Christ.

The new cemetery provided by the corporation of Widnes for that borough was formally opened on Tuesday afternoon by the mayor. It has been laid out under the direction of Mr. J. S. Sinclair, the borough surveyor.

A new cemetery chapel is being erected at East Finchley, from the designs of Messrs. Forsythe and Maull, architects, London. Special consideration has been given to the ventilation, which will be carried out on the Boyle system.



## Correspondence.

UNIVERSITY COLLEGE, LONDON.

To the Editor of the BUILDING NEWS.

SIR,—I should be glad if you would permit me to make it known to your readers that the committee of management of this college have reduced the fees in the classes of Architecture and Construction, so as to bring them within the reach of students obtaining County Council Scholarships, or others of equal value.

For five guineas a student can now attend a course of forty lectures in either art or construction, and also the evening drawing class in the same subject.

The subject of my public opening lecture on Monday, Oct. 10th, at 7.30 p.m., is "Students' Difficulties."—I am, &c., T. ROGER SMITH.

## RIDGE TILES AND SLATE ROOFS.

SIR,—It does occur to me that Mr. Voysey has gone out of his way to advertise his own peculiar views as to what is and what is not correct in regard to the crowning of slate roofs. It is well known that many architects of eminence place tile ridges on roofs covered with green slates! And why not? In the rudiments of our artistic training we are taught that the two colours harmonise and complement each other! In all my long experience I have never been able to see anything pleasant to the eye in lead ridges. We require something to relieve the dulness and monotony of slates. Lead is too much of the same colour. We are the better judges of some distinct crest for a skyline, in the same manner as we finish off our own dress with a collar, &c., of white, or another colour! I trust young architects will use their own judgment and common sense in this matter, and not be influenced by anyone who glories in being pedantic!—I am, &c., ED. CALVERT.

10, North Saint Andrew-street, Edinburgh.  
Sept. 26.

## ADVERTISING ARCHITECTS.

SIR,—When I read Mr. Swaine's query if cases of the above often happened, I was somewhat puzzled as to whether he was descended from the Good Samaritan or Pecksniff, as his question was couched in such childlike-and-bland language. With the letter of "R. R." there is hardly the same difficulty. Would he kindly give list of buildings he has done himself, and of which he was and is proud to be the architect, and which were worthy of having a board affixed? Also might I ask if "well-known architect's remark" re brass plate was made when he was looking "R. R." in the face? Further, am I right in assuming "R. R." is an architect, and has an office "for honour"? May I inform him some of us poorer folk have offices "for livelihood"; or in other words, both "R. R." and ourselves may be working for what we are short of.

With a vagueness identical with "R. R." stamp of individual, he refers to the advert., but gives only the most slender details. May I ask if he is not capable of thinking that most people will take that advert. as evidence of someone desirous of providing the needful for life's requirements?

Perhaps "R. R.," having one talent (Q. E. D.), is specially enamoured of the advertiser who appears to have more than that number, and who is wishful of adapting himself to surrounding circumstances?

If "R(ambling) R(ot)" would speak a word of encouragement to one who apparently is striving to gain an existence, instead of trying somewhat of the opposite, he might find that with repeated efforts he would most likely be able to overcome his natural proclivities, thereby proving an unbounded astonishment to his connections; but they would get over it.—Yours, &c.,  
Sept. 24, 1898.

VIRA.

## A CORRECTION.

SIR,—In your impression dated 16th is a list of tenders for works at Henley Brewery, in which my contract is given as £8,500. This is incorrect, as the actual figures were £7,160, an error being discovered in first summary and rectified by letter before the lists were published. I shall be glad if you will note this.—I am, &c., B. HOBBS.  
Hart-street, Henley-on-Thames.

## Intercommunication.

## QUESTIONS.

[12554].—**Worm-Eaten Furniture.**—Will Mr. Hems or some other authority kindly say which is the best means of stopping the ravages of the wood-worm in old furniture? I have brushed the affected parts with solution of corrosive sublimate, but found a difficulty in getting it into the holes?—G. W. F.

[12555].—**Building Construction.**—Can any of your readers inform me where I can now procure the sheets showing details of building construction which were sold at 3d. per sheet, and much used at the drawing classes in London about ten years ago? They were then, I believe, procured from, or published by, some person or firm in Plumstead.—OLD STUDENT.

[12556].—**Pebble-Dashed Work.**—I should be obliged if any of your readers could furnish me with a good specification for pebble-dashed work, as largely used in the South, having a bright sparkling appearance, with a dead-white background? Particulars sufficient to instruct the workmen from would oblige.—T. W. H.

[12557].—**Boundary Walls.**—I have to build on a site, the property on one side having projecting stone stringcourses and a projecting gutter. I shall be glad if any reader of the BUILDING NEWS can recommend an up-to-date book treating on the law on the above. Also a good book dealing with rights of light and air.—J. E. S.

[12558].—**Heating Bathroom.**—What is the best means of heating a small bath-room? I have found oil-stoves a failure.—MONK.

[12559].—**Artificial Stone.**—I shall be glad if any of your experienced correspondents will tell me which is the most durable artificial stone. There are so many kinds advertised, that only practical experience of the merits of each can be of any use. How are artificial stone staircases constructed? Are they formed by filling in moulds of the steps placed in position, or are the steps cast and put up like stone?—A NOVICE.

[12560].—**Lych-Gates.**—Can any of your readers tell me of any good examples of timber-constructed lych-gates? Should they be of oak or fir timber, and how should the timbers be framed?—A. T. S.

[12561].—**Casement Stays.**—Which are the best stays for large casement windows—brass or gunmetal? Perhaps some reader can recommend a good pattern. I want to fix it to the meeting stile. Name and address of any maker will oblige.—A BUILDER.

[12562].—**Buff Terracotta.**—Where is this to be obtained? I do not want the colour to be too bright.—A.

[12563].—**Lining Vaults.**—Is there not some kind of bituminous lining that can be used for rendering brick vaults dry, side walls, and arches?—THOMAS.

## REPLIES.

[12546].—**Shutters.**—Revolving shutters are made of wood laths hinged together, or of curvilinear-shaped iron or steel laths—the latter are the best. Apply to Francis and Co., Gray's Inn-road, for particulars and list of their revolving shutters. Every particular as to space required behind fascia, grooves, &c., is furnished in their catalogue.—G. H.

[12549].—**Sketch Plans.**—The architect's demands are usual, and nothing out of the way.—L. E.

[12549].—**Sketch Plans.**—If plans and specifications are finished complete ready for tenders, and in some cases with tenders obtained, the charge is according to the R.I.B.A. schedule, and the documents would be handed over to the client. As "Inexperienced" is paying a sum equal to 1½ per cent. for sketch plans, he should not in fairness expect the architect to give the drawings up. The law in this, as in many other things, is contrary to common sense.—H. L.

[12549].—**Sketch Plans.**—Twenty-four years' experience teaches me that it is the custom for the architect to retain the plans. They are indeed very seldom asked for.—ALFRED G. KYLE.

[12549].—**Sketch Plans.**—The architect's custom is to retain plans if the work is not proceeded with. You pay for the architect's skill in designing what you require if carried out. Such is the architect's position. But the law has given the client a right to retain the plans, and if you claim them your architect, no doubt, will give you tracings, although I do not see what good they are to you. If you carry them out at any future time you are certainly doing injustice to your architect, unless you engage him to complete them and write specifications. It is to protect himself that the architect has always kept his plans. Of course, I am presuming in the above reply that there is no agreement as to property in the plans.—ARCHITECT.

[12550].—**Adjoining Walls.**—The ordinary custom is for builder using an existing gable to pay half cost of same. It is then a party-gable, but if adjoining owner prefers to build 9in. gable of his own on his own land, what have you to do with it, unless there is a question of ancient lights? Has adjoining owner offered to pay half cost of gable, and have you refused?—ALFRED G. KYLE.

[12550].—**Adjoining Walls.**—If "D." has built up to the extent of his land, why should not the adjoining owner build as he pleases, provided that he does not raise, or cut into, or otherwise injure the existing house? Why should "D." keep his flank wall free?—H. LOVEGROVE.

[12550].—**Adjoining Walls.**—If he used your wall as a party-wall he would have to contribute half the expense of building it. Of course, if it stands on the extreme boundary of your ground he can build his against it.—L. E.

[12550].—**Adjoining Walls.**—If your gable-end forms the boundary of your ground between you and your neighbour, he can build a 4in. or 9in. wall against yours so long as he does so on his own land. Your wall or gable is really a party-wall, I imagine. You would not like adjoining builder to use your wall if it stands on your land, therefore he builds his own half-brick or brick

wall to carry his roof-timbers, &c. This is only fair, and I do not see how "D." can prevent his neighbour from building on his own land.—AJAX.

[12551].—**Imitation Timberwork.**—This is sometimes done by nailing floor-boards or boards about 1½in. thick to the front. If they are made of cement use Portland cement and sand in proportion of three-fifths parts of sand to one of cement.—LOUIS ERWOLD.

[12551].—**Imitation Timberwork.**—If "Kent" means imitation timberwork, nothing can be worse; but at Brighton there is some good work in panels of colour executed under Mr. A. H. Kersey. Rough-cast is executed by rendering the wall and putting a second coat of coarse stuff in small pieces, throwing on while wet with a large trowel from a pail a mixture of hydraulic lime, gravel, and sand. Colour at once with limewash and ochre, or mix cement, sand, and gravel (with ochre stirred in)—proportions one of cement to two of gravel, &c. Do not put inch boards on this and make believe that it will appear to be half-timber work.—H. LOVEGROVE.

[12552].—**Water Delivery of Pipes.**—To calculate quantity of water delivered by pipes use the following formula, taken from Molesworth's Pocketbook:—

$$W = 471 \sqrt{\frac{D^5 H}{L}}$$

Where W = cubic feet of water discharged per minute.  
L = length of pipe in feet.  
H = head of water in feet.  
D = diameter of pipe in inches.—L. E.

[12552].—**Water Delivery of Pipes.**—The volume of water flowing out per second may be found by the formula  $\pi r^2 \times \sqrt{2gh}$  where  $\pi = 3\frac{1}{7}$ ,  $r$  is the radius of the cross-section of tube,  $g = 32$ , the acceleration due to gravity, and  $h$  is the head of water when the head is 30ft. For the lin. pipe, the volume per hour in cubic feet is—

$$3,600 \times \frac{22}{7} \times \frac{1}{4} \times \frac{1}{2} \times \sqrt{64 \times 32} \times \frac{1}{144} = 792 \text{ ft.}$$

For the ½in. pipe, the volume per hour in cubic feet is—

$$3,600 \times \frac{22}{7} \times \frac{1}{16} \times 40 \times 32 \times \frac{1}{144} = 198 \text{ ft. per hour.}$$

When the head is 6ft., for the 1in. pipe, the volume per hour in cubic feet is—

$$3,600 \times \frac{22}{7} \times \frac{1}{4} \times 61 \times 6 \times \frac{1}{144} = 1,210 \text{ ft. per hour.}$$

For the ½in. pipe, the volume per hour in cubic feet is—

$$3,600 \times \frac{22}{7} \times \frac{1}{16} \times 61 \times 6 \times \frac{1}{144} = 302 \frac{1}{2} \text{ ft. per hour.}$$

When the head is 15ft. For the 1in. pipe, the volume per hour in cubic feet is—

$$3,600 \times \frac{22}{7} \times \frac{1}{4} \times 30 \times 4 \times \frac{1}{144} = 594 \frac{1}{2} \text{ ft. per hour.}$$

For the ½in. pipe, the volume per hour in cubic feet is—

$$3,600 \times \frac{22}{7} \times \frac{1}{16} \times 30 \times 4 \times \frac{1}{144} = 148 \frac{1}{2} \text{ ft. per hour.}$$

—G. H. L.

[12553].—**Dousing.**—There are various opinions on the "art" of the "water-finder." I do not think much of it, and apparently the Local Government Board does not either.—L. E.

## CHIPS.

The wing added to the Free Methodist College, Victoria Park, Manchester, by Ald. James Duckworth, at a cost of £3,000, was opened on Friday. Ald. Duckworth has raised by subscription endowment of £20,000 for the college. The addition made to the college increases the accommodation from that sufficient for 16 students to that for 24.

A church-hall is being built at Newlands, Glasgow. The style is Decorated Gothic, and the hall is being built from plans by Messrs. Malcolm Stark and Rowntree, Glasgow. It is capable of seating 350, and will cost when completed about £1,450. The mason work will be done by Mr. A. Stewart, South Portland-street, and the Wright is Mr. W. Cowan, Bishop-street, Port-Dundas. The foundation-stone was laid on Saturday.

The Royal Commission on Sewage Disposal are this week inspecting the works erected at Exeter for the purification of sewage by the "septic" system. Next week they will inspect the sewage disposal works of the town councils of Manchester, Oldham, Chorley, and Rochdale. The offices of the commission have been removed from 16, Victoria-street, to 23, Great George-street, Westminster.

The Board of Trade have confirmed an order authorising the construction of a light railway in the county of Wilts, from the London and South-Western Railway between Grately and Porton, to Amesbury and Shrewton.

At Bolton on Wednesday, his Honour Judge Jones awarded, under the Employers' Liability Act, £250 damages to a joiner named Edwin Kelly, aged 32, who had been disabled whilst working on a scaffold for Messrs. Marsden, of the Bolton Steam Saw Mills, who admitted liability. The plaintiff alleged that he complained that the scaffold on which he was working was unsafe, but his warning was not heeded. The structure gave way, and he was so injured as to be permanently prevented from following his trade.

At the last meeting of the Haltwhistle Rural District Council their engineer, Mr. Harry W. Taylor, A.M.I.C.E., of St. Nicholas Chambers, Newcastle-on-Tyne and Birmingham, presented his scheme for the sewerage of West-end. The council considered it very satisfactory, and instructed him to prepare a scheme of sewerage for Town Foot, and also to report upon the disposal of the sewage of Haltwhistle.



## LEGAL INTELLIGENCE.

**ABBEY MANSIONS, WESTMINSTER.**—Under the Dangerous Structure Clauses of the London Building Act of 1894 and the Amendment Act of 1898, a summons was heard on Thursday in last week before Mr. Marsham, at the Westminster Police-court, addressed to the owners of the building known as Abbey Mansions (north block), requiring them to take down the cracked and defective portions of the stonework of the angle turret at the corner of Victoria-street and Orchard-street. Mr. F. F. Daldy, appeared for the London County Council; and Mr. Pollard defended. Mr. Daldy said the building was now in a very dangerous state, and something must be done, though the London County Council had been placed in a great difficulty by the previous decision of the Court—under appeal—that the building was vested in and in the occupation of the Crown. The County Council had been in communication with the Government, and Sir John Taylor, consulting architect to the Commissioners of Works, would tell the Court the present position of affairs. Mr. Marsham thought it a pity that what was necessary for the public safety could not be done at once, and the question of liability decided afterwards. Mr. Daldy said that there had been a promise to strengthen the defective part of the building with steel bands, but only one band had been put up. Mr. Pollock Marshall said that five steel bands would be in position in a few days. Mr. Pawley, the owner, while not admitting any obligation, was doing everything he could. Mr. E. Drury, district surveyor, said that the cracks in the brickwork were widening. He considered that the stonework of the turret was moving and the cracks all developing. The indications showed the possibility of a very serious accident. In witness's judgment it was necessary for the safety of the public that this building should be shored up at once. Cross-examined, Mr. Drury said that during the last few days he had detected a number of fresh cracks in the stone work. Sir John Taylor, architect to her Majesty's Office of Works, said that on the 3rd of August last he made an inspection of the building, and refused to certify it, on the ground that it was not safe for habitation. The Government had repudiated the agreement to take over the building. The magistrate decided to inspect the building with experts, who might agree as to what was immediately required for the public safety.—On Monday an adjourned hearing was held, when Mr. Pollard, for the owner, Mr. Pawley, said, notwithstanding the understanding arrived at, practically in deference to the magistrate's repeated suggestions, the County Council had committed a breach of good faith by the fresh notices served on Saturday. All that was referred to the arbitration was as to the safety of the turret, and if the fresh requirements of the district surveyor were admitted there would doubtless be other notices served. Mr. Seager Berry, for the County Council, pointed out that only a notice was served for fresh work, and that there was no summons in respect of it. The County Council were perfectly ready to abide by the reference agreed upon, but the district surveyor, as a public official, was bound to take a cautious attitude. Answering the magistrate, Mr. Drury said in his opinion the crack had opened since Saturday. Mr. Pollard said defendant, while agreeing to the decision of the arbitrator about the turret, which could be enforced as an order of the Court, would not consent to be fired at in every direction by the County Council. Mr. Pawley, the owner, still maintained that the exemption as to the building being vested in the Government applied as it did when the Court decided the point in his favour last July. He asked that Mr. Pawley's architect should be allowed to state his views as to the stability of the building. Mr. J. H. Goodland, the architect, was sworn, and said that there was no danger to the public whatever, and no change in the building since the previous hearing except as to what was due from vibration in inserting the steel strengthening bands. Mr. Seager Berry declined to cross-examine in view of the arbitration proceedings which were going on. Mr. Marsham decided that the arbitrator must report, as before decided. He adjourned the summons for three weeks.

**SUBSIDENCE OF PROPERTY AT HAMPTSTEAD.**—At the Sheriff's Court, Red Lion-square, Holborn, on Monday, Mr. Under-Sheriff Burchell and a special jury heard the case of "Anderson v. the Great Central Railway Company." The matter has been recently before Mr. Justice Byrne in the Chancery Division, and has also engaged the attention of the Court of Appeal. The claimant, Mr. Stewart Anderson, now sought to be compensated in the ordinary way under the Lands Clauses Consolidation Act. The case was a claim for compensation for injury to the premises No. 1, Goldhurst-terrace, Finchley-road, N.W., which were held by the claimant under a lease for 21 years from 1894 at a rent rising by stages from £180 a year to £250 a year. Shortly after claimant took the premises the railway company began the construction of their new line into London, and, he alleged, as a consequence the excavations and other works of the

company the claimant's premises, which were only just completed when he entered them, rapidly showed serious signs of subsidence, and wide cracks were found in the walls. The claimant consequently lost his lodgers and sustained great loss in the business of a general trade agency carried on by him in the premises in question. An action for damages was begun against the railway company, who had acquired the freehold of the premises, but the Courts held that the claimant's only remedy was by a claim under the Lands Clauses Consolidation Act, hence the present proceedings. Evidence as to the structural injury to the premises was given by Mr. Curphey and Mr. Crickmay, and the claimant also gave evidence and stated the injury was due to the works of the railway company. The case was adjourned until Wednesday, when Mr. Littler, Q.C., subjected the witness to a severe cross-examination to show that the business had never been a remunerative one, and that he suffered no injury by the cracks, even assuming that they were caused by the construction of the railway. On behalf of the railway company Mr. Littler called Mr. William Barber (Messrs. Barbers, Bellamy, and Co.), who stated that the claimant received an allowance from the late owner on entering the premises in consideration of their defective state of repair some time before the construction of the line was begun. The premises were practically no worse now than when claimant took them in 1894. The cracks and subsidence arose from the inferior nature of the building. Mr. Herbert T. Steward (Messrs. Hunt and Steward), architectural adviser to the Home Office, expressed the opinion that the defective condition of the house was due to the shrinkage of the timber, and not in any way to the works of the new railway. Other witnesses were examined, and, after a short consultation, the jury announced that they found that no structural damage was done by the railway, and that no compensation whatever was due to the claimant.

**VALUE OF PROPERTY IN BERNONDESEY.**—Mr. Under-Sheriff Burchell and a special jury, on Tuesday, at Red Lion-square, Holborn, heard the case of "Hill's Trustees v. the School Board for London." This was a claim for compensation in respect of the freehold interest in premises Nos. 70, 72, 74, and 74a, Tanner-street, and Nos. 1 to 8, Assembly-place, Bermondsey, the site being required for a board school. Mr. Littler, Q.C., C.B., stated that the property had been in the possession of the claimants since 1874, and had steadily increased in value, especially since the opening of the Tower Bridge and the extensive clearance of property in the vicinity. He called Mr. E. H. Eison (Messrs. Reynolds and Eison), who stated that the area of the property in question was 14,730ft., which he valued at 4d. per foot per annum, or £245 10s., and capitalised at 25 years' purchase, £6,137. From that he deducted £452 in respect of existing leases, making £5,685, to which he added £933 for the buildings and 10 per cent. for compulsory sale, making a total claim of £7,280. Mr. James F. Field (Messrs. Field and Sons), ex-president of the Auctioneers' Institute, and Professor Banister Fletcher gave confirmatory evidence. Their valuations were very close, £7,301 being the Professor's figures. On behalf of the school board Sir William Marriott, P.C., Q.C., admitted that property in Bermondsey had been increasing in value owing to the erection of the Tower Bridge, but the fact that the property in question had not been included in the betterment area of the Tower Bridge (Approaches) Bill showed that it was not likely to be enhanced in value. He called Mr. Samuel Walker (Messrs. Walker and Sons), who valued a portion of the land at 4d. per foot and the remainder, back land, at 2d. per foot, as a cleared site. His detailed valuation amounted to a total of £3,948, to which he added 10 per cent., the customary allowance, for compulsory sale, making £4,340. Mr. W. P. Goulding, Mr. David Burnett (Messrs. Bean, Burnett, and Eldridge), and Mr. J. B. Cooper (Messrs. Ventom, Bull, and Cooper) gave similar evidence as to value. Their valuations were also close together, £4,340 that of Mr. Samuel Walker, and £4,080 Mr. Burnett, and £4,007 17s. Mr. Cooper. The jury awarded the claimants the sum of £6,150, plus an allowance of 10 per cent. for compulsory sale, £615, making a total compensation of £6,765.

**BY-LAWS AS TO AIR-SPACE IN REAR OF BUILDINGS.**—At the Isle of Wight Petty Sessions on Saturday, J. T. McDougall, of London, was summoned for contravening the building by-laws of the Isle of Wight Rural District Council, by failing to provide 150ft. at least of air-space at the rear of lodge buildings erected at his Island residence, Elm Dene, St. Lawrence. According to the prosecution, this was an important test case under the new by-laws. The council had declined to approve the plans of buildings, consisting of stables, coach-house, and dwelling-house, because, as they contended, they did not conform to the by-laws as regards rear air-space. The back of the buildings were close to the perpendicular face of a cliff, which reached to the eaves. The buildings were proceeded with in defiance of the council. Mr. Damant, defendant's

solicitor, contended that there had been no breach of the by-laws, which only provided that there should be "not less than 150sq.ft. of open space free from any erection above the level of the ground." The cliff was not an "erection," and the by-laws, unlike those of the Ventnor District Council, did not provide that the air-space should be on the same level as the lower floor. The action of the urban district council was quite unreasonable, and if upheld people would have to excavate and live in caves in the district of the Undercliff, or building would have to be largely abandoned. There was 1,000ft. of air-space behind the building, whilst in front the air-space extended across the Channel to France. After considerable argument the Bench decided that there had been no infringement of the by-laws, and dismissed the case.

## CHIPS.

Mr. Silvanus Trevail, F.R.I.B.A., of Truro, has, says yesterday's *Western Morning News*, derived great benefit from the Marienbad treatment, and intends to prolong his holiday on the Continent.

The Lancaster Town Council have unanimously invited Mr. Alderman William Ball, marble mason, Conservative, to accept the position of Mayor for next year. It is understood that he will accept.

Mr. James Berkeley Smith, of Berkeley House, Seaford, Liverpool, who died on May 30 last, aged 69 years, has bequeathed to the City of Liverpool, for the Walker Art Gallery, the group of sculpture "The Angel's Whisper" and the oil painting "The Desecrated Sanctuary."

Since 1876, when the Corporation of Birmingham took over the waterworks, reductions in the water rates have been made resulting a saving to the consumers of £33,000.

An old music-hall in Cannon-street, Middlesbrough, was purchased some time since for £3,500 by the vicar of St. Paul's in that town, and it has now been converted into a mission-hall, from plans by Mr. Walter G. Roberts, architect, of 61, Albion-road, Middlesbrough. The alterations, which have cost about £1,150, have been carried out by Messrs. Allison. The mission-hall was recently dedicated by the Archbishop of York, who at the same time unveiled five windows in St. Paul's Church, which have been filled with stained glass representing Northern Saints, from designs by Mr. Percy Bacon, of London.

The Earl of Jersey, Colonel Boughy, and Mr. Fitzgerald, the Light Railway Commissioners, held an inquiry, on Monday, at Portmadoc, touching a proposal for the construction of a line from that town through the Pass of Aberglaslyn, to Badgelyert. The Commissioners refused the order on technical grounds.

The new church of St. David, at Manordwy, Pembrokeshire, was dedicated on Wednesday week by the Bishop of St. David's. The architects were Messrs. Protheroe and Phillot, of Cheltenham, the design being Gothic, and the material used native dressed stone, freely intermixed with Bath stone. The church will hold about 300 people, and has cost nearly £1,600. The contractors were Messrs. Thomas and Lewis, of Newcastle-Emlyn. Three stained-glass memorial windows have already been presented to the church, namely, the west window, representing the Ascension, and two in the chancel, representing the Resurrection.

At the Shire Hall, Hereford, on Saturday, Mr. H. T. Wakelam was presented with an illuminated address and a gold watch by the district surveyors of the county, on the occasion of his resigning the surveyorship of Herefordshire to take up the position as county surveyor of Middlesex. Mr. John Parker, city surveyor, Hereford, in making the presentation, said it had been subscribed to by the district surveyors and the surveyors of the boroughs and urban authorities in the county. During the time Mr. Wakelam had been associated with them in their work he had found a warm place in their hearts, and they all wished him every success and prosperity in his new sphere of labour. Mr. Wakelam suitably acknowledged the presentation.

The city council of Canterbury have under observation plans for a new Guildhall prepared by the city surveyor. They show a frontage of 118ft. in Guildhall-street, and 56ft. in High-street. On the ground floor will be a magistrates' court and the county and bankruptcy court. The upper floor will be taken up with the council chamber, committee-room, and mayor's parlour, together with the offices of the town clerk. The chief entrance will be in Guildhall-street. The style is described as "a free Gothic treatment of secular character."

Durwen was *en file* on Saturday when the ceremony of opening the Diamond Jubilee Tower, which has been erected on the top of the moor, 1,300ft. above sea level, was performed by the lord of the manor, the Rev. W. A. Dackworth. The tower has cost £600.



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ILLUSTRATIONS.

THE PALACE THEATRE, BLACKBURN.—NORTH-EASTERN RAILWAY OFFICES, YORK.—"ROSS HOUSE," HAMILTON, N.B.—"BUILDING NEWS" CLUB DESIGNS FOR A SMALL MODEL FARM.—NEW RACECOURSE, HAYDOCK PARK.

Our Illustrations.

NEW PALACE THEATRE, BLACKBURN.

THIS building is just started on a fine open site in the Station-square facing the railway terminus; it has frontages on three sides, so that it is a model site for a theatre. It will be built with local bricks and Accrington facings, and will form a picturesque addition to the ornamental gardens and the new esplanade which has been formed by tunnelling-over the river. The theatre is built of fireproof construction, and served with ample stairs and exits. There are two tiers with large stage-boxes, and a group of ten other boxes at the back of the grand circle leading off the foyer. The auditorium will seat over 2,000, and the plans have been passed by the licensing magistrates. Ample stage accommodation and dressing rooms are provided, with every modern contrivance, including a new patent "turn" clock of Mr. Arber's own invention. Mr. S. F. Davidson, of Newcastle-on-Tyne, is the builder, the ironwork being by Messrs. T. Drew-Bear and Co. The theatre is to be opened next summer. The architects are Messrs. J. T. Wimperis and Arber, of Sackville-street, Piccadilly, London, W.

NORTH-EASTERN RAILWAY COMPANY'S NEW OFFICES, YORK.

(For description and sketch plan, see p. 455.)

"THE ROSS," HAMILTON, N.B.

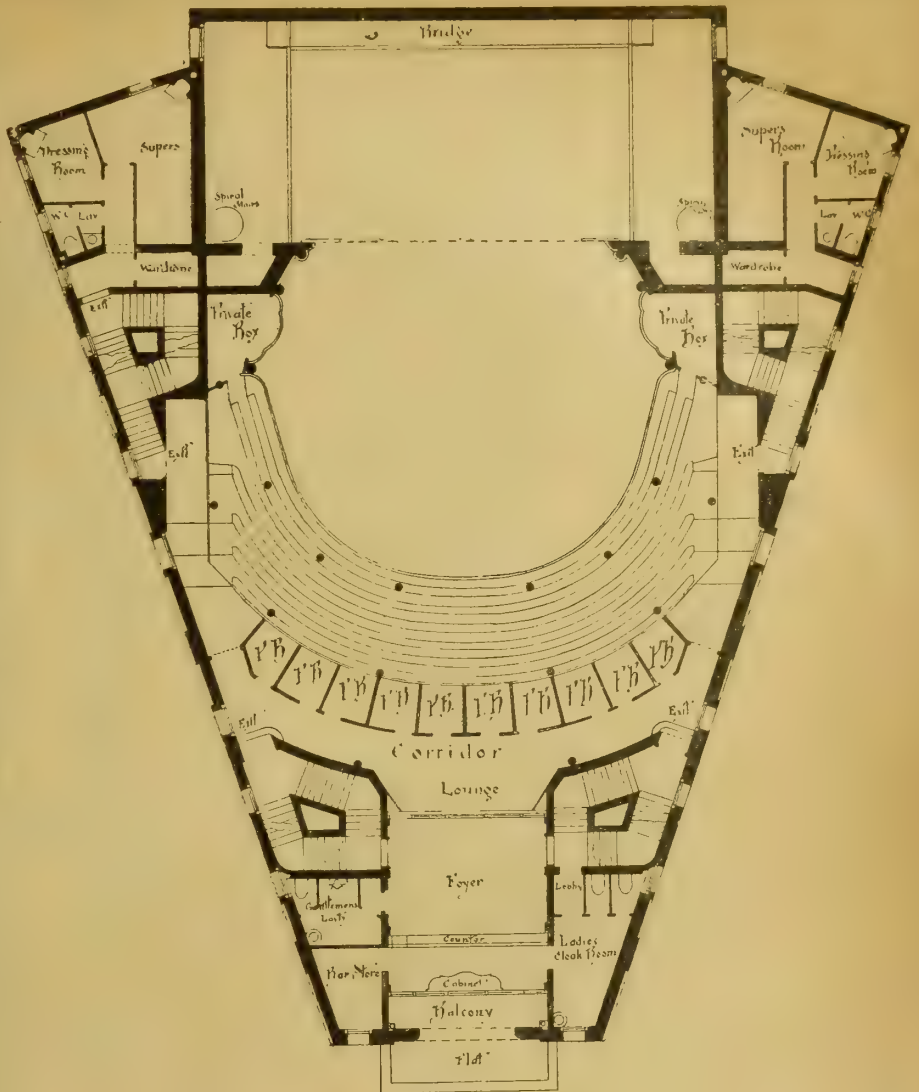
THE mansion-house of Ross is beautifully situated near the junction of the rivers Clyde and Avon, and is the seat of the Aikman family, the present representative being Major Robertson Aikman. The estate of Ross was acquired early in the 18th century by Thomas Aikman, Keeper of the Records of Scotland; he was succeeded by a grandson of Wm. Aikman the painter. The said Thos. Aikman built the original house of Ross, which has been entirely remodelled and enlarged by the present proprietor. The illustrations show generally the blending of the new and old buildings. The centre part of the lawn front is the old portion, and the other parts are new. All the work has been carried out by local tradesmen. The drawing of the staircase was exhibited at this year's R.A. Exhibition, the Hall at Glasgow Institute, and the exterior view at the Royal Scottish Academy. The architect is Mr. Alex. Cullen, I.A., F.R.S.E., of Hamilton and Motherwell.

"BUILDING NEWS" DESIGNING CLUB: A MODEL FARM.

(For description and awards, see p. 456.)

HAYDOCK PARK RACECOURSE.

THESE buildings are nearing completion. The design was selected in a limited competition, the



Grand Circle & Foyer

PALACE THEATRE, BLACKBURN.

cost being about £14,000. The architects are Messrs. Mangnall and Littlewoods. The plan given with the view shows the arrangement of club inclosure, Tattersall's ring, and other rings belonging to the course. The position of the stewards' stands and other stands, as well as the stables, is also clearly defined. The course is close to the railway, and has a station.

CHIPS.

The Newton Abbot Urban District Council received last week the sanction of the Local Government Board for a loan for the purchase of Courtenay Park and the improvement of the sewage outfall works.

A largely-attended statutory meeting of the Devonport ratepayers decided on Tuesday night, by a considerable majority, to apply to Parliament for compulsory powers to acquire the rights of the Devonport Waterworks Company. The company was recently approached by the water committee of the corporation, but refused to treat at the price named by the committee—£350,000.

Lady Mary Glyn, wife of the Bishop of Peterborough, opened at Leicester on Friday a new diocesan home for waif and stray boys, which has been purchased at a cost of £3,500.

An altar of oak inlaid with gold is about to be placed in the garrison church of St. James at St. Peter Port, Guernsey, at the end of the apsidal chancel, which is now being extended in depth. The chief panel contains a representation of the Last Supper. The work has been carried out by Messrs. Harry Hems and Sons, of Exeter. A new pulpit is being erected in the same church, having six carved panels. This and the new reading-desk, also of oak, is the work of Mr. Henry I. Marquand, of Bording, Guernsey.

A memorial window was recently dedicated in the south transept of the parish church of Abbot's-Bromley, Staffs. The window contains five lights, representing the Mother and Holy Child, St. Anne, St. Elizabeth, St. Agnes, and St. Ursula, with above them St. Michael, St. Gabriel, and St. Raphael. The work was executed by Messrs. Burlinson and Grylls, of London, who also inserted the window at the east end of the church.

The Lowestoft Town Council have instructed Mr. W. C. C. Hawtayne to prepare a scheme for lighting the borough by electricity, and to include the provision of power for traction purposes in consequence of an application by Messrs. Seaton and Beer as the East Anglian Electric Light Railway. This railway is intended to extend from Caistor to Southwold, running through Lowestoft and Yarmouth, Hopton, Corton, Kessingland, and Wrentham. In and near the towns and villages the rails are to be laid along the public roads flush with the surface, whilst the remaining length of the line will follow the roadside. Except at the termini, there are to be no stations. The cost is estimated at £300,000.

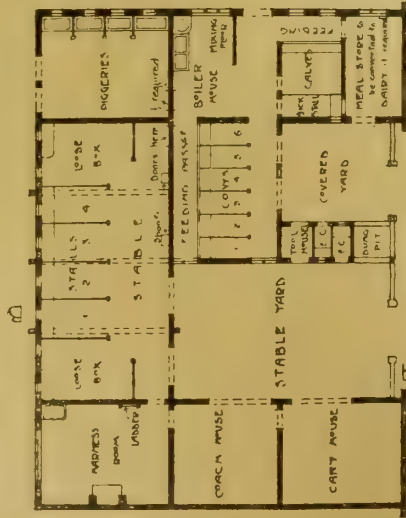
A draft of a proposed new constitution club, and suggestions for a fresh code of by-laws thereunder, has just been issued to members of the American Institute of Architects for their consideration. The grade of Associate is reintroduced, and it is arranged that both Fellows and Associates shall pay a uniform fee of ten dollars (£2) a year.

Elward Appleby, foreman, was superintending on Tuesday some operations in the construction of the station buildings of the Grand Central Railway Station at Leicester, and was standing on some planks near the platform, when an engine and some trucks came by. The engine caught the end of one of the projecting planks, throwing Appleby head first down a deep cutting which is being arched over. He fell a distance of 31ft., and was killed on the spot, his neck being broken by the fall.





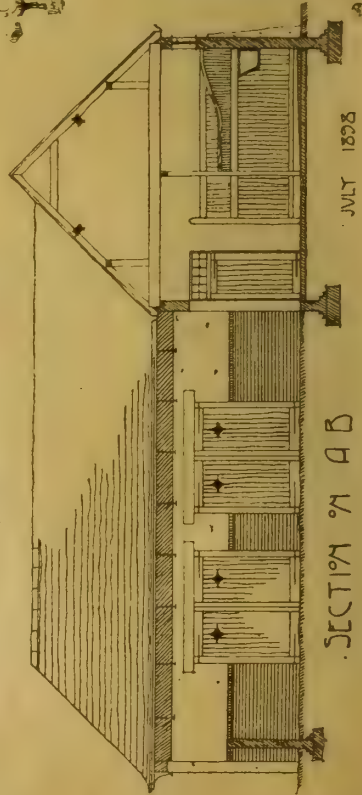
UPPER FLOOR PLAN.



GROUND PLAN.



BACK ELEVATION



SECTION N A B

JULY 1898

SCALE FOR PLANS: 0 10 20 30 40 FEET

SCALE FOR ELEVATIONS: 0 10 20 30 40 FEET

PLACED THIRD

: B. A. D. C.

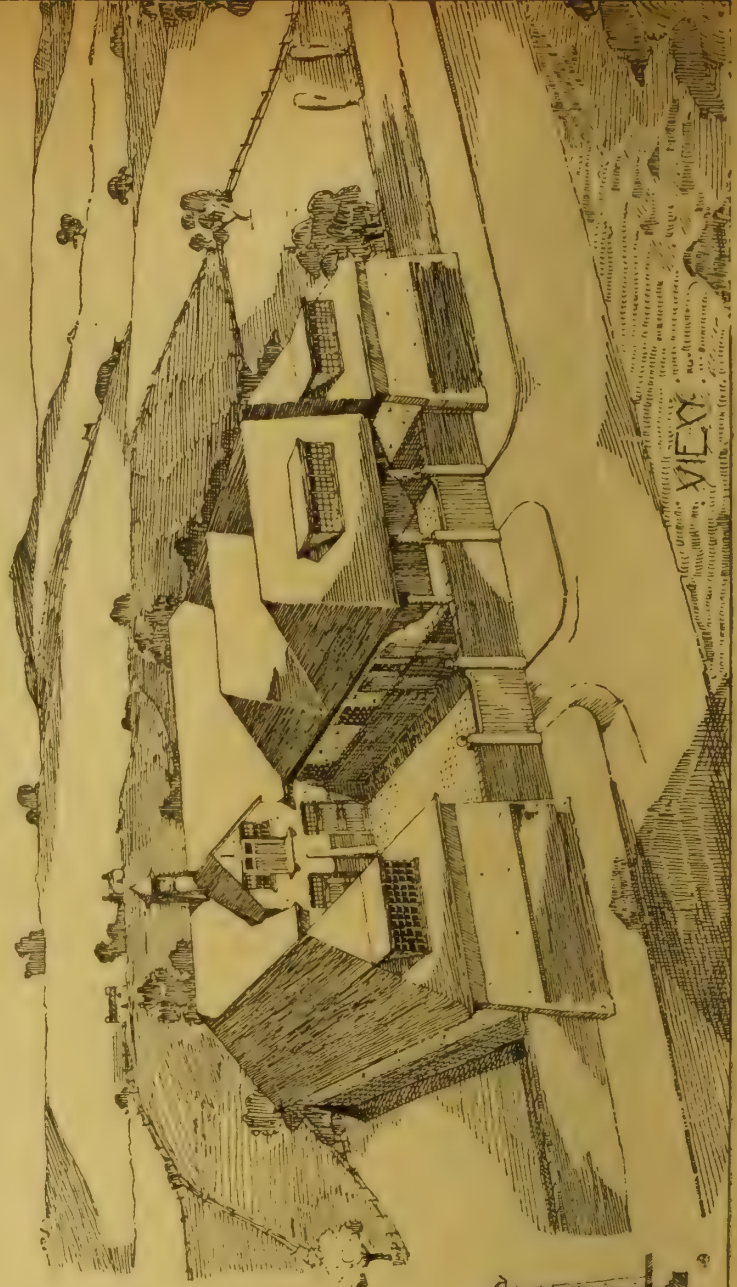
: DESIGN FOR A.

: SMALL GROUP OF

: FARM BUILDINGS

: BY "SMAN".

: FRONT ELEVATION:

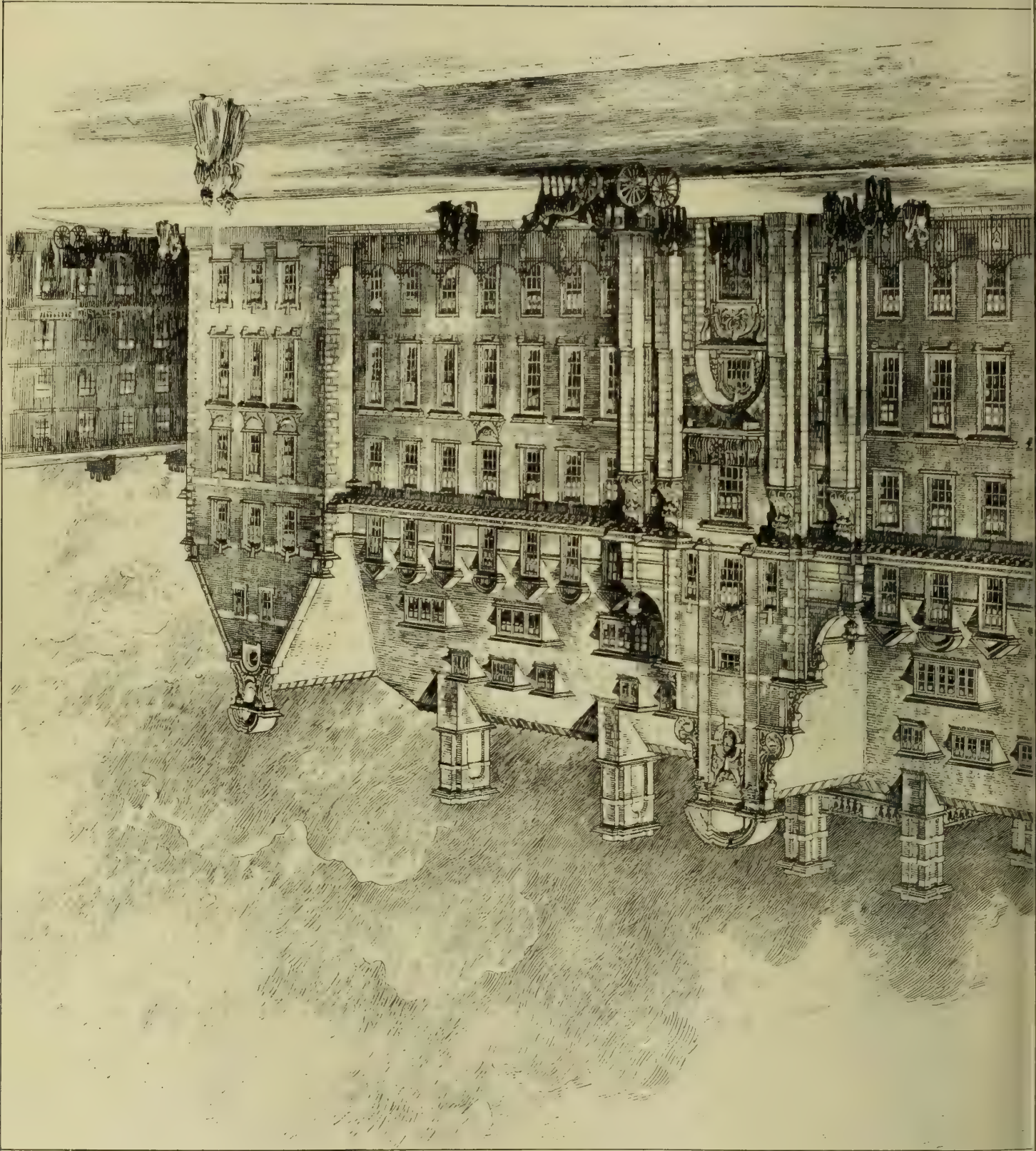


THE BUILDING NEWS

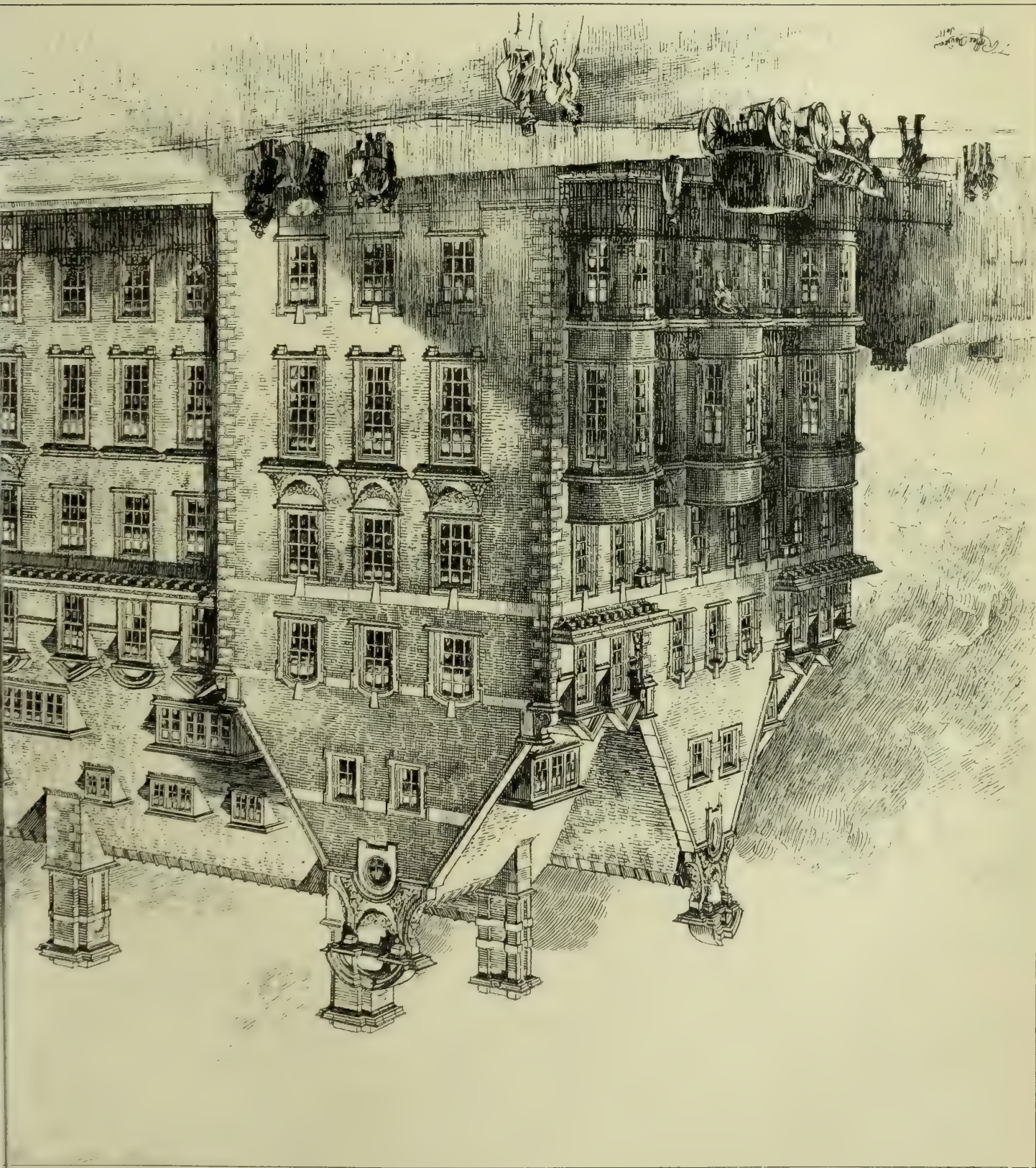




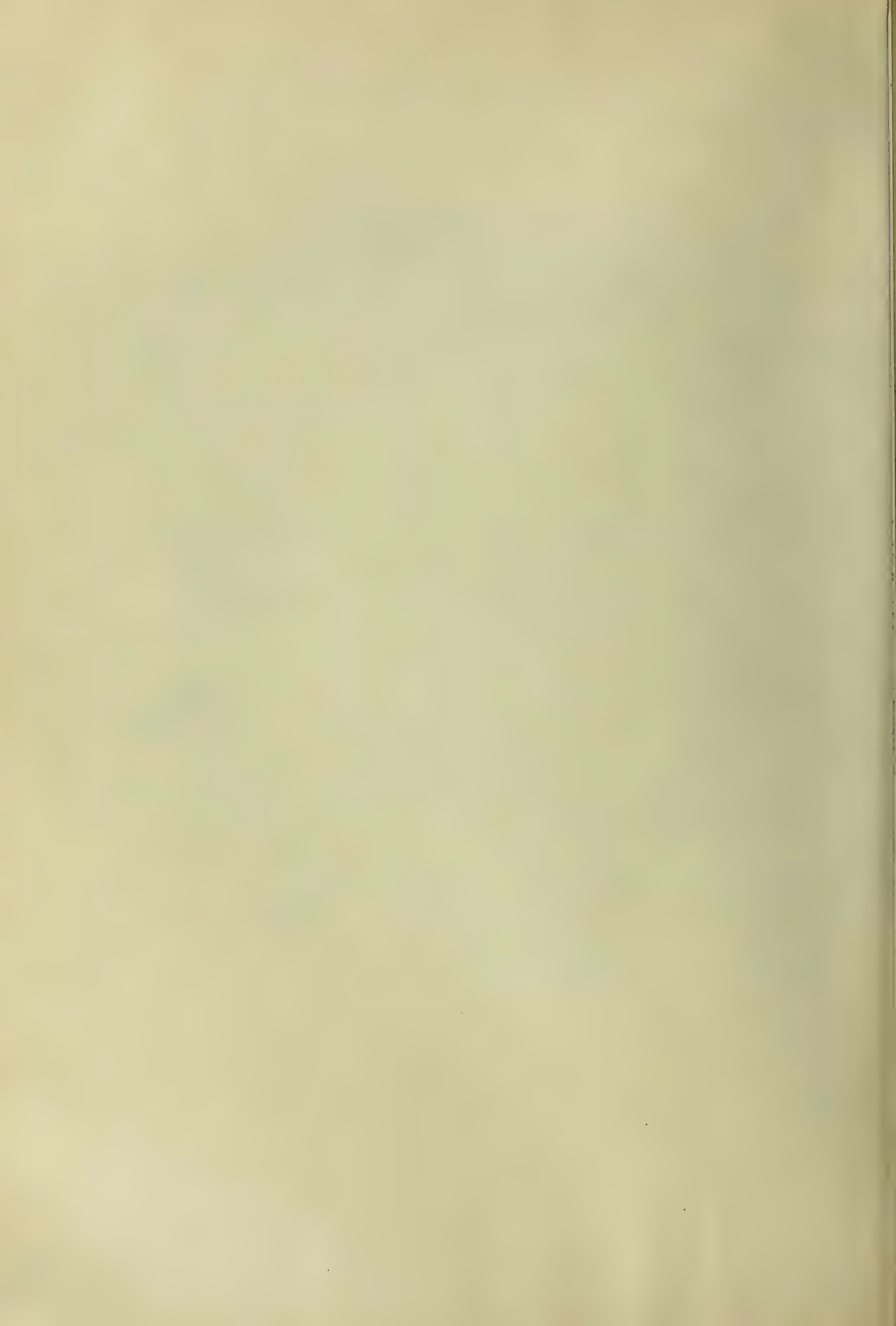




















THE ROSS, HAMILTON, N.B. MAIN STAIRCASE. ALEX. CULLEN, I.A. ARCHT.

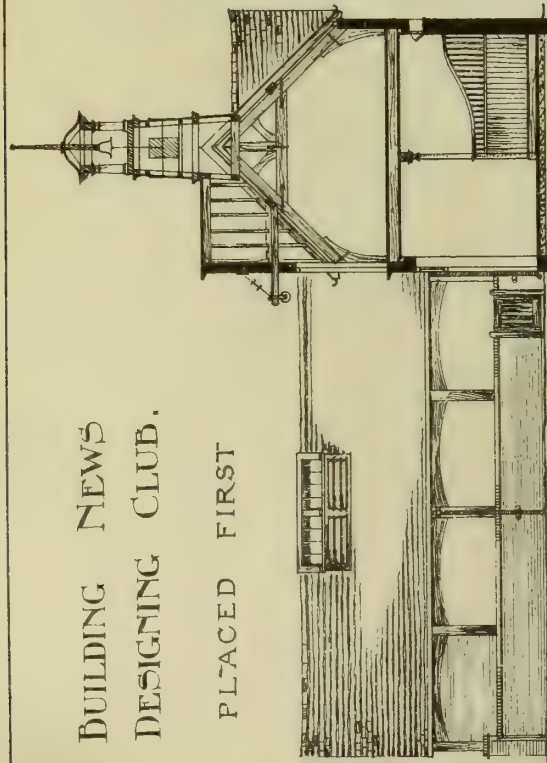






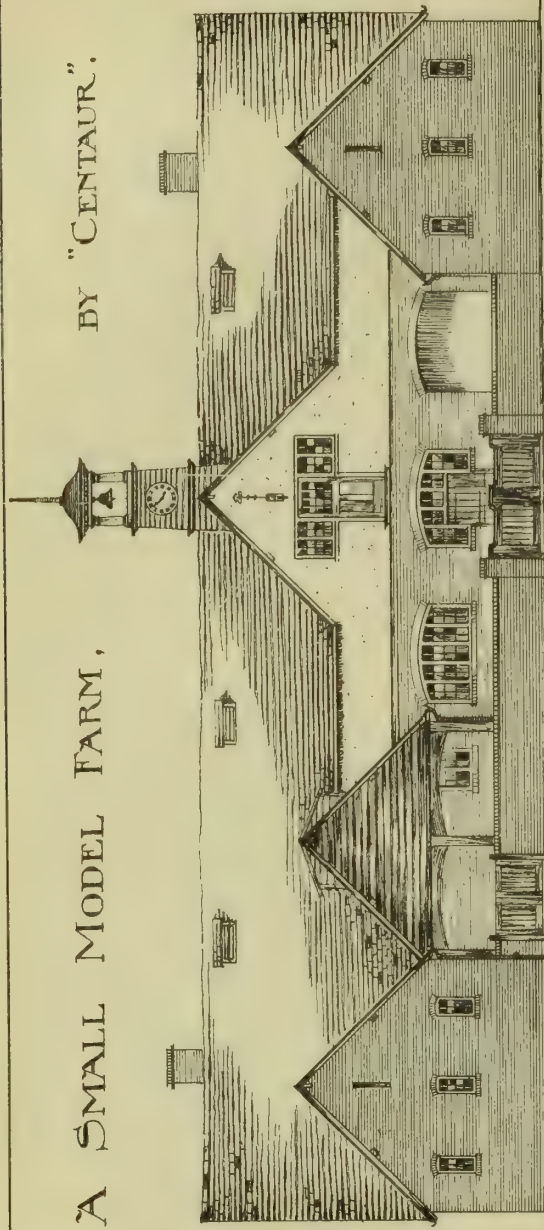
BUILDING NEWS  
DESIGNING CLUB.

PLACED FIRST



A SMALL MODEL FARM,

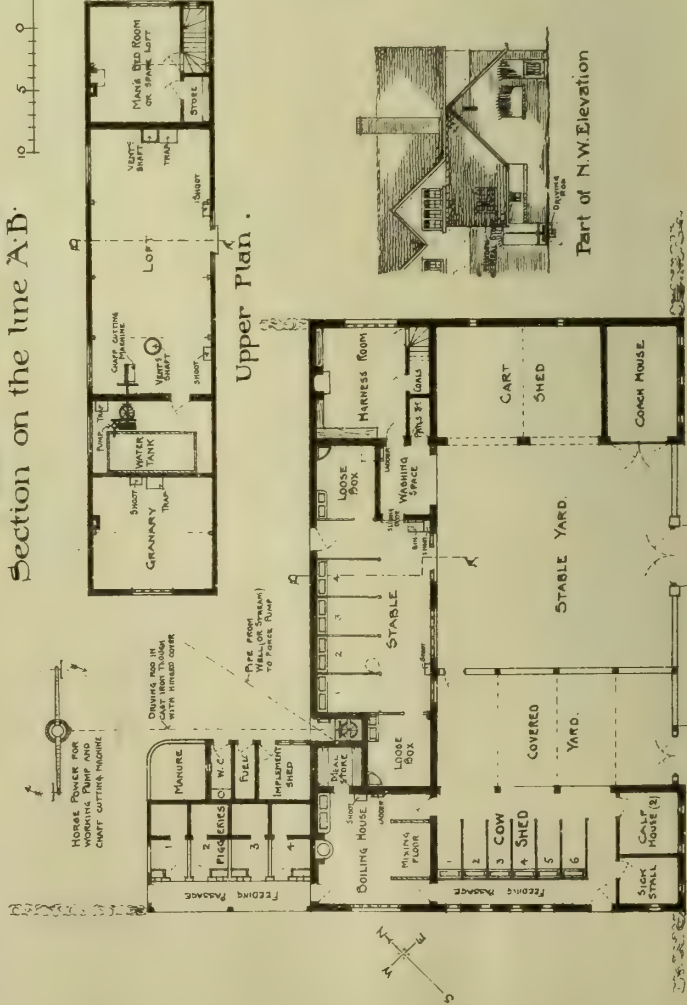
BY "CENTAUR".



S. E. Elevation.

0 10 20 30 40 Feet.

Section on the line A-B.



Ground Plan

0 10 20 30 40 Feet.

E. View.

July '93.

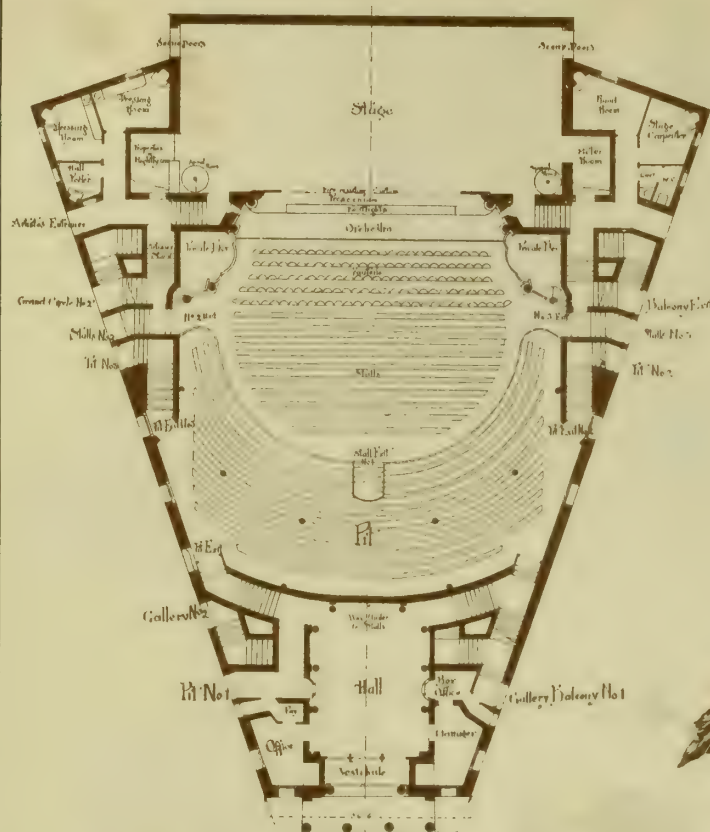






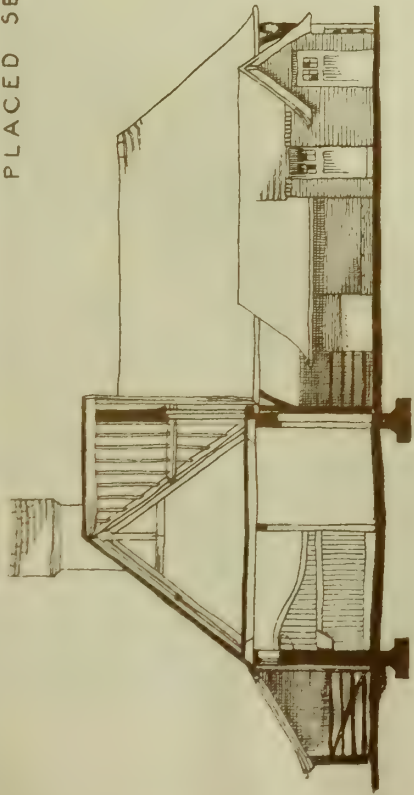
NEW PALACE THEATRE, BLACKBURN.

J T WIMPERIS & ARBER, ARCHITECTS

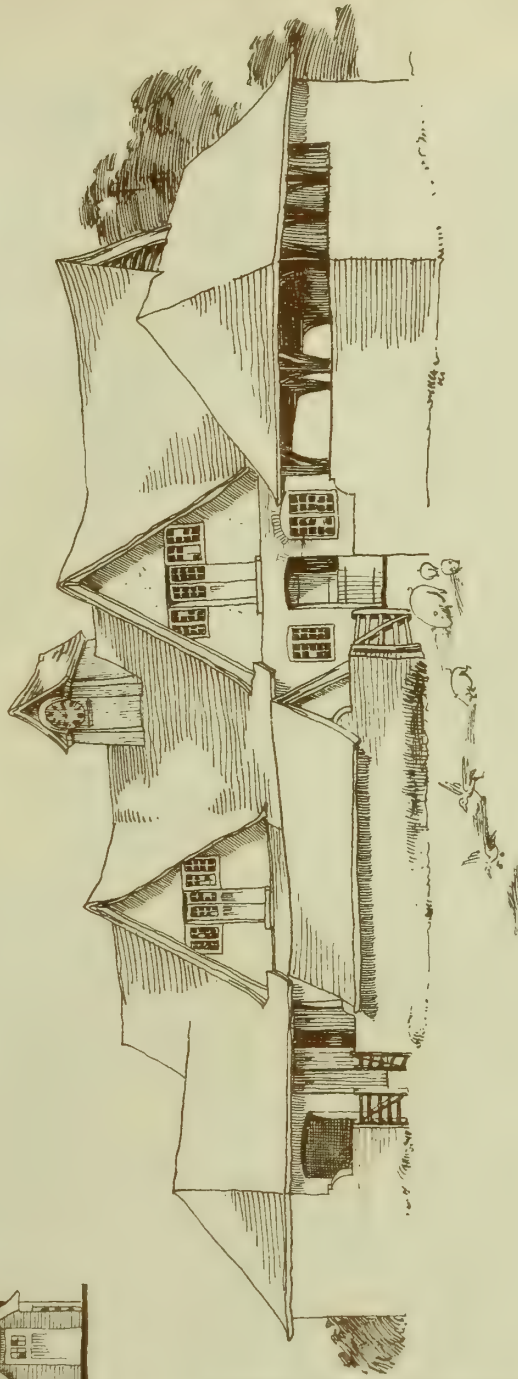
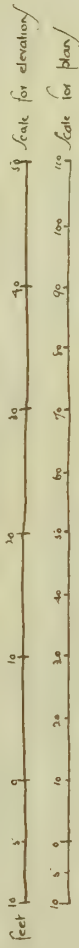




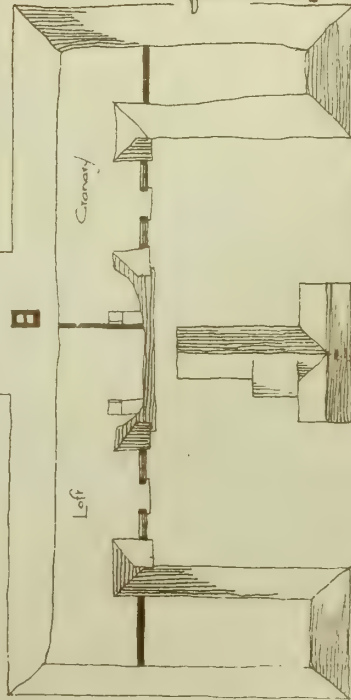
PLACED SECOND



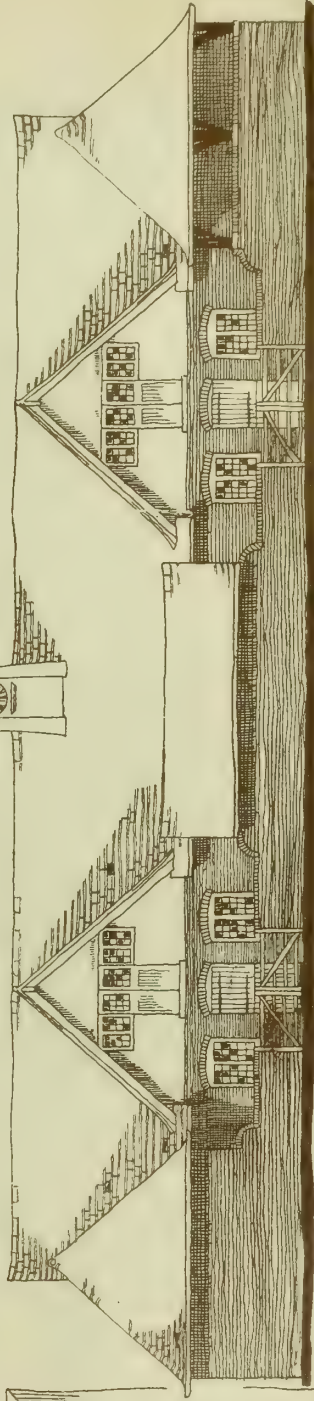
B.N.D.C. · A · SMALL · MODEL · FARM ·  
DESIGNED · BY · PANTILE.



Ground Plan

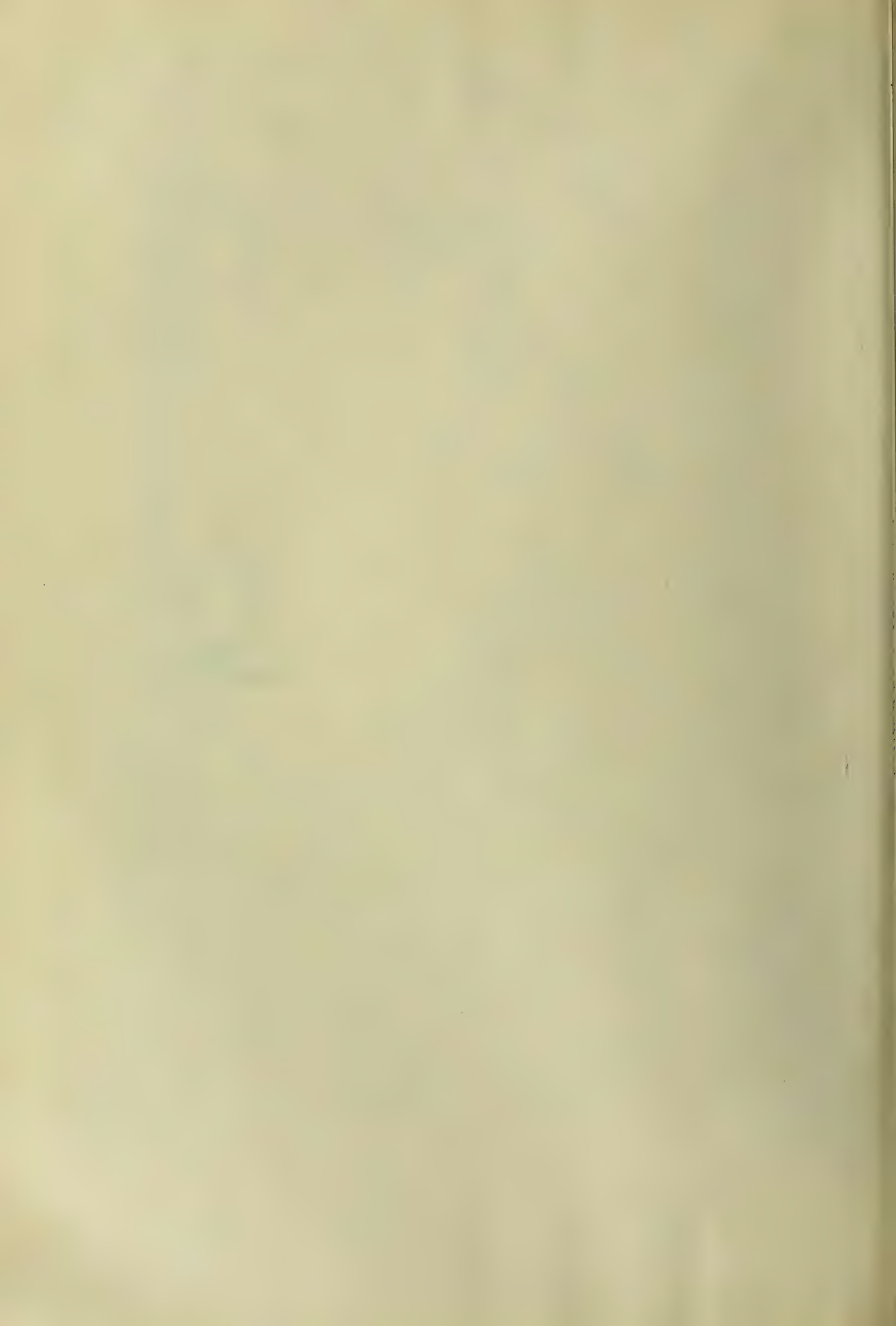


Loft Plan

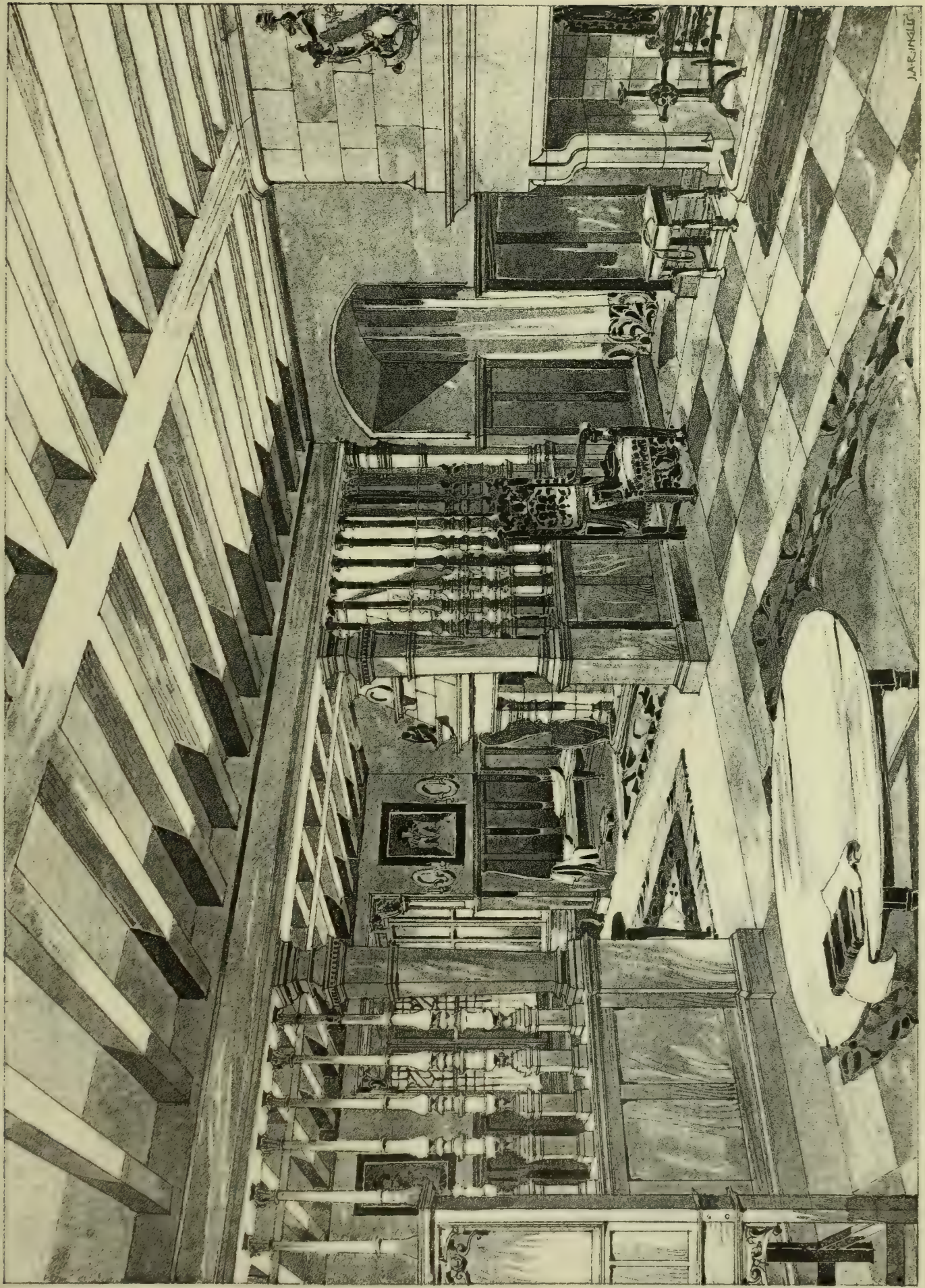


Main Elevation





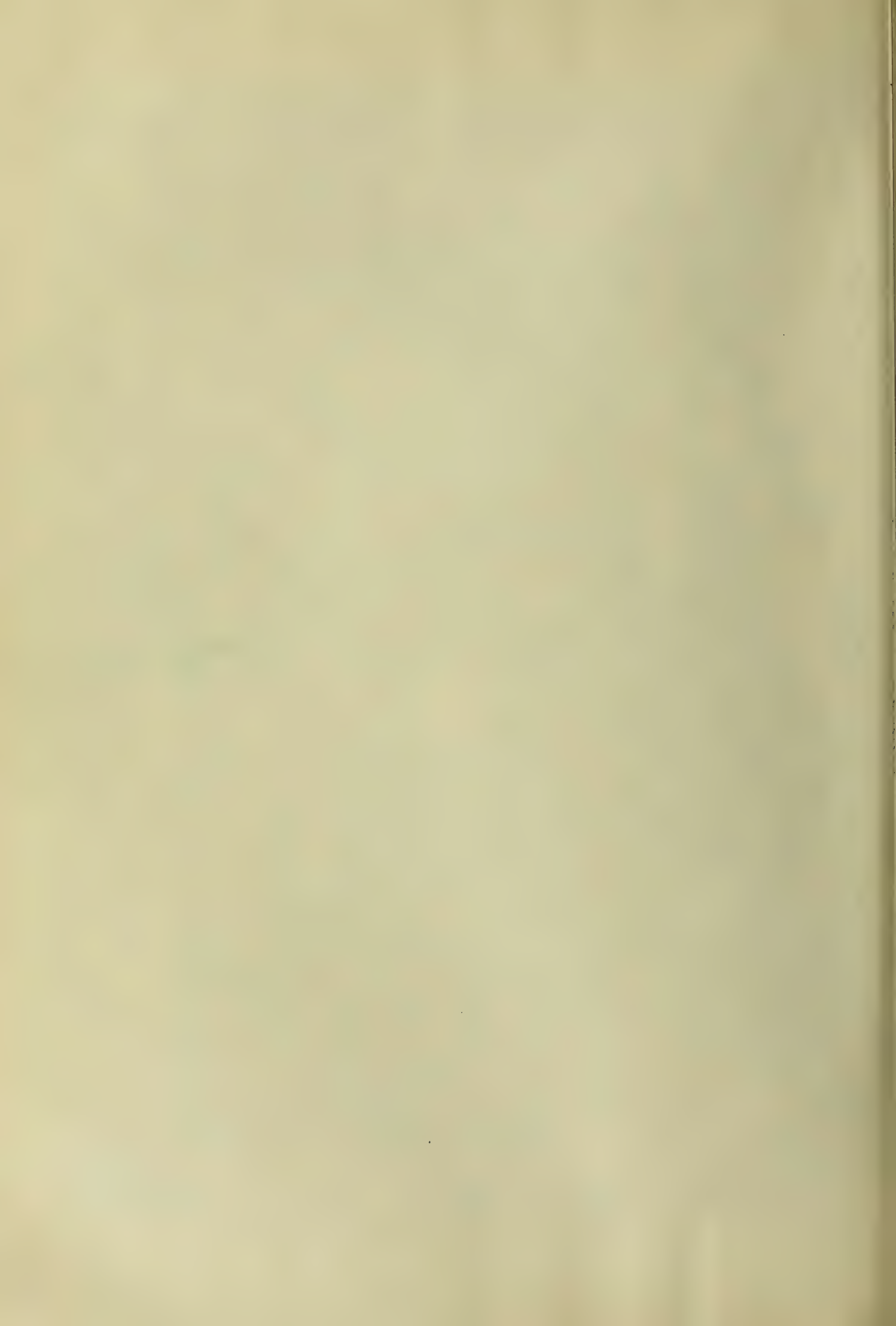




THE ROSS, HAMILTON. N.B. THE ENTRANCE HALL. ALEX. CULLEN, ARCHITECT.

PHOTO-TINT, by James A. McKim, Esq., New York, N.Y.

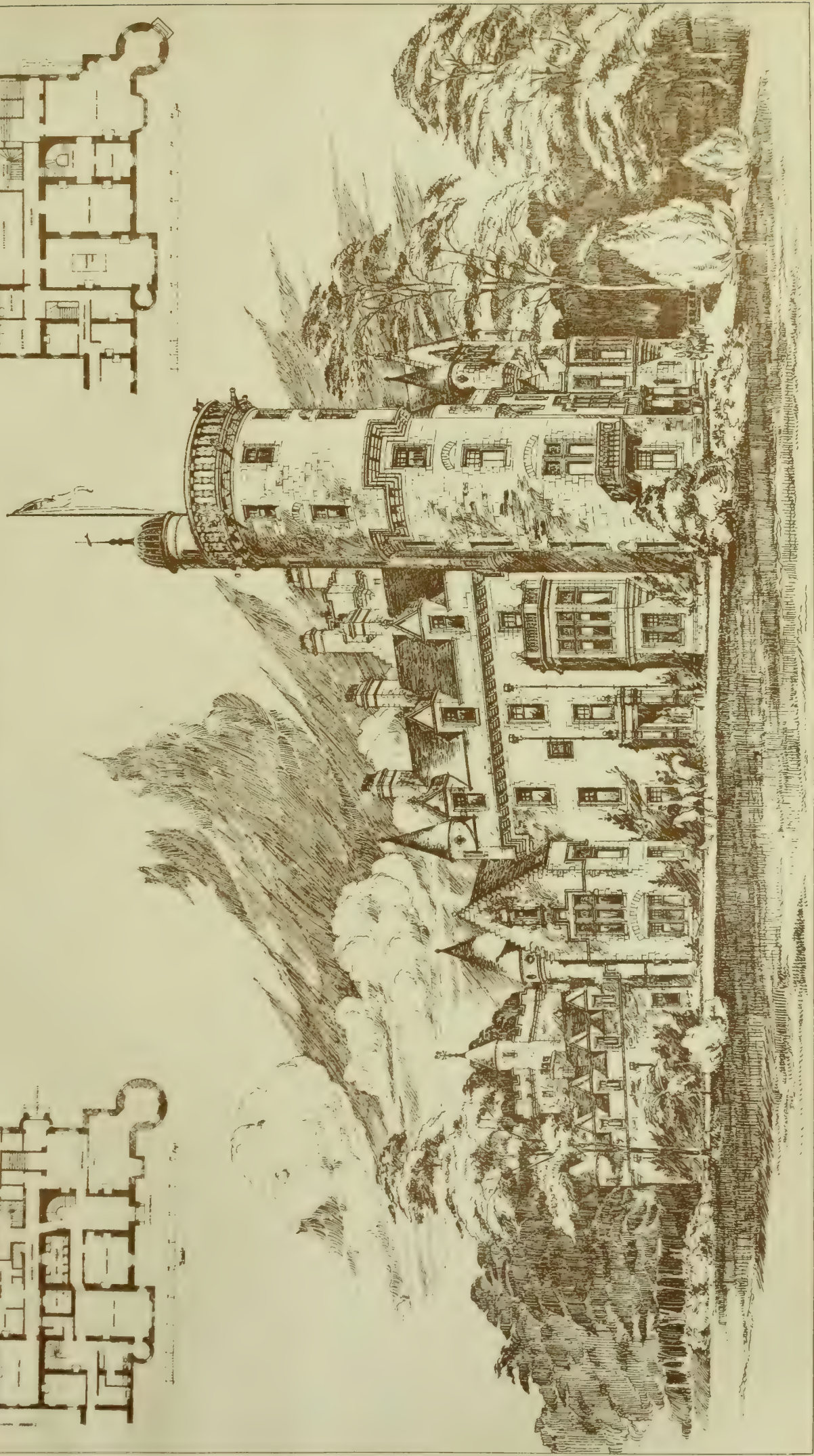








ROSS HOUSE: HAMILTON  
LOWE PRUITT: ALEXS CULLEN  
ARCHITECT

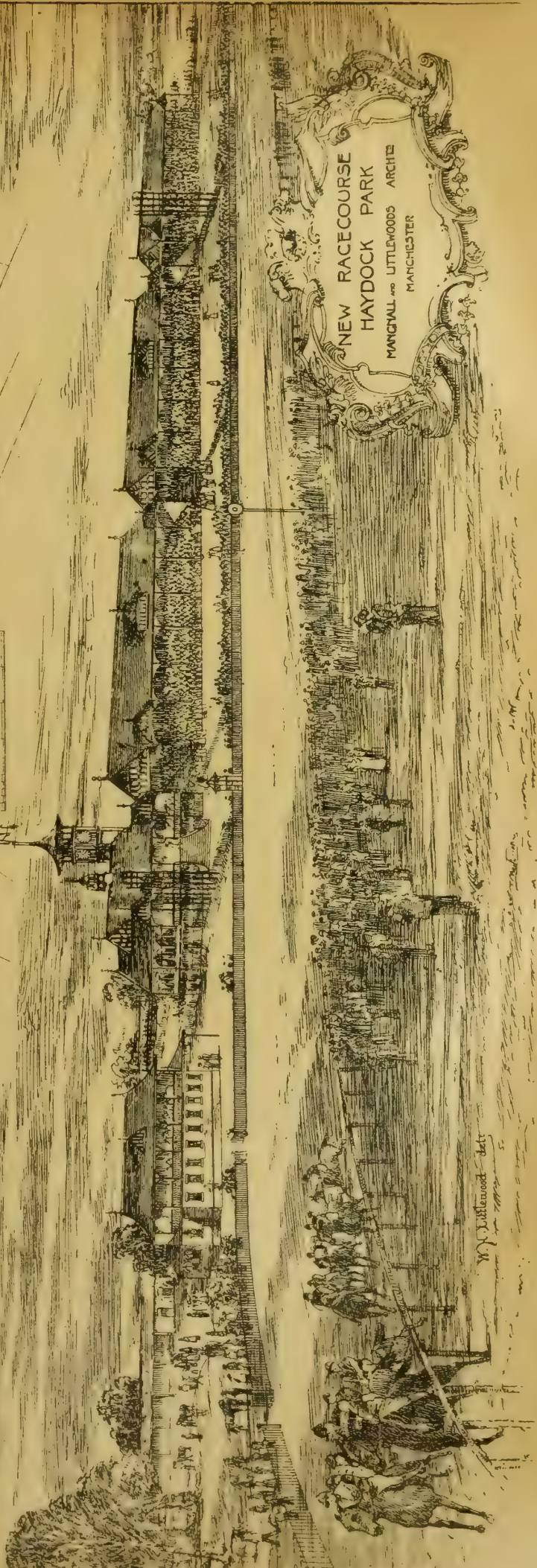








HAYDOCK PARK  
RACECOURSE



NEW RACECOURSE  
HAYDOCK PARK  
MARGALL AND LITTLEWOODS ARCHT  
MANCHESTER



### WATER SUPPLY AND SANITARY MATTERS.

**BEDALE.**—A special meeting of the committee appointed by the Bedale Rural District Council to consider two schemes of water supply prepared by Messrs. Fairbank and Son, of York and London, was held on Tuesday week. The A Scheme was to put down two dams and to raise the water from a point at Bedale Beck above the bridge to a reservoir to be built on the highest point of land above Askew, and then allow the water to descend to the town by gravitation. The two dams would raise 60,000gal. per day, and the scheme would cost under £3,000. The B Scheme would convey the whole of the water for domestic purposes from the harbour below Bedale, where there is a weir. It was calculated that 25,000gal. of spring water per day would be pumped to the reservoir. The total cost of the B Scheme is under £3,400. The committee unanimously agreed to recommend the B Scheme to the council.

**BRISTOL.**—The sanitary committee discussed in private on Friday the report of Messrs. Taylor, Sons, and Santo Crimp on the question of the disposal of the city sewage. The scheme for discharging the sewage at Avonmouth and Dunball were most favoured by the committee. The engineers estimated the cost of the undertaking at £379,000, the sum required for repayment of capital and interest being £15,497, and, with an extra cost of £2,000 for pumping, the annual expenditure would be about £18,000. There were some questions asked as to whether the scheme would interfere with dockisation, and on this point satisfactory assurances were given by the engineers. The scheme was then approved by the committee, and the report will be sent on to the council, together with a supplementary report, in which Mr. Santo Crimp gives the results of experiments made with floats from Avonmouth above the Dunball position, from which he is quite sure the scheme will not be detrimental to dock extension or dockisation.

**GLASGOW.**—The town council held an extraordinary meeting last week to consider a report on the disposal of sludge under the new sewerage scheme for the western districts. The sub-committee prescribe a recommendation, after visiting London, Manchester, and Salford, "That in the design of the new sewage works at Dalnair and Braehead it is imperative to continue the use of methods which experience has proved practicable on a large scale, and there seems no room for doubt that chemical precipitation alone is the means to adopt, and the most economical and satisfactory method of disposing of the sludge is to send it to sea." After a long discussion the report was adopted by 36 votes to 25, and arrangements will therefore be made for conveying the sewage out to sea.

**MAIDSTONE.**—A letter has been received at Maidstone from the Local Government Board stating that a loan to cover the expenses incurred by the town council in connection with the typhoid epidemic which devastated the borough last autumn can only be granted for three years. The council had applied for sanction to borrow £18,000, and to spread repayments over 20 years. The Local Government Board intimate that they are disposed to grant a loan of £15,000 only. This decision means an annual rate of 1s. in the pound in that borough for the three years.

**MOFFAT, N.B.**—For nearly three years the commissioners of Moffat have been discussing proposals and plans for the purification and disposal of the burgh sewage, which is at present being discharged in an unpurified state into the River Arran, serious objection to which has been taken by the district committee of the county council. After taking the advice of Mr. T. O. Niven, civil engineer, Glasgow, it was resolved to adopt the Dibdin method of purification, and negotiations were entered into some time ago with Mr. Hope Johnstone, of Annandale, for the acquisition of a suitable site on which to construct the proposed works. Mr. Hope Johnstone, however, declined to give the land required, and the commissioners, in the circumstances, have been forced to take advantage of the provisions of the Public Health (Scotland) Act, 1897. They gave notice on Friday that it is intended to make application to the Local Government Board for Scotland for a provisional order empowering them to put in force the provisions of the Land Clauses Act with respect to the acquisition of lands otherwise than by agreement, for the construction and maintenance of sewage works for the burgh. The quantity of land required for these purposes is three acres or thereby.

**SHEFFIELD WATER SUPPLY.**—The proposal of the Leicester and Nottingham Corporations to acquire the waters of the famous Darbyshire rivers, the Derwent and the Ashop, has created some alarm to the Sheffield Corporation, and the water committee of that body has recommended the council to take steps in defence of their own rights to the water. The scheme of the Midland towns is to construct four reservoirs at Ashopton, one of the most beautiful spots in Derbyshire, and a favourite resort of Sheffield people. Not only is the place

within ten miles of Sheffield, but some of the water to be acquired drains from hillsides which are in Yorkshire. A conference between the various local authorities interested in the subject is to be held, and, failing a satisfactory agreement, the Sheffield Corporation is advised to promote a Bill to secure a portion of the threatened supply.

**ST. ANDREWS, N.B.**—The police commissioners have considered the report of the engineers, Messrs. Belfrage and Carfrae, C.E., Edinburgh, on the existing and proposed additional water supply for the city. The estimate of the cost of the works recommended in connection with the proposed Kinaldy scheme, embracing (1) reservoir to hold 36,000,000 gallons, (2) 10in. pipe from the reservoir to the new filters, (3) filters and clear-water wells, (4) 10in. main pipe from the new clear-water well to the town, (5) distributing pipes, (6) fittings, valves, &c., is £15,000; cost of Langraw supplementary storage reservoir, £3,000—total £18,000. This estimate is exclusive of the value of land and way-leaves to be acquired.

### CHIPS.

At a meeting of the St. Helens Corporation, on Friday, it was reported that the Local Government Board had sanctioned the expenditure of £18,450 for works of street paving, &c., and of £5,000 for the construction of the subway in Church-street.

On Saturday a large five-light stained-glass window was unveiled in the Britain Hill Unitarian Church, Heywood. From the designs of the late Sir Edward Burne-Jones, the window has been executed by Messrs. Morris and Co., of Merton Abbey, Surrey. There are ten figures in the window, emblematical of Truth, Liberty, Faith, Love, Generosity, Humility, Justice, Mercy, Charity, and Fortitude.

The new burgh police-offices erected in Sturrock-street, Kilmarnock, were formally opened on Monday. The building, which is in the French Renaissance style, includes court-hall and the various offices, together with sixteen police-cells.

At the last Worcester meeting of the library and museum committee of the corporation, the chairman (Mr. F. Corbett) referred to the claim made by the contractors (Messrs. J. S. Wood and Son) for the erection of the Victoria Institute, in respect of the loss sustained by them in the erection of the building owing to the delay in the supply of terracotta. The city council had refused to entertain the question of compensation, being convinced that legally the contractors had no claim. He (the chairman) had conferred with the architects and contractors, with the result that the contractors agreed to accept, in settlement of their claim, £500, and he proposed that the city council be asked to authorise the architects to include this amount in their final certificate.

Part of the groining of the crypt of the chapel of St. Stephen at Westminster having recently shown signs of subsidence, the building has been shored up and is now being underpinned preparatory to carrying the walls on iron girders.

Vauxhall Bridge is at length disappearing, after an existence of a little over eighty years. Messrs. Pethick Brothers, of Plymouth, have contracted for its removal, and they have been engaged upon it now for about three weeks. The footways are all torn up, and already so much of the roadway has been removed as to show great gaps through to the river below.

The committee appointed by the Okehampton Guardians met on Saturday to consider the advisability of building a new workhouse or extending their present premises. After consideration, it was decided that the members of the committee should inspect on Tuesday next, Oct. 3, the newly-erected workhouse premises at Fordingbridge, Hampshire, which the Local Government Board describe as model buildings.

Mr. Sidney Cooper, R.A., gave a dinner on Monday night at Vernon Holmes, on the occasion of his ninety-fifth birthday. His health continues very fair, and he is still busily occupied in his studio.

It is stated that the plans of the London County Council for cutting a new thoroughfare between the Strand and Holborn, to be submitted to Parliament next session, have been so varied as to avoid destroying the church in Sardinia-street, which was erected by Inigo Jones. It was feared at first that this venerable building would have to be pulled down. It is the oldest Roman Catholic church in London.

The restoration of Greyfriars Church, Elgin, by the Marquis of Bute has now proceeded so far that services were held in it on Saturday. There is yet much to be done internally. The fittings, which are rich in carving, have been made in Edinburgh, while the glazing and ornamental windows are the work of Messrs. Lavers and Westlake, London. The opening of the Priory has been fixed for St. Francis Day, October 4.

The magistrates of Eastbourne granted, on Monday, a provisional license for a large Kursaal which it is proposed to build on the pier on the site of the present pavilion.

In furtherance of the Fleet-street improvement the City Court of Common Council agreed last week to purchase for £4,000 the leasehold of No. 82 in that thoroughfare.

Col. A. J. Hepper, D.S.O., R.E., Local Government Board Inspector, held an inquiry last week in the Council Chamber, Watford, into an application made by the Urban District Council to borrow £5,750 for works of sewerage and £1,750 for water supply. Mr. Waterhouse, engineer and surveyor to the council, explained the proposals.

The work of restoring the interior of the nave of Norwich Cathedral was commenced last week. The services are being held in the choir and transepts, which are temporarily separated from the nave by a substantial hoarding.

Colonel Luard, one of the Local Government Board Inspectors, held an inquiry at Tonbridge last week relative to the application of the urban district council for a loan of £5,000, for the purpose of erecting a technical institute and free library at the lower end of the High-street, at the junction with Barden-road and close to the railway station. Mr. Phillips, the architect of the new buildings, produced the plans and explained them to the inspector.

On Saturday, Col. W. Langton Coke, M.Inst.C.E., on behalf of the Local Government Board, held a public inquiry at Ashbourn into the scheme of the London and North-Western Railway Company for the erection of new dwellings for persons of the labouring class, to replace 13 houses demolished for the construction of the Ashbourn and Buxton Railway. The new houses will be built from plans by Mr. George Biddle, estate agent to the company.

The Bristol School Board adopted, on Monday, plans by Mr. H. Dare Bryan, of that city, for a school to be erected in Wells-road. The estimated cost at 6d. per foot cube is about £10,456, and it is proposed to build it of Pennant stone faced with brickwork. For schools at New Brislington, amended plans by Mr. W. Paul were adopted.

Messrs. E. H. Shorland and Brother, of Manchester, have just supplied their patent Manchester stoves to the West End Hospital, London, W.

According to an anonymous writer in the *City Press* a City architect paid a year ago £1,100 to a builder for the erection of a villa in a northern suburb. To-day the builder requires an additional £300 for the erection of a sister villa in the same thoroughfare.

At the meeting of the Luton Rural District Council on Monday it was reported by the surveyor that the water supply at Leagrave, near Luton, had totally failed, and boring operations had been commenced near to the bed of the Lea to secure water. The council decided to give a guarantee to the Luton Water Company to insure a return of 10 per cent. on the cost of the company laying water-mains to Stopsley.

The Rugby School Chapel, which has been enlarged as a memorial to the late Rev. P. Bowden Smith, will be reopened by the Archbishop of Canterbury to-morrow (Saturday) afternoon, when the monument in memory of Archbishop Benson and the window to Dean Goulburn's memory will also be unveiled.

Messrs. Douglas Young and Co., auctioneers, held on Friday a sale of the third portion of the Park Estate at Ilford, which belonged to the Liberator Group. The prices realised were largely in excess of those previously obtained. The sale of this estate, together with the Queen's Park Estate at Brighton, and that of Bembridge in the Isle of Wight, makes the total realisation of Liberator assets for the week over £40,500.

At Monday's meeting of the gas committee of the Birmingham Corporation, the progress of various new works now in course of construction at Saltley was reported upon. The tank is now ready for the reception of the new four-lift gasholder at Neshells. This will hold eight million cubic feet of gas. A smaller gasholder has had its capacity doubled by telescoping, and will now hold four million feet. A new retort-house is to be built, and improvements in the sewerage works and the bed of the River Rea have also been undertaken by the gas committee. The total expenditure on these works is estimated at £366,000.

David Cooke, a builder, was summoned at Leighton Buzzard, on Tuesday, for obstruction on the highway by digging a trench to make connections for the drainage of his building. It was pleaded that there was ample room for vehicles to pass, and the vehicles did pass. Lady Macnamara, lady-in-waiting to Princess Louise, and the wife of the chairman of the Bench, made the complaint. The surveyor said that no notice would have been taken of the matter but for her ladyship. The chairman admitted his peculiar position, and, under the circumstances, dismissed the case.



## Our Office Table.

THROUGH the generosity of Colonel F. R. Waldo Sibthorp, the South Kensington Museum has recently become possessed of a large collection of silversmiths' work, chiefly German, ranging in date from the 16th century to the present time. These specimens are very varied in form, and include tankards, flagons, beakers, and salvers, decorated in repoussé and by engraving with flowers, scrollwork, and figure subjects. There is also a considerable collection of spoons. Among the pieces of historical interest is a standing cup and cover surmounted by a bust of Gustavus Adolphus, King of Sweden, and with an inscription in his honour. There are a number of specimens of the work of English silversmiths, the most important being two communion cups of Queen Elizabeth's reign, one of which retains its paten-cover. The series of English spoons covers a considerable period of time; they are interesting on account of the hall-marks, the decoration of the handles, and the shapes of the bowls. The handles of some terminate in figures of Apostles, others are seal-topped, whilst others are of the plain, "sleppe endyd" form. A set of tea-spoons in the form of shells with dolphin handles formerly belonged to Lord Nelson. Colonel Sibthorp has included in his gift a small collection of snuff-boxes of the last century, two of which are specially deserving of notice. The first is of tinted gold set with diamonds and other jewels; the second is of enamel, and has inside the lid a portrait of Peter the Great, painted by Crodowiezky.

The autumn exhibition at the Nottingham Art Gallery was opened at the Castle in that city on Saturday. The feature of the display this year is the Cavan-Irving collection of paintings of the Dutch, Flemish, and Early English schools hung in Gallery C. Among the modern English works arranged by Mr. Wallis, the art director, in Gallery D are portraits by W. W. Ouless, A. S. Cope, J. Charlton, and Walter Urwick; genre works by Stanhope Forbes, Haynes Williams, Herbert Draper, E. Blair Leighton, and T. B. Pennington; landscapes by Niels Lunds and Tom Mostyn, and the late Edwin Ellis.

The twentieth annual Ecclesiastical Art Exhibition held in conjunction with the Church Congress was opened by the Mayor of Bradford on Monday morning. The display is arranged in two sections, the trade and loan collections. Among the exhibits in the second category are Brontë family relics, lent by Mr. Horsfall Turner. The Rev. E. W. Brereton contributes a chalice and paten, set with precious stones, and from the Rev. R. G. Irving comes a silver chalice, 187 years old. The vicar and churchwardens have lent the Bierley communion plate, and a display of old needlework comes from the Horbury School of Embroidery, Wakefield. Mr. Churchwarden Farris has some loans connected with St. Ethelburga Parish, Bishopsgate-street, E.C., including a silver flagon, of date 1694; a paten, a silver chalice, 1560; and the beadle's staff, with date 1787. Mr. William Scruton sends a collection of old views of Bradford and Yorkshire generally, besides a large number of portraits of Bradford worthies and old mansions in and around the city. Mr. J. Eyre Poppleton sends a number of casts from pre-Reformation bells in Yorkshire church towers; and Mr. Samuel Margerison, of Calverley Lodge, near Leeds, shows about 150 photographs, each one illustrating some noteworthy feature of an old parish church, including a photograph of a bell gable from Howell, Lincs; a doorway from Brixworth, Northants; a poor's box from Wellingore, Lincs; a font from Helpringham, Lincs; a font and cover from Calverley; a pulpit from Hannington, Northants; and a lectern from Blythburgh, Suffolk. The Mayor and Corporation of Bradford have placed on view the corporation plate, consisting of the mace (which is silver-gilt, and measures 4ft. 3in. long), the mayor's chain, the Armada jug (the form and ornament of which belongs to the 16th century, the legend concerning it being that the original jug was washed ashore in the Hebrides from a wreck of one of the vessels of the "Great Armada"), loving-cups, desert and flower stands, epergne, &c.

The first theatre in London to adopt electrical power to assist in the construction of elaborate scenes in the manner advocated by Mr. Edwin O. Sachs is the Theatre Royal, Drury Lane. Mr.

Sachs who holds the commission, has, to begin with, been intrusted with the arrangement for moving some large sections of the stage floor—each measuring 40ft. by 7ft.—to any level above or below the footlights, every movement to be easily controllable from an ordinary switchboard. This improvement will already be completed for the impending pantomime. The contractors are the Thames Ironworks Co., whose civil engineering and electrical department are excelling themselves in the rapidity of execution under the most difficult circumstances, as will be seen from the fact that the whole of the heavy constructional work had to be carried out whilst such an elaborate play as "The Great Ruby" was in rehearsal, the rehearsal being done on temporary stage flooring, and shifts of men working turn by turn day and night. As regards the system of construction adopted, those of the suspended electrical lift have been applied, but in such a manner that the appliance will be a great improvement on what has so far been done on the Continent. The material is steel throughout, except for the stage floor proper.

An investigation at Bow-street Police-court, on Friday, into a charge of fraud in conducting investigations into a family pedigree, suggests the lengths to which self-styled genealogists will go in order to procure money from those desirous of tracing a family tree. In the case now before the Court it is alleged that the defendant forged various entries in the old parish registers of Mangotsfield, fabricated a seal which he pretended to be the old seal of the Shipway family, cut inscriptions on beams, coffin-lids, &c., in Mangotsfield church, and forged three wills of members of the Shipway family, which he pretended to have found in the Gloucester diocesan registry.

A REPORT has just been officially published by Mr. Higham, based on a note by Mr. A. R. Becher, on the financial results of irrigation in the whole of India in the year 1896-97. It shows a net profit to the Government of no less than 6·15 per cent. on all major irrigation works, and of 9·05 per cent. on all minor irrigation works. Fourteen large irrigation systems have paid off the entire accumulated interest on their capital outlay, and seven more are expected to do the same within the next four years. The extent of these profitable operations may be judged by the fact that in the year under review seventeen million acres in all were irrigated. The value of crops raised on this area is estimated as forty-six crores of rupees. These figures include concerns which are unprofitable as well as those which are profitable. They also include projects not yet in full operation.

An artistically-printed catalogue of 72 pages has just been published of the works exhibited by the Northern Art Workers and Guild at the City Art Gallery, Manchester. The Guild was inaugurated by Mr. Walter Greene in July, 1896, with the view of treating artists and workers of every kind in one organisation. The catalogue is in appearance and artistic typography much like the work turned out in the late William Morris's time by the Kelmscott Press, and has been arranged by Mr. H. C. Chorlton, who also designed the well-filled green, scarlet, and buff cover. A preface is written by the master of the guild, Mr. William Burton, and Mr. Walter Crane contributes some "Notes on Needlework in the Present Century." Short chapters are included by various members of the guild, including one on "Architecture," by Mr. F. Foster; "The Relationship Between the Pictorial and the Decorative Arts," by Mr. Reginald Barber; "Painters' Processes," by Mr. Walter J. Pearce; and "Repoussé Work," by Mr. James Smithers.

The fact that a river-water supply is more liable, than one collected from moorlands or springs, to contain and cultivate the germs of typhoid fever, is brought out by some statistics relating to the death-rate from typhoid per 100,000 of population in American cities tabulated by Dr. A. N. Bell. Taking the records of the last seven years, Dr. Bell finds that the death-rate in five United States cities using river-water averages 58 per hundred-thousand, the highest rate being 84 at Pittsburgh, and the lowest 39 at St. Louis. In five cities using lake-water the average is 42, the highest being 71 at Chicago, and the lowest 29 at Milwaukee. In four European cities, however, where the water supply is filtered, the average death-rate is only 9·1, the highest being 14·4 at London, and the lowest

being 5·7 at Rotterdam. Lawrence, which filters the water of the Merrimack River after it has received the sewage of Lowell, 55 miles higher up the river, has reduced the typhoid death-rate from 123 in 1890 to 16 in 1896.

For some little time past the Greek Archaeological Society has been excavating in the neighbourhood of Theron, the place of assembly for the ancient Ætoliens. Professor Sotiariades, the scholar who is in charge of the operations, states that the Temple of Apollo, which has recently been discovered, dates apparently from the 7th century B.C. It is built on a cemetery, where may still be seen the bones and ashes of the dead, preserved in large vases of earthenware. Five iron and copper swords and two buckles were also found in the large field which contains the cemetery and temple. The foundations of the temple indicate, the professor says, that it pointed due north and south, like the ancient temples of the Etruscans in Italy. The sacred inclosure was divided into two galleries by six wooden columns, of which the bases are still preserved. The temple was 38 metres in length and 12 metres in breadth. Of the 20 marble columns which went round it, the bases and various parts are preserved. Several heads, beautifully modelled in clay, and coloured, stood on the cornice of the temple. Inscriptions, some giving the decrees of the Ætolian assembly, have also been found, and are of exceptional interest.

HORNETS have not only stopped work on a new church-spire for the Wall-street Methodist Church in Louisville, Ky., but are likely to cause a lawsuit between the members of the church and the contractor, George Lynch. Lynch contracted to build the spire, but in tearing down the old one a nest of hornets was found. The little insects routed the workmen, several of whom had narrow escapes from death by falling to the ground when stung. Sulphur and fire were tried, but after the steeple had been set on fire once and the flames barely extinguished, this plan was abandoned. Lynch wants to finish the work, but says he cannot tackle the hornets. The church people are getting very impatient, and threaten to sue him.

The twenty-sixth course of lectures and demonstrations for sanitary officers arranged by the Sanitary Institute will be given this autumn on Mondays, Wednesdays, and Fridays at 8 p.m. The introductory lecture will be delivered by Sir Douglas Galton on Monday evening, October 17, and among the subsequent lectures are "Sanitary Laws and Regulations Governing the Metropolis," by Dr. Louis Parkes, on October 19; "Sanitary Law: English, Scotch, and Irish," by Mr. Herbert Manley, of West Bromwich, on the 21st; "Trade Nuisances," by Professor A. Bostock Hill, of Birmingham, October 26; "Objects and Methods of Inspection," by Dr. J. F. J. Sykes, the Medical Officer of Health, St. Pancras, October 28; and "Water Supply, Drinking Water, Pollution of Water," by Professor W. H. Corfield, October 31. On Nov. 11 a lecture on "Sanitary Building Construction" will be given by Professor Roger Smith, F.R.I.B.A., and other lectures are announced for November.

The unprofitable nature of Government investment in house property in India is well illustrated in an official report just published. It reviews the results of 1896-97, and shows that in this year, which is the last for which statistics are available, the net return on the capital cost of all Government buildings for which rent is charged in India was a little over 1½ per cent. In Bengal, indeed, where the value of rental Government buildings exceeds that of any other province except Bombay, the net return was only 1 per cent., while in Coorg and Assam actual deficits occurred.

The Santo Domingo mahogany, which also grows in almost equal excellence in some provinces of Cuba, is, says the *American Architect*, when carefully selected, the most beautiful of the cabinet woods, and good logs of large size, which can rarely be had nowadays, bring large sums of money in the market. As the tree, like all hardwoods, is of slow growth, and as the West India Islands have been supplying the wood for two or three centuries, it is not possible to procure Spanish mahogany in the large sizes which architects require for their work, and as the wood is peculiarly hard and dense, and so cannot be steamed and cut into veneers as other cabinet woods are now cut—by revolving against a powerful cutting blade—architects have had to



fall back on the coarser and less variegated woods of the American continent itself. But there is still a goodly supply in the islands, and lumbermen are actually planning to exploit—and exhaust—it under the new conditions made possible by recent events, and there is likely to be made so heavy an onslaught by American capitalists that, instead of the present meagre supply of the wood, the market is likely soon to be in possession of a superabundance, and the price, in place of ranging in the neighbourhood of eighteen cents per foot, as it has of recent years, will fall into the same price line as maple.

In cold weather, not unfrequently there is necessity, says Mr. E. P. Dunnington, of Virginia University, for leaving the trap of a closet unused in a location where it cannot be warmed, when, if the water standing in it is frozen, the trap might be destroyed, or, if the water be removed, sewer-gas would escape. This difficulty may be overcome, says Mr. Dunnington, by putting into the trap about a pound of common salt. This salt will saturate three pints of water, which is approximately the volume required to fill a closet trap, and this solution will not be frozen at any temperature above zero. Repeated stirring will be required to get the salt dissolved. In hot weather, in an unoccupied house there is danger of water evaporating from a closet trap, so as to "break the seal" and allow the escape of sewer-gas. This result may be prevented by putting into the trap about a half-pound of dried commercial calcium chloride. This salt has so great an affinity for water that it will hold on to it even through the greatest heat of the summer, and it is not corrosive or poisonous. In some degree calcium chloride acts like common salt in preventing freezing, but for this purpose common salt is most efficient.

The largest marine structure that ever entered the bay of San Francisco arrived in that port on August 1. It consisted of an immense raft of piles, 10,000 in number, which had been chained together at Stella, State of Washington, a point about 70 miles from the mouth of the Columbia river. The dimensions were: total length 600ft., breadth 50ft., with a depth of 45ft. The 10,000 piles, which varied in length from 30ft. to 90ft., were from 12in. to 18in. in diameter at the butt. The raft drew 30ft. of water, and it contained upwards of 5,000,000 lineal feet of timber. The distance from starting-point to destination is about 700 miles, and 5½ days' towing was employed in bringing it to port. To transport the same number of piles by steamers would have employed twenty, at least, of the ordinary size. The journey from the shipping-point was made without accident, owing to the unusually favourable weather. In the construction of the raft a cradle was first built of the length of the proposed raft, with side timbers 20ft. in height, separated from each other by blocks. The interior of this cradle was of the shape of the raft, largest in the centre and tapering to a point at both ends. By means of an engine and tackle the piles were hoisted over the sides of the cradle and landed in their proper places by hand. When the raft was built up to one-half the proper height, a chain cable, 2in. in diameter, was stretched from end to end, and at every 10ft. a chain was made fast to the central cable and extended to the outside, where two ends were fastened to the cable which surrounded the raft. Sixty tons of chain, in lengths of 50ft. to 150ft. and 1½in. in diameter, were used. The outside was surrounded by these cables at intervals of 10ft.

In our note on p. 390 on the new high altar of the Church of the Sacred Heart at Minehead, it was incorrectly stated that the material used was Seaton Stone. The stone used was Beer stone, from the famous Beer stone quarries, near Seaton, a material which deservedly enjoys the highest reputation. The altar referred to was executed by Mr. A. B. Wall, of Cheltenham, and was designed by the Very Rev. Canon Scoles, of Yeovil. Mr. Wall has also recently erected a high altar in Beer stone in the church of St. Teresa, Birkdale, Southport; and a high altar, Lady altar, and St. Joseph's altar in the Convent Chapel, Layton Hill, Blackpool; and in each case the choice of the stone has given the completest satisfaction to all concerned.

The preliminary announcement of the N.A.P. Window Co., Ltd., will be found on another page, and the prospectus will be before the public next week. The capital will, we understand, be £200,000, and the directorate a very

strong one. Architects and builders are sufficiently acquainted with the merits of the N.A.P. window to make any remarks from us at this juncture superfluous; but we understand that the further capital is required to carry out a large number of orders already in hand, and to cope with the increased business which the directors anticipate will result from the prominence given to the Window by this issue. Seventeen British patents are included in the purchase, three in connection with sliding, and four in connection with casement windows; also the rights in the foreign and colonial patents, from which the company expect presently to make a substantial profit.

#### MEETINGS FOR THE ENSUING WEEK.

MONDAY.—Liverpool Architectural Society. Opening Address by the President, W. E. Willink, M.A., A.R.I.B.A., New Law Library, Castle-street. 6 p.m.

WEDNESDAY.—Edinburgh Architectural Society. "Vaulting," by A. R. Scott. 8 p.m.

FRIDAY.—Architectural Association. Address by President, G. H. Fellowes Prynne, F.R.I.B.A., and Distribution of Prizes. 7.30 p.m.

#### THE ARCHITECTURAL ASSOCIATION.

ON THURSDAY, 1st, ANNUAL GENERAL MEETING at No. 9, Grafton-street, W. 7.30 p.m. Distribution of Prizes. Address by the President, Mr. G. H. FELLOWES PRYNNE. Exhibition of Prize Drawings and Students' Work.

Classes commence OCTOBER 10th, 6.30 p.m. Studio opens OCTOBER 11th, 6.30 p.m.

Pamphlet, containing full particulars and nomination forms for membership, may be obtained on application to the Hon. Secs., at 56, Great Marlborough-street, W.

E. HOWLEY SIM

G. B. CARVILL } Hon. Secs.

#### CHIPS.

The parish church of All Saints, Ryther, has been restored at a cost of about £1,500, and on Thursday afternoon in last week the edifice was formally reopened by the Archbishop of York.

The death occurred a few days ago of Mr. William Swale, the late superintendent of streets under the City of London Corporation. The deceased was appointed to the position in 1867, and retired about six years ago at a generous pension of £500 a year.

Newcastle-on-Tyne Cathedral was reopened on Sunday after the renovation of the interior and the installation of the electric light.

The American Institute of Architects will hold its thirty-second annual convention in Washington, D.C., Nov. 1, 2, and 3, with headquarters at the Arlington.

The Speaker of the House of Commons will unveil, on Tuesday next, the memorial to the late Mr. J. R. Creighton at Carlisle.

The tender of Mr. William Fyles, builder, of Ormskirk, for the erection of a new drillhall and recreation-rooms for the Ormskirk companies of the 3rd V.B.K.L.R., has been accepted, and the work will be commenced very shortly. The site has been given by Regimental Sergeant-Major J. Eastham, of the Lancashire Hussars; and the building is estimated to cost about £2,000. The architect is Mr. H. Rimmer, of Ormskirk.

With the exception of a short section near the new stone viaduct west of St. Austell—now rapidly approaching completion—the line of the Great Western Railway Company through Cornwall is now doubled all the way from Liskeard to Probus junction, a distance of nearly 30 miles. Some very heavy works are in hand between Camborne and Hayle, in building new viaducts, doubling the line, &c.

At a special meeting of the Dawsbury Town Council on Friday, a letter was read from Mrs. and Miss Fletcher, offering £8,000 towards establishing six homes for the deserving poor. The council undertook the trust. On the same day the chairman of the Dawsbury Technical School also received a letter from Mrs. and Miss Fletcher offering £2,000 towards that institution.

The contract for the new premises of the London and Midland Bank, situate in North-street, Leeds, has been let to Messrs. Craven and Umpleby. The work is being carried out from the plans and under the supervision of Mr. William Bakewell, F.R.I.B.A.

A new altar has just been placed in the new Lady chapel of St. Joseph's Church, Birkdale, the design of Messrs. Pugin and Pugin, of London. The main body of the altar is of Beer stone, relieved by marble columns in serpentine, while the centre-piece is a representation of the Virgin and Child, in oils, by a Roman artist. Below the altar is a representation of the Annunciation of the Blessed Virgin. Both the Lady chapel and the altar are memorial gifts from the congregation. The total cost has been £1,500. The solemn opening of the altar took place on Sunday.

## LATEST PRICES.

### IRON, &c.

	Per ton.	Per ton.
Rolled-Iron Joists, Belgian.....	£8 0 0	to £8 10 0
Rolled-Steel Joists, English.....	6 10 0	" 7 0 0
Wrought-Iron Girder Plates.....	5 15 0	" 6 10 0
Bar Iron, good Staffs.....	7 0 0	" 8 0 0
Do., Lowmoor, Flat, Round, or Square.....	17 0 0	" 17 5 0
Do., Welsh.....	5 15 0	" 5 17 0
Boiler Plates, Iron—		
South Staffs.....	7 17 6	" 8 5 0
Best Suedshill.....	10 0 0	" 10 10 0
Angles 10s., Tees 20s. per ton extra.		
Builders' Hoop Iron, for bonding, &c., £8 15s.		
Builders' Hoop Iron, galvanised, £15 10s. 0d. per ton.		
Galvanised Corrugated Sheet Iron—		

8ft. gauge	8ft. long, inclusive	No. 18 to 20. No.	Per ton.	Per ton.
Best ditto.....	£10 15 0	11 5 6	£11 0 0	11 10 0

	Per ton.	Per ton.
Cast-Iron Columns.....	£6 0 0	to £8 10 0
Cast-Iron Stanchions.....	6 0 0	" 8 10 0
Rolled-Iron Fencing Wire.....	7 0 0	" 8 0 0
Rolled-Steel Fencing Wire.....	7 0 0	" 7 10 0
Galvanised.....	10 10 0	" 11 10 0
Cast-Iron Sash Weights.....	4 0 0	" 4 2 6
Cut Clasp Nails, 3in. to 6in.....	8 15 0	" 9 15 0
Cut Floor Brads.....	8 10 0	" 9 10 0
Wire Nails (Points de Paris)—		
0 to 7 8 9 10 11 12 13 14 15 B.W.G.		
8/6 9/0 9/6 10/3 11/0 12/0 13/0 14/9 16/9		per cwt.
Cast-Iron Socket Pipes—		
3in. diameter.....	£5 10 0	to £5 15 0
4in. to 6in.....	5 5 0	" 5 10 0
7in. to 24in. (all sizes).....	4 15 0	" 5 0 0
[Coated with composition, 2s. 6d. per ton extra; turned and bored joints, 6s. per ton extra.]		

	Per ton.	Per ton.
Pig Iron—		
Cold Blast, Lilleshall.....	105s. to 110s.	
Hot Blast, ditto.....	57s. 6d. to 62s. 6d.	
Wrought-Iron Tubes—Discount off Standard Lists f.o.b.		
Gas-Tubes.....	75p.c. Fittings 77p.c.	
Water-Tubes.....	70 " 72s	
Steam-Tubes.....	62s " 65s	
Galvanised Gas-Tubes.....	60 " 62s	
Galvanised Water-Tubes.....	55 " 57s	
Galvanised Steam-Tubes.....	45 " 47s	

	10cwt. casks.	5cwt. casks.
Sheet Zinc, for roofing and work- ing up.....	£23 0 0	to £24 0 0
Sheet Lead, 3lb. per sq. ft. super.....	15 0 0	" 16 0 0
Pig Lead, in 1cwt. pigs.....	14 0 0	" 15 0 0
Lead Shot, in 25lb. bags.....	17 10 0	" 18 0 0
Copper Sheets, sheathing and rods.....	64 15 0	" 65 15 0
Copper, British Cake and Ingots.....	74 10 0	" 74 10 0
Tin, Straits.....	73 10 0	" 73 10 0
Do., English Ingots.....	76 0 0	" 77 0 0
Spelter, Silesian.....	21 17 6	" 22 2 6

### TIMBER.

	per load	£13 0 0	to £15 10 0
Teak, Burmah.....	10 10 0	" 14 10 0	
" Bangkok.....	4 5 0	" 6 5 0	
Quebec Pine, yellow.....	4 0 0	" 6 0 0	
" Oak.....	4 0 0	" 5 15 0	
" Birch.....	5 0 0	" 6 0 0	
" Elm.....	4 5 0	" 5 10 6	
" Ash.....	2 0 0	" 4 0 0	
Danish and Memel Oak.....	2 10 0	" 4 10 0	
" Fir.....	4 15 0	" 6 5 0	
Waincot, Riga p. log.....	4 10 0	" 5 10 0	
Leh, Danzig, p. log.....	5 0 0	" 6 10 0	
St. Petersburg.....	8 0 0	" 8 10 0	
Greenheart.....	4 5 0	" 15 0 0	
Box.....	0 1 8	" 0 1 10	
Sequoia, U.S.A. ....per cube foot			
Mahogany, Cuba, per super foot			

lin. thick.....	0 0 5	" 0 0 6
" Honduras.....	0 0 4	" 0 0 6
" Mexican.....	0 0 4	" 0 0 5
Cedar, Cuba.....	0 0 4	" 0 0 4
" Honduras.....	0 0 3	" 0 0 4
Satinwood.....	0 0 5	" 0 1 0
Walnut, Italian.....	0 0 8	" 0 0 7
Deals, per St. Petersburg Standard, 120—12ft. by 1½in.		

by lin. :-		
Quebec, Pine, 1st.....	£18 0 0	to £24 10 0
" 2nd.....	13 0 0	" 16 10 0
" 3rd.....	6 0 0	" 9 10 0
Canada Spruce, 1st.....	8 10 0	" 10 10 0
" 2nd and 3rd.....	7 10 0	" 8 10 0

New Brunswick.....	7 0 0	" 8 0 0
Riga.....	8 0 0	" 9 0 0
St. Petersburg.....	9 10 0	" 14 0 0
Swedish.....	9 10 0	" 16 10 0
Finland.....	9 10 0	" 10 0 0
White Sea.....	10 10 0	" 17 15 0
Battens, all sorts.....	5 0 0	" 16 0 0
Flooring Boards, per square of lin. :-		
1st prepared.....	£0 9 6	" £0 16 0
2nd ditto.....	0 8 0	" 0 13 0
Other qualities.....	0 6 3	" 0 7 0

Staves, per standard M. :-		
Quebec pipe.....	—	—
U.S. ditto.....	£35 0 0	" £42 10 0
Memel, cr. pipe.....	210 0 0	" 220 0 0
Memel, U.S.A. ....	180 0 0	" 190 0 0

### OILS.

	per ton.	£17 0 0	to £17 10 0
Linseed.....	22 18 0	" 23 0 0	
Rapeseed, English pale.....	21 5 0	" 21 10 0	
Do., brown.....	15 12 6	" 16 5 0	
Cottonseed, refined.....	28 10 0	" 29 0 0	
Olive, Spanish.....	20 5 0	" 20 10 0	
Seal, pale.....	27 10 0	" 28 0 0	
Cocanut, Cochin.....	24 0 0	" 24 5 0	
Do., Ceylon.....	22 5 0	" 22 10 0	
Palm, Lagos.....	18 15 0	" 19 15 0	
Oleum.....	0 6 3	" 0 7 6	
Lubricating U.S. ....per gal.	0 0 5	" 0 0 5	
Petroleum, refined.....	1 0 0	" 1 5 0	
Tar, Stockholm.....per barrel	0 12 6	" 0 15 0	
Do., Archangel.....	23 15 0	" 24 0 0	
Turpentine, American... per ton			



## THE BUILDING NEWS

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## READY-MADE ART.

A VERY trite and apt remark was made by a speaker during the Church Congress the other day, which was echoed by the meeting. Referring to some alleged illegal practices, he said: "Everything was illegal once, and had to be fought for." So it is with many things in architecture and building. No one early in this century would have thought of doing anything contrary to the rules of Classic architecture. People at that time would have been much offended at a steep roof or a gable, and even when churches were afterwards built in the Gothic style the prejudice could not for a long time be shaken off; the roofs were kept flat and hidden behind parapets as much as possible. It was thought incorrect, also, to use stone in irregular courses, or to make quoin-stones of irregular heights and sizes. It was deemed contrary to the rules of correct art to expose the wrought timbers of a roof. Plaster, stucco, and paint were the legal and proper means of covering walls, ceilings, and fittings. Later, the stopped chamfer was considered the only proper way of finishing Gothic woodwork, and every window must be pointed. In our own day we have also many prejudices, and work in certain grooves. There is a party of legalists and purists who will not accede to any departure if it is contrary to their ideas, who oppose every foreign innovation or practice, however good in itself, if it is not English in growth. Give a dog a bad name, and it is enough to keep him out of all decent society. And so it is with any design or departure from the commonplace which is not understood by the man of only one idea. Every style of decoration or architecture has had to contend against this prejudice. Not till it had become a little popularised by repeated use was the ban removed. So it has been with all kinds of exotics Venetian Gothic, Japanese, "Queen Anne." Ready-made art is always of the regulation kind, dull and commonplace, a blind imitation of the letter or outward form, because it is easier than the intelligent study of the spirit and principles which at first gave form and life to it. And it is this sort of art that is rampant among us to-day. We have still the formalist adhering to slavish and mechanical imitations. The pattern-made building is everywhere. They are cheap and easy in production. Thus we have the mock Gothic villa—pretentious, but entirely devoid of the true spirit of the style; the stereotyped Renaissance bank or municipal offices, with skin-deep detail and mouldings in cast terracotta; and the machine-turned-out overmantel or sideboard of the manufacturer's type. These productions are all injurious to the architect who is trying to cast off the trammels of style, and to design his work in the true spirit of honest construction. But the ready-made building, like the manufactured article or piece of furniture, is of everyday occurrence. We cannot go anywhere without seeing the hand of the cheap imitator. Look at the villa one sees built on all new estates and fashionable resorts. Like shoddy and the ready-made garment, these buildings are built of the very flimsiest and cheapest material; if it is a copy of a half-timber building, the studs are mere planks or battens fastened into channels of the wall or stucco. The ready-made plan is apparent; it may be a copy of a good arrangement, but spoilt by

inattention to those little niceties and details of planning which the real architect observes. Perhaps the entrance is on the wrong side of hall, and the staircase in front, while the doorways of rooms are placed just where they are not wanted and are most uncomfortable. But it is in the elevation that ready-made buildings are most apparent. The elevation is generally a copy of some design that is workable and cheap; the brickwork is coloured or tuck-pointed, the dressings are in soft stone in which carving is the chief item, mitred angles are avoided, the doorway decoration consists of half-turned shafts with carved capitals, and all the details are turned out in halves, or are repeats. Window-frames, sashes, and mullions are made by the hundred. In the carpenter and joiners' work machine labour is predominant, the turning-lathe and the moulding-plane being employed to save hand labour where such labour is legitimate—and also where it is not. Every scantling and moulding is of the stock size or pattern; no solid mouldings are to be found, but the "planted" moulding of the sawmills type everywhere. And so it is all through. The architraves and moulded work are meagre and thin, and the fittings of the cheapest quality. But it is when we look at the finishings, the ironmongery, locks, fastenings, and even furniture that the ready-made brand is so forbidding. The fireplace, especially the chimney-piece and fire-grate, are of the "wholesale ironmonger pattern." The elaborate cast-iron front and hood, the printed tile hearth and side panels, and the overmantel made up of lathe-turned balusters, and fretwork in an elaborate style, simply glued and blocked or nailed together represent pattern-made art with a vengeance. In the modern shop front and the municipal buildings of our streets, this "ready-made" architecture is rampant, and for it the architect is responsible, who, to carry out his pet design, is willing to submit to its being shorn of all its solidity and character. He prefers to have thin detail and shoddy fittings than honestly to give them up for something plainer and more substantial; prefers the vulgar and cheap imitation to the special production in which thought and honest design and execution are evident. And this kind of "architecture"—if we can so dignify it by name—is no doubt the outcome of our love for imitation and conventional treatment, relying so largely on precedent because it is less troublesome and laborious to produce than to invent for ourselves. The age of legality or formalism has given our artists and craftsmen a long period of rest, and has made them lazy; they have been content to follow the old paths, the same arrangements, and combinations, and details have been repeated—all very conducive to the manufactured and ready-made building, and it appears extremely awkward or eccentric to make any new departure. The few men who are bold enough to throw over the conventional and stereotyped are laughed at as visionaries, or "cranks," as introducers of archaic ideas and the like. But this "advanced school" have their extremists.

Affectation is, of course, as highly objectionable as legality or purism. Some architects will go to great expense in order to appear that their work is fresh or original: they will have their columns of stone or marble chipped so that they may look hand-wrought, or their wooden balusters shaved by a chisel instead of turned by a lathe because the old wooden balusters were so worked. A master of modern Gothic thus writes:—"Many architects will purposely contrive those parts of a design in woodwork which a modern workman would naturally wish to turn with a lathe or run with a plane in such a manner as to defeat the workman's intentions, and compel him to work the whole by hand instead, simply because, for want of proper tools, work of this kind was

often done by hand in the Middle Ages." And the same writer shows that the lathe and the plane exactly perform the legitimate function of machinery, which is to take off our hands all monotonous labour which requires to be done in large quantities. The more we substitute machinery for hand-labour in these kinds of work, the better. Where we can employ a machine, it is degrading to make a man use his hands. Those of the "ready-made" school adopt the machine, not because it is degrading to use the hand for mechanical work, but because it is cheaper and easier—a different motive altogether. If the extremist in art is fanatical, he is at best honest in his intentions; he eschews machine labour because he believes it degrades art by making the craftsman a machine too; he prefers a wooden baluster that is shaped and wrought by hand, inasmuch as it exhibits human thought, and there is more interest in hand-wrought detail than machine-made; but he errs in thinking the old worker would have rejected mechanical tools in the production of his circular stone shafts, or in other details in which mechanical labour is more concerned than hand or the eye. The ancient mason and woodworker was no fanatical believer in imitating the methods of his predecessors; if he had a way of his own, he followed it. The ready or pattern-made building is the product of thoughtlessness, apathy, and cheapness.

## FRENCH ART AT THE NEW GALLERY.

WE cannot say that the French pictures now on view at the New Gallery are so interesting or representative of French art as those that were exhibited at the Guildhall lately. The chief surprise is that the New Gallery collection is not larger than it is. It represents contemporary work, and as such is instructive by way of comparison with our own methods. Realism there is; but it is not of such a pronounced kind as to shock or wound the susceptibilities of the most delicate person. Jules Machard is restrained and refined in his conceptions. His "Sleep o Eros" (4) a large picture, with the mythic youth overtaken by slumber on the bank of a stream, his golden hair loosely flowing from his brow, is clever. The repose of the youth is complete. Over his head red blossom hangs. He lies outstretched, his lower limbs partially extended, while one arm above his head holds the bow. The flesh tints are pale and somewhat vapid, but the composition and drawing bold. The west room has a few important works. "Solitude" (7), by Frederic H. Bridgman, an American painter, is a prettily-conceived study of a girl's head with rich golden tresses, the expressive eyes are captivating, and the warm rich colour is set off by a leafy background. There is considerable freshness and sense of atmosphere in Francis Tattegrain's "Herrings." The waves reflect the yellowish light of sunrise; but the white crests are rather heavy. A boat laden with fish is on the beach, and the fisherman is filling the basket of a fisher-girl, who is buying. The clear light is the chief charm of this bright picture. The great coast scene by Adrien Demont, "Wreckage," is a large bay; the receding tide has revealed a wide treacherous beach, strewn with wreckage, a few dead bodies, covered over, are laid out on the fore-shore, while two men are busy near. The scene is early morning; clouds tinged with rosy hues overshadow the scene of desolation. It is broadly painted. The same sea painter's "Cast up by the Sea" is a smaller but clever piece of work, a flock of wild seabirds hovering round the body of a dead seal (26). Henry Mottez, "Spring," paints a woody glade dappled with sunlight (9); and "In the Park of St. Ange" (13), by Ernest Gaston Marché, is a bright



study of fallen leaves and bloom. Of studies of the figure we must mention Madame Virginie Demont-Breton's "In the Azure Sea," a young girl bather, her arms thrown forward as if to swim, a bright and vivacious picture; Jean Joseph Weert's "A Reverie," a small figure of a lady with loose robe adjusting a wreath of leaves round her head; "A Bravo," by Ferdinand Roylet, a sallow-faced but determined-looking valiant, his eyes and whole appearance of the brigand type, a loose black cloak and wide-brimmed hat, one arm on sword. Ernest Bordes's "Portrait" (21) is full of character; Weert has also a portrait of "M. Ravaisson, Membre de l'Institut." Jean Louis Gerome, also a member, sends an allegorical subject, "Diana" (24), the goddess of hunting armed with her bow and quiver rising amidst blue clouds, illumined by the moon. Clever and feeling is Charles Sprague Pearce's "Rural Melody," a boy playing a flute in a field; round his neck is slung a red earthenware bowl, and his shoulders are covered with rough sacking. The colour, light, and air are admirable qualities. One of the cleverest decorative subjects is "An Angelic Choir" (29) by Edgard Maxence, a design, in rich colour, of a group of angels singing, with a beautiful rich painted window behind. We may almost imagine we are looking at a richly coloured mosaic; the jewel-like splendour of the painted rose window adds to this effect. Rather painfully realistic but clever is the picture of "The Entombment" (32), by Henri Roger.

The North Room has a somewhat crude landscape, "A Pool, Les Dimes, near Boulogne" (33), brilliant in colour. Raphael Collin is a refined and restrained painter of the nude figure. His picture, "Awakening" (37) is one of the chief works, a graceful full-length figure of a maiden with the faint blush of morning upon her face, her arms stretched above her head, and standing upon a blue drapery in a green spring meadow. The background of vernal green foliage sets off the delicate modelling of the figure, which, but for an evident defect in the drawing of one knee, would be perfect. This work is one of his best. The subjects by G. Guillaume Roger (35) are clever and finished productions. "A Fantasy" is a garden scene, a dream of decorative colour and harmony, where, under the pale light of evening, maidens are dancing to a harp. The pale greens and reds of the girls' flowing draperies, carrying Chinese lanterns, make a pleasing harmony of colour. The same painter's figures of "The Knitter" (42) and "A Young Breton" (46) are conceived in a flat decorative style; no modelling or shaded effect is attempted. Mdlle. Juana Romani's "An Alpine Flower" (36) is in striking contrast—the pretty *décolleté* maiden, her head resting on a bank, and clad in a rich grey brocaded tissue, showing pearly teeth between rosy lips, is a finished work of a very different order. Her "Faustolla da Pistoia" (38) is delicate in modelling and colour; the expression of the girl's face and the dress are skilful and technically handled. Other subjects are a portrait by Ernest Bordes (34), natural in treatment; the series of admirable portraits by J. J. Benjamin-Constant, Membre de l'Institut (51-55), including the niece of the artist, his aunt, and M. Saint Saens the composer, the latter of marked features decked in the jewelled order and costume of a member of the Institute of France, with green laurels on his lapels, all full of character and technical finish; a portrait of a young artist, an intellectual, anxious face, by Jules Valladon; "A Young Girl," by Paul Léroy (49); and two large landscapes, one a fine moonlit woodland by Ernest Gaston Marché, "The First Quarter," with a placid lake reflecting the moonlight, the other a golden cornfield swept by a breeze, by Alexis Morlot. M. René Billotte,

has a moonrise scene on the Canal of St. Denis (20), wonderful in its orange-toned atmosphere. Paul Billotte's "Vineyards at Croissy" (62) is fine and vivid. "Cherries" is a delightful little child-study (57), a smiling and vivacious face, by Emile Renard; and there is a charm and natural colour in the little work by R. Collin, "In the Country," a young girl standing in a doorway.

The collection of Enamels in the north room, executed by M. Eugène Feullâtre, chiefly in vases, caskets, and goblets, the various articles of jewelry by M. René Foy, and the objects of art exhibited by Signor Bardini, of Florence, including several very beautiful specimens of 15th and 16th-century embroideries, altar frontals, busts, carved picture-frames, cassone fronts; a fine tapestry after A. Bronzino (125), representing a vine tree and rich border of fruit and flowers; and the cases of bronzes, majolica, &c., are worth attention, but we cannot do justice to the collection here. In the balcony is a large collection of photographic reproductions from the Windsor, Stuart, and other collections.

### MODEL SPECIFICATIONS.—XXXIII.

#### MISCELLANEOUS FITTINGS, CHURCH WORK, IRONMONGERY.

WE here complete the Joiner's work in all essentials for ordinary buildings. Other items might be mentioned, but it would prolong too much these notes. Stable fittings have now so completely been transferred from the joiner to the ironfounder and smith, that we shall not attempt to give the clauses for the old class of fittings. Mangers and stall divisions are now a distinct trade. A more important section is that of church joinery, which has also, to a large extent, been transferred to the church-fitter and furnisher. We may give a clause or two for church seats, which vary much in design and detail. The old framed high pew is, happily, defunct, and in its place we have benches, or seats, with open sloping backs; plain, solid bench ends 2in. or 3in. thick, tenoned and framed to chamfered oak sills. Our sketches show two designs for shop-fronts; a shop-front cornice with boxing for revolving-shutters, details of casement, section of coffered ceiling, a circular fluted column, &c.

A great many miscellaneous clauses under the Joiner may be given, but we confine our attention to those of a generally useful character. Besides those we have already given may be appended a few others.

135. *Framed Pilasters*.—Fix on each side of doorway 1½in. (or 1½in.) deal (oak or mahogany) diminished pilasters, 8in. (or 10in.) wide, glued and blocked to skeleton grounds, fluted in front, the angles rebated and grooved together, with caps and bases according to details.

136. *Entablatures*.—to be executed to detail in two (or more) pieces fixed to deal brackets to wall, and to be glued and blocked.

137. *Casings*.—(In all cases specify thickness, if fixed with screws, or brass cups and screws). For example—

The pipes to be cased with wrought rebated grounds and lin. wrought casing fixed with brass cups and screws for removal, and provide and fix small doors on 2in. brass butts with brass knob turn-buckles.

138. *Framings Generally*.—(State thickness, if panelled, shape of panels, if spandrel-shaped, their number in height or length, if prepared for glass.)

139. *Girder Casing*.—The girders (14in. by 12in. each) of floor to be cased with 1in. (or 1½in.) deal rebated and grooved together at lower angles, on brackets notched to flanges, the soffits to be moulded and square (in so many panels).

When quadrant corners occur to upright framings of cupboards, column casings, &c. (state the girth of quadrant corner, thus), the front and sides of cupboard to be framed into solid quadrant corners 6in. (or 8in.) girth, out of 2½in. or 3in. deal, grooved and beaded on both sides.

140. *Cornice, &c.*.—The cornice of shop-front to be moulded to design, 18in. (or 24in.) girth, 12in. high, and 9in. (or 12in.) projection of 2in. deal,

the pieces rebated together, glued, and blocked, and to have a ½in. cover-board 9in. or 12in. wide, and deal backings, with all necessary mitres and housings complete.

141. *Coffered Ceiling*.—The ceiling of shop or saloon to be formed as shown (see sketch) in detail, divided into panels by beams and cross beams. The coffers to be formed by the continuation of the two upper members of cornice, a cyma-recta bead and fillet, and corona in two pieces, rebated together, secured to proper deal brackets fixed to joists every 2ft. 6in. apart, the mouldings mitred and tongued at the angles. The soffits to be 12in. wide, formed of moulded and square framing 1½in. thick, rebated to sides. The soffits of panels to be 1½in., cross-tongued, fixed to joists along the centre, but free to expand or contract at the edges. Include all notchings, mitrings, glued, and blocked work.

142. *Attendance*.—The carpenter and joiner is to provide all necessary attendances on other artificers following or preceding, and the joiner is to attend plumber in sinks, baths, lavatories, cisterns, and bellhanger, &c., in cutting away and making good after him.

The following general clause may be added for—

143. *Ironmongery*.—The ironmongery to be of approved description, selected by the architect when not otherwise described, and to be fixed with screws. All door furniture and brass fittings to be fixed with brass screws. All iron furniture to doors and windows to be japanned. The door furniture to consist of two knobs of brass or porcelain, two drop escutcheons, and two large and two small finger plates, or according to approval. All iron butts to be of wrought iron.

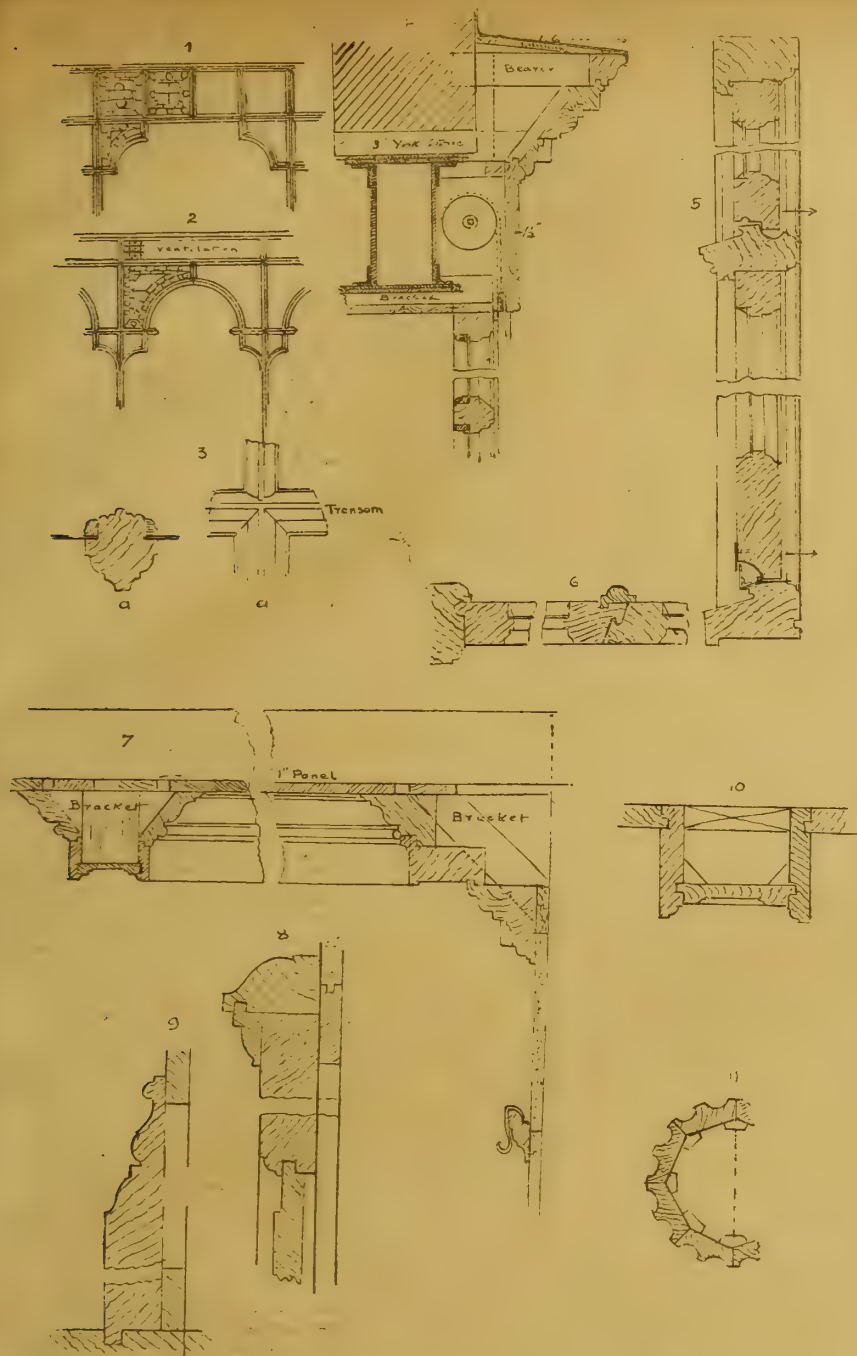
It is often better to provide a p.c. sum for each article, door or windows, the architect making his own selection, or to specify a pattern from a manufacturer's catalogue.

In describing butts or hinges, specify length of knuckle of hinge, also if the butts are projecting, if rising, are to have steel washers and pins, &c.; cross-garnet hinges for outer inferior doors is described in length, as "18in. strong cross-garnet hinges"; other hinges, like "strap" hinges, are described as to length and substance of iron, as 2in. by 3in.; ornamental hinges should be described as those of such-and-such a firm, or the number in catalogue given; if of a special design by the architect, provide a sum according to detail; the lengths of bolts, if brass, iron barrel, necked, &c. For casements, patented fastenings are provided, and these should be selected from patterns and the number or manufacturer's name given; or the architect may specify "to be selected by the architect." The length of fastening for folding casements should be stated, and the same as to patent weather light sill-bars for casements opening outwards, screwed to casement and oak sill. These fastenings and sill-bars ought to be specially described, or the builder is apt to use inferior fittings. We shall illustrate a few of these.

#### CHURCH JOINERY.

144. *Seating*.—The seating of the church to be in conformity with the plans and working drawings supplied by the architect, and to be of well-seasoned selected English oak, wrought, chamfered and stopped (or cut and moulded), and to be framed and put together under the architect's directions. The bench-ends to be wrought, cut out of solid selected oak 2in. or 3in. thick, 3ft. high, and 18in. wide, shaped to design, and to be tenoned and pinned to oak sill, and grooved for backing. The back framing to be 16in. high, 1½in. housed into bench-ends, open-framed with upper rails 4in. and 1½in., chamfered and rounded (or moulded) top and bottom rails, framed into uprights or standards, and grooved for seats and book-ledge, with stiles 3in. by 1½in. chamfered at edges at intervals as shown. The backs to be sloped 3in. The seats to be 1½in. (or 1½in.) wrought, cross-tongued, 13in. in width and 17in. above floor, housed into bench-ends and supported on cut 1½ standards or brackets 4ft. (or 5ft.) apart. The book-board to be 4in. wide and 1½in. thick, fixed level, housed into bench ends, and carried by cut brackets at intervals. (The seats should be 3ft. apart from centre to centre of backs, and about 18in. to 20in. wide for each person). The children's seats to be of 1½in. deal (or oak), 9in. wide, on 1½in. brackets fixed 2ft. 6in. apart, and the free seats to be 1½in. deal, as shown, 11in. wide, rounded on front edge and open framed backs, with stiles and rails 3½in. wide, and with 2in. standards and ends shaped to drawings.





145. *Pulpits and Reading-Desks.*—These are often specially designed and executed by church furnishers, the framing usually of 1½ in. or 2 in. deal or oak, with door of same thickness on brass hinges, a deal floor on bearers, book-board, moulded cappings and bearers, with wainscot steps and risers, carriages, cut string-boards, &c.; but it is unnecessary to frame a clause for a fixture that varies so much in design, and is often richly traceried and carved. In these cases special detail drawings must be prepared by the architect if he wishes a satisfactory interpretation of his design, or a design selected from the trade list of some well-known church-fitter.

#### IRONMONGER.

It is necessary to preface the clauses in this trade by some introductory remarks, as that: All the ironmongery is to be of the best description and quality, or of town manufacture, and to be fixed with screws. Brass screws to be used in fixing all brass-work or fittings, and all bolts are to have brass or iron sockets of suitable description. All screws in hard wood casings are to have brass cups. The architect to approve of all locks and door furniture, samples of which are to be submitted, and in all cases they must harmonise with the architectural character of the rooms.

All hinges to be of a quality and strength suitable to the weight of gates, doors, and

casements. The butt hinges are to be cast, wrought iron, or brass, to suit the class of joinery. For good work they should be wrought.

Gate-hinges are to have chill-hardened pivots, and steel washers are to be used for brass butts. External window shutters are to have wrought-iron Parliament hinges.

Sometimes it is specified that the whole of the locks are to have a master key, with three keys to pass, as in the case of offices, hotels, &c. Describe the number of bolts required, and if of iron or brass. Mortise locks of an improved pattern should be specified, and they should have rounded back corners, so as not to weaken the middle rail of door.

In specifying locks state their size, length in inches, whether iron, rim, reversible with brass mouldings, mortise, drawback, &c., if with three, two, or one bolt, if dead or stock, if rebated or half-rebated. If each door has two different kinds of furniture it should be so stated. When special kinds of locks are required, as stock locks with wrought-iron mountings, or finger-plates of artistic kind, it is better to mention the firm. For superior mortise-locks give name of manufacturer. State diameter of door-knobs, and whether of brass, porcelain, or ebony.

A large variety of rim and mortise locks are in the market, and if any special description is required it is desirable to specify the makers' or patentees' names, and the prime cost of each article. The following firms can be relied upon for superior quality, workmanship, and finish: Hobbs, Hart, and Co., Arlington-street, Islington; James Hill and Co.; J. H. Boobyer and Sons, Stanhope-street, W.C.; Young and Marten, Stratford.

For furniture, lock and door-knobs and handles, latches, polished brass, or repoussé lock plates; espagnolette bolts in brass and iron; casement and sash fasteners, fanlight openers, and other details, the above firms may be mentioned; also Messrs. Burt and Potts, York-street, Westminster; Henry Hope, Lionel-street, Birmingham; N.A.P. Window Co., Victoria-street; W. and R. Leggott, High Holborn.

1. *General.*—The ironmongery to be of the best and strongest quality suitable to the several fittings and requirements, and to be approved by the architect (or samples to be submitted for approval). All brasswork to be fixed with brass screws. Provide all brass or iron sockets and plates, brass cups, bolts, butts, hinges, &c., of suitable description and strength for their several requirements.

2. *Rim Locks.*—Provide and fix to all ledged doors and to all bedroom doors on third story 6 in. japanned rim locks with brass bolts, with strong brass furniture. Or—

The doors on upper floor to have strong rim locks, with brass-bushed keyhole and follower, brass furniture, and two iron or brass bolts, to be supplied by Boobyer and Sons. Provide and fit to 1½ in. four-panel doors on upper floor James Hill and Co.'s 8 in. patent reversible rim locks with brass wards, two iron (or brass) bolts, or (their double brass bushed and solid brass wards, Scotch spring locks with two iron bolts, No. 46R).

3. *Front Door Lock.*—The front door to have one of Hobbs, Hart, and Co.'s 8 in. iron drawback locks, with solid ward bushed Scotch spring with back slide, p.c. 12s. 6d. Or—

The entrance door to have one of James Hill and Co.'s (or Boobyer and Sons) spring rim locks; or four-lever mortise locking-latch with two keys, with gunmetal knob and escutcheon, and two gunmetal barrel bolts, No. 217R, p.c. 18s.

4. *Door Springs.*—The swing doors of vestibule to be fitted with loose beads, brass cups and screws, and the doors to swing in a hollow groove in the framing, and to be hung on James Hill and Co.'s, Archibald Smith and Stevens, or Young and Marten, or other spring hinges or centres, p.c. (35s. or 50s.) Or—

The vestibule doors to be provided with patent double-action spring centres with check, top centre pivot complete.

5. *Mortise Locks.*—The locks to the principal doors are to be superior 6 in. two-bolt four-lever mortise-locks with brass bolts, and be provided with two keys each. Or—

Provide to the four (or six) panel doors of principal rooms, japanned cased, brass roller bolt, 6 in. mortise locks, with two keys each, and with brass finger-plates and furniture of p.c. 5s. each. Or—

The 2 in. four-panel doors to have Hill's special "Villa" 6 in. two-bolt mortise locks, No. 35R, reversible, brass bolts, and two levers each (p.c. value 3s. 6d.) with brass furniture approved.

6. *Stock Locks.*—The outer yard doors, &c., to have 8 in. strong oak-cased stock-locks, solid ward, brass bolt, p.c. 5s. (or to be fitted with Hobbs, Hart, and Co.'s, or Boobyer and Sons best stock-locks, with staples and escutcheons complete.) Or—

The side-entrance doors to have 1 in. japanned brass bolt night-latches, two keys each, brass knob, and two 9 in. japanned iron barrel-bolts with brass knobs.

7. *Cupboard Locks.*—The cupboards are to be fitted with 3 in. locks suitable to their position and character, and are to be approved, with brass escutcheons and two keys each complete; or provide and fix James Hill and Co.'s (or Young and Marten's) cupboard locks (describe No. or pattern in catalogue).

8. *Other Locks.*—All other latches, bolts, &c., to be of a description and quality suitable to the purpose for which they are required, and are to be approved.

9. *Sash Fasteners.*—Provide to all sash windows on basement floors patent 3 in. brass spring sash-



fasteners (p.c. 2s. 3d.) of approved make; also two brass sash-lifts to each window (1s. 6d. per pair). Or—

Provide and fix to the sash windows strong brass spring roller sash-fasteners.

The ground-floor windows to have approved brass burglar-proof sash-fasteners, and lifting hooks; or they are to be of the manufacture of Boobyer and Sons, or Hart, Son, Peard, and Co.

The sash-cords of best windows to be of the strongest flaxen cord or "fine twine sash cords"; or to be steel ribbon sash-lines.

10. *Casement Fasteners*.—All casements to have approved fasteners of espagnolette type, with bolts shooting into sockets at top and bottom, and to be provided with handles of approved pattern; or the casement fasteners and stays, waterbars, &c., to be of the approved design supplied by the N.A.P. Window Co., Ltd., Victoria-street, W.C.; Jas. Hill and Co.; H. Hope, Birmingham; Burt and Potts, Westminster. Or—

The windows of ground and first floors to have bronzed iron, or brass, or gunmetal casement fasteners, No. — in Young and Marten's catalogue.

11. *Water-Bars*.—The casements to be fitted with Hill and Co.'s brass (or gunmetal) water-bars, No. 2104r, screwed to sill and rails, and to have Hill's iron (or brass) casement bolts No. 1304r (or 1755r). Or provide and fix quality — of the N.A.P. "wet and draught excluder."

12. *Fanlight Opener*.—(Fanlight and skylight fastenings and stays are numerous, and many very superior fittings are on the market. It is thought better to specify the firm's name or the patent than to describe any ordinary apparatus. Many of the fanlight stays are worked by rods and screws, or by cords. Gearing is not always satisfactory. The clauses may take this form):—

Provide and fix to entrance door fanlight a gunmetal quadrant opener, with pulleys, cleats, &c., complete, —ft. long, or specify W. and R. Leggott's patent "Silens" opener (or Jas. Hill and Co.'s patent "Twin-screw" opener, p.c. 10s. 6d.) Or provide and fix to fanlights the N.A.P. screw fanlight gearing.

13. *Skylight Fittings, &c.*—The skylights over billiard-room (or hall) to be fitted with approved wrought-iron elbow-jointed levers (or quadrant), strong flax lines, &c. (or with Leggott's opener). Or—

The lantern-lights to be actuated by Hill's patent continuous gearing (cord or rod) action, iron or brass.

## A BOOKE OF SUNDRY DRAUGHTES.

[WITH ILLUSTRATIONS.]

THE scope of contemporary reproducing processes is seemingly limitless, and all kinds of old prints, historical caricatures, and various manuscripts are being collated and reproduced by photo-zinc or photo-lithographic means. Inevitably a good deal of rubbish is unearthed in this way, and exploited in a cheap and inadequate manner, for the ready means by which the process-block lends itself to such undertakings is bound to be abused. There are, of course, however, notable exceptions, and among these, certainly, is the facsimiled volume, entitled "A Booke of Sundry Draughtes, principally serving for Glaziers: And not impertinent for Plasterers, and Gardiners: besides sundry other Professions," and which the Leadenhall Press has just reprinted. The publisher's preface is so much to the point, and states the information available about this "booke" so concisely, that we cannot do better than quote it almost in extenso: This quaint old treasury of decorated drawings for leaded glass (the textbook on the subject) has not hitherto been reproduced in facsimile. An original copy of the book (published in 1615) is "worth its weight in gold, and is now almost impossible to procure. The British Museum is without one. The volume from which this reproduction is faithfully facsimiled came from the celebrated library of the Earl of Ashburnham, recently dispersed at Messrs. Sotheby's sale-rooms. The author describes his work as 'not impertinent' for 'sundry professions.' He might, perhaps, not impertinently have included people of taste and culture." The author's plates are apparently not consecutive, but it was well thus to adhere to the original make-up, and the parchment binding, with its leather thongs, are exactly imitated from the old "booke." The author was one "Wa: Gedde," and it particularly enhances the interest of his work to know that just 50 years ago Henry Shaw, F.S.A.,

copied this book, which was "Printed in Shoolane, at the sign of the Falcon, by Walter Dight, in 1615." Shaw's copy, under the title of "The Glaziers' Booke," was published by the well-known Wm. Pickering, of Piccadilly, and Shaw's reprint has itself long been described in the booksellers' catalogues as "scarce." The plates and frontispiece were re-engraved, but their special quaintness and the spirit peculiar to these old and somewhat rough drawings in Walter Gedde's "booke" may be looked for in vain in Shaw's copy of it. Nevertheless, Shaw's "Glaziers' Booke" was exceedingly well done, and he added a large number of designs by his friend Willemt, so that the volume has been most useful in its way, and in its turn furnished the basis of another like work, published a few years ago in Paris. By the courtesy of the Leadenhall Press we have been enabled to accompany these notes with reduced impressions of four of the plates from the 17th century original, and in making our choice we have selected patterns which seem well contrived for present-day uses. The preface of Gedde's book is devoted to the problem of the Square and its application to the matter in hand. The first portion of the patterns are "square draughtes formed upon direct, and collateral lines; which fitly may be applied to sundrie vses," and the second half occur under the comprehensive description, which runs thus in an ornamental cartouche: "Here followeth sundrie Sortes, of Circular, or Compas Draughtes for Glazing: And will fitly serve for divers vses." The volume ends with "The Manner, Howe to Anneile, or Paint on Glas; The True receptes of the cullors, The ordering of the Furnace, and all the Secretes thereunto belonging." The mysteries thus divulged have, of course, long been superseded, and are now of no practical utility, beyond serving to show, on the one hand, the difficulties under which some of the finest glass ever made was executed, and, on the other, how exceedingly careful the old workers must have been in the details of their processes. It is beyond dispute, however, that much of the charm of the old glass is due to its accidental effects, both of shapes and colours, which the Medieval artists availed themselves of with such taste and skill. The machine-like accuracy and uniform colouring associated with modern manufactured glass destroys beyond compare all this incidental beauty and individuality which always belongs to vernacular work, even though it may be contemporary with what is generally termed a "debased" period. Walter Gedde was evidently an enthusiast, and no good work is possible without enthusiasm. He was a glazier, and may be pardoned if he viewed buildings mainly from that standpoint. He believed in the importance, at any rate, of his own special craft, for he says, "As the principall beantie, and countenance of architecture, consists in outward ornament of lights, so the inward partes are ever opposite to the eies of the beholders, taking more delight in the beauty thereof, being cunningly wrought then in any other garnishing within the same." He has, therefore, comprehensively set down in his variety of "draughtes" some "ordinary and plaine, others curious and pleasant," and if the experts in glazing deem the plainer patterns needless, he urges, "notwithstanding here I doe in friendly courtesie admonish, that it is most needefull." In this there can be no doubt that Walter Gedde was right, for it is the good judgment of real taste to insure well-proportioned simplicity, and in few things does careful drawing and refined plain patterning more completely show itself than in quarry glazing. The scorings or shading of these "sundry draughtes," as indicated in the upper part of three of the designs which we print to-day, does not improve them particularly, when, as in some instances, the intention is to suggest the interlacing of strap work, as in basket or wattle work. In all glass a flat treatment must remain an elementary truism, and, if colour is needed in quarry glazing, roundels or emphasised parts of the pattern furnish the best means of securing it. Panels, too, with outlined foliations in clear or transparent brown greatly increase the interest of white quarry work, and it is difficult to specify a more pleasing, and at the same time more unassuming variety of glazing than the enrichment of occasional quarries with flowers and other ornaments outlined in this fashion without any regard to a formal regularity; the lead work itself is so defined that some freedom from restraint is all the more welcomed in the glass. To scheme designs with too elaborated a fret

only taxes the limits of the glass-cutter needlessly and encourages continued damage. Some of the patterns in this "booke of draughtes" are open to that objection. We heartily commend the enterprise and good taste displayed by the Leadenhall Press in thus producing so well this excellent and useful old volume.

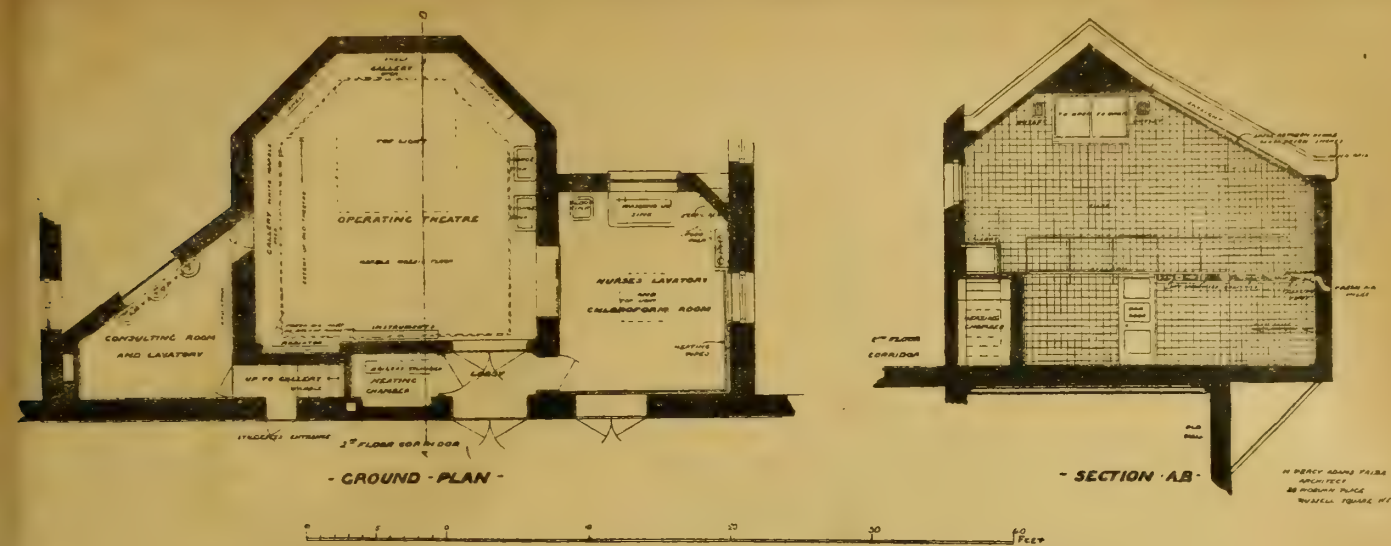
## THE RISE OF EGYPTIAN CIVILISATION.

THE winter season of Museum lectures at Owens College, Manchester, was inaugurated on Saturday by Professor Flinders Petrie, whose subject was "The Rise of Egyptian Civilisation." At the outset Professor Flinders Petrie referred to a lecture he gave at Owens College four years ago, in which he dealt with the products of what was then "a new race" to Egyptologists. This race, which was, when he lectured, believed to have invaded Egypt between the Sixth and Tenth Dynasties, was now known to be prior to the historic period. He put their date certainly as early as 5000 B.C., and it was probably earlier. They proved not only by their bodily structure, as shown by a comparative study of their skulls, to be of a different race to the subsequent inhabitants, but their capabilities were also of a different order. They were excellent handicraftsmen, working the hardest stone with a truth of form and an excellence of finish which were truly remarkable; whilst in the chipping of flint knives and spear-heads, and especially in the delicate serration of their edges, their skill had never since been equalled. In power of artistic expression, however, they were inferior to their successors. The professor sketched the dawn of civilisation in Egypt, giving reasons for fixing the close of the Neolithic period at about 4700 B.C. He proceeded then to give some account of his last year's excavations at the royal cemetery of Denderah. These tombs had been specially valuable in throwing a new light on the hitherto dark period between the Sixth and Tenth Dynasties. The history of Denderah, as reflected in its cemetery, began in the Fourth Dynasty; there was a flourishing period from the Sixth to the Eleventh Dynasty, and a revival of prosperity in Ptolemaic and Roman times. At Kierakonopolis the excavations had also proved of special interest in revealing monuments of warfare and of history, as opposed to the sepulchral remains of the primitive kings found in recent years. Some very remarkable examples of paint palettes for toilet purposes were discovered here by Mr. Quibell, who was working for the Egyptian Research Account; but perhaps one of the most beautiful finds was an enormous jar of syenite 2ft. across, highly polished both inside and out, perfect in proportion, and worked down to a thickness of half an inch. This jar and a number of other Egyptian antiquities have just been presented to the Manchester Museum, where they will shortly be exhibited. In the Denderah tombs statues were rare, and the sculptural remains revealed but one illustration of agricultural life. Some interesting slabs were obtained from above the false doors along the sides of the royal tomb. These include a panel of Prince Mena, namesake of the founder of the Egyptian monarchy and himself a monarch of Denderah. This panel is among the gifts to the Manchester Museum. Beads and potteries and amulets of various periods have also found their way to Manchester, and a beautiful group of stone vessels sculptured in diorite and accurately worked to such thinness as to be translucent.

## THE OPERATING THEATRE AT WESTMINSTER HOSPITAL.

THE old theatre at the Hospital in the Broad Sanctuary at Westminster has been entirely remodelled, improved, and enlarged, being 7ft. 6in. longer than formerly, and the floor of the theatre has been lowered 2ft. The old wooden seating, which was in a semi-circular form, rising from the ground at one end of the theatre to near the ceiling, has been entirely removed, and accommodation is now provided for 45 students by a marble gallery, 2ft. 6in. wide, all round the theatre, at a height of 6ft. 6in. from the floor. By this means, which is, we believe, unique for an operating theatre, the entire floor-space of the theatre is available as working space for the surgeons, &c., and the students will have a very much better view of the operations from the gallery





THE OPERATING THEATRE AT WESTMINSTER HOSPITAL.

than formerly. The room on the right of the theatre has been taken out square, as this room was cramped and almost useless for its purpose before. The walls and ceilings of all these rooms are entirely lined with glazed tiles; those on the ceilings being separately screwed up, each tile being made with a lap-joint. There is a dado, as high as the gallery, of olive-green tiles round the theatre, and a dado 4 ft. high round the other rooms. The remainder of the tiling of the walls is of a warm cream colour, the ceilings being white. All corners throughout are rounded to facilitate cleaning. The floors are of white marble mosaic, with a coloured border. The skylight of the theatre is double glazed, with an air-space of 7 in. between the glass, with the object of equalising the temperature; the outer light can easily be opened and cleaned from the gallery. The hot-water heating and supply is all worked from the small heating-chamber near the entrance, and is so arranged that the attendant has only to turn a handle and the theatre will, in a few minutes, be heated by hot water, and by turning another handle hot water will be supplied to all the fittings; thus, at any hour of the night or day, these rooms can be heated and supplied with hot water, independently of the rest of the hospital. The case containing the hot-water pipes in the theatre is fed with fresh air direct from outside, the inlets being glazed stoneware pipes, for easy cleanliness; also with a fresh-air supply radiator, which is hinged, so that it can readily be cleaned. The outlets for vitiated air are next to the ceiling. The artificial lighting is entirely by electricity—a pendant in the centre and brackets on the walls—the exposed wires being covered with indiarubber so that they can be washed. A separate main is laid for electrolysis, the cantery or a motor; gas is laid on to the several sterilisers, and a hood is placed over these with an extract flue to carry off the fumes.

#### THE SANITARY CONGRESS AT BIRMINGHAM.

WE conclude from our last issue, pp. 455-6, our notice of the papers read at the Congress, held by the Sanitary Institute at Birmingham, the best-attended and most successful one which has ever taken place under the auspices of that body.

#### SANITARY PROGRESS IN BIRMINGHAM.

In the course of his address to the municipal and county engineers, Mr. T. de Courcy Meade, the chairman of that section, remarked that the sanitary history of Birmingham might be said to have commenced with the appointment of a medical officer of health and a health committee in 1873. Until then little attention had been paid to sanitary matters, and the condition of the town was decidedly bad. There were sixty miles of streets and roads unsewered, and only four miles of road surface out of a total of 190 miles were properly paved. The drinking water was largely obtained from shallow wells, almost all of which were badly polluted, and a large part of the closet accommodation was on the ash-pit-privy system. In certain parts of the town there was

a large number of old and crowded houses, and very little was done to prevent the spread of infectious diseases. In the first five years after the appointment of the Health Committee the death-rate was 24.8 per 1,000. In the second five years (1878-82) it was 21.6, and in the succeeding five years it was reduced to 20.7. The zymotic death-rates for the same periods were 5.3, 3.8, and 3.2 respectively. At the present time, out of 262 miles of streets, Birmingham had 33 miles paved with granite or wood, and 8½ miles partially so paved. The remaining ash-pits, a large proportion of which were in the recently-added parts of the city, were being gradually abolished. The number of water-closets was over 50,000, and of pan-privies over 30,000. A large number of old and unhealthy houses had been demolished, and extensive provision now existed for the isolation of cases of small-pox and scarlet fever, and for the disinfecting of houses and their contents. The refuse disposal in Birmingham was conducted partially on the conservancy system and partially on the water-carriage system, the latter having been for many years past the only system allowed for new buildings. The water supply of the town was at present derived from streams and deep wells, being well filtered before delivery; but the corporation was now engaged in obtaining a more abundant supply from Radnorshire. Practically the whole of the small-pox cases and 80 per cent. of the scarlet-fever cases now obtained treatment at the city hospitals. Much remained to be done in Birmingham, as in other towns. Evils that had been growing up for generations could not be overtaken in a day. If they could start and plan a town as they did a hospital they might do something fairly satisfactory from a sanitary point of view. But our large towns had grown up without system and without much sanitary control, and they had to take things as they were and make the best of them. In many things they could not act in advance of public opinion. Therefore, popular lectures were of great service.

#### DWELLING ACCOMMODATION IN CITIES.

Dr. J. F. J. Sykes, of London, read a paper on "Dwellings of the Poor." Having canvassed the merits of different kinds of dwellings, the writer said that the cubic space per head was the most difficult point of all to deal with in practice, and must be regarded sanitariously as the most important. Calculated on a physiological basis, the requirement for the human adult was 10,000c.ft. We were continually bemoaning the large death-toll of consumption, or tubercular phthisis, essentially a disease spread by crowding, and the medical profession was now strongly advocating the cure and mitigation of the disease by fresh-air treatment. Was it out of place to advocate even more strenuously the prevention of the disease by fresh air, by the provision of more cubic space, and especially by raising the present inadequate minimum standard? The minimum standard should be advanced to 400c.ft. at the very least. They were living in a fool's paradise if they thought they were going to succeed in providing the working classes with more breathing space without

having the means of preventing it being compressed to its original proportions by the pressure of population. Mr. Peter Addie (late the manager of the Birmingham Improvement Scheme) read a paper on "The Removal of Insanitary Areas, and the Management of Improvement Schemes under the Housing of the Working Classes Act." Having, with the aid of maps and diagrams, given an exhaustive account of the Swansea and the Birmingham improvement schemes, and of the dwellings about to be erected by the Birmingham Corporation in Milk-street, Mr. Addie went on to say that it was difficult to provide for a population of so diverse a character as the working classes. The respectable element was weighed down by a number of thriftless and unclean people, and, though this difficulty might be removed ultimately by universal education, he was afraid that many years would elapse before the dwellings municipalities so liberally provided would be appreciated and used to the best advantage. Among other difficulties spoken of in the paper were the reluctance which magistrates sometimes exhibited to make orders for the closing of dangerous or insanitary houses, the authorities having no appeal against their decision. This was one of the greatest blots in the Act. It was a matter of deep regret that many of the houses inhabited by the working class were in bad repair, and that infectious diseases claimed the majority of their victims from such houses. If the local authority did not step in, an area after area became insanitary, and in many of our large towns there existed courts and alleys without number where perpetrators of crime or vice congregated.

A paper was read by Dr. H. Scurfield, medical officer of health for Sunderland, on "The Necessity for the Amendment of Part I. of the Housing of the Working Classes Act, 1890." His chief contention was that greater liberty should be given to local authorities in determining the type of buildings to be erected on the "unhealthy area." Four years and eight months had elapsed since the Local Government Board were asked to approve a scheme of improvement in Sunderland, half of the time having been spent in correspondence with that board. Local authorities ought not to be compelled to submit every detail of such schemes to the Local Government Board. Surely the local authorities had a more valuable opinion than that body as to whether it was desirable to provide one-roomed tenements or not. Dr. Marsden (Birkenhead) strongly condemned one-roomed tenements; but Dr. Eustace Hill (Durham) said those of three or four rooms were often let off to lodgers and greatly overcrowded. He favoured a great limitation of the Local Government Board's power of supervision. Dr. Manley (West Bromwich), Dr. Vacher, Dr. Robertson (Sheffield), and Dr. Barwise (Derby County Council) all thought one-roomed tenements would be an advantage in dealing with a certain class of people. A motion in favour of allowing greater freedom to local authorities was adopted.

#### INDICTMENTS OF THE LOCAL GOVERNMENT BOARD.

The Rev. Dr. J. Charles Cox read a paper on "Village Sewerage Schemes: Experiments in the



Rural District of Brisworth." The moral he drew from these experiences was that rural authorities with small populations should try every other expedient before resorting to water carriage, and that pressure should be brought to bear upon the Local Government Board to remodel its procedure, and no longer sanction loans for tiny filtration-beds with a clay subsoil.—Alderman Compston, Rawtenstall, read a paper entitled "Sewage Disposal and Official Hindrance," in which he said that the natural difficulties were usually augmented by the withholding by the Local Government Board of its sanction from any method, no matter how suitable for efficient local conditions, unless vast areas of land were purchased also. The writer instanced Maidstone, which had an obsolete and most execrable system of sewers, which it was prevented in this way from reconstructing. In the crowded parts of Lancashire this was a very serious question.

#### THE DUTIES OF MUNICIPAL ENGINEERS.

A conference of municipal and county engineers was held under the presidency of Mr. T. de Courcy Meade, who observed that the duties of the municipal engineer had been divided into six heads, which embraced no less than 98 distinct subjects. It was, therefore, not surprising that the municipal engineer should always be a student, anxious to learn all that was new, and desirous to benefit by the experience of other engineers. It should not, however, be forgotten that the communities, whose representatives they served, reaped the benefits of the knowledge thus gained. The housing of the working classes, although a well-worn topic, was likely to be of interest. The difficulties of providing sufficient suitable accommodation at a reasonable cost were great, but in Manchester they had been overcome by the erection, on the cleared sites, of blocks of five-storied tenements, approached by a common stairs and balconies; blocks of tenements of two and three stories, with separate entrance and stairs to each set of tenements; terrace cottages of five rooms each, and a model lodging-house. The Manchester Corporation were also erecting cottage dwellings in the outskirts of the city, about two and a half miles from the cleared areas, where land was less costly. These cottages varied somewhat in character, and each contained from five to seven rooms. Much work had also been done in the improvement of existing dwellings and the conversion of "back-to-back" houses into "through" houses. This work, though excellent where it was effected, had a tendency to cause overcrowding elsewhere, as the number of persons that could be accommodated in the converted and improved dwellings was much less than was crowded into the "back-to-back" houses before alteration. The substitution of private water-closets for common pail-closets and privies was gradually proceeding, the water system being provided whenever alterations to property were effected by the corporation.

#### BY-LAWS AS TO NEW STREETS AND BUILDINGS.

Mr. J. S. Pickering, Nuneaton, read a paper on this subject, in which he said it was true that the by-laws made since the passing of the 1875 Act generally adhered closely to the "model" series of 1877; but this was not so much on account of their general suitability to the districts for which they were adopted as to the fact that the Local Government Board would not sanction any important departure from their "model" code. The result was that many authorities possessed no by-laws; others depended upon by-laws of doubtful validity, made under former Sanitary Acts, while the great majority did not enforce the particular by-laws they had been compelled to include in adopting the "model" series. The varying circumstances of different districts, he contended, made it impossible to frame a series of by-laws applicable to all. By-laws, for instance, affecting new streets and buildings in large towns would be altogether unsuited to the requirements of the villages of rural districts. But, obvious as that was, it was a matter which was overlooked, and accounted for the absence of by-laws in many rural sanitary districts. It appeared to him that many provisions contained in by-laws might with advantage be incorporated in the Sanitary Acts, making them statutory enactments rather than measures to be adopted at the option of local authorities. By-laws should also be made less comprehensive.—Mr. Price, Birmingham, said one would like to know how far the Public Health Acts Amend-

ment Act of 1890 was in force. In very few cases in his experience had full advantage been taken of the various clauses, more especially in regard to details in respect of the height of rooms. By-laws might be divided into two classes—one in which the by-laws would be general and applicable to every authority, and another in which by-laws were simply applicable to particular districts. Birmingham had one of the discretionary by-laws, which had been very useful, and carried out with great advantage to the city. It was an open question in Birmingham that they would have to tackle the question, because in some cases the by-laws were not sufficiently powerful, and in others were oppressing the building trade.

#### SEWER VENTILATION.

Mr. T. J. Moss Flower read a paper on "Precautions to be Observed in the Ventilation of Sewers and Drains." The object aimed at was to prevent the evolution of gases, and to carry harmlessly from the sewers the gases that could not, owing to the physical conditions that existed in sewers, be prevented. With good falls and plenty of flushing all foul matter could be removed before decomposition set in, and unless that could be done a nuisance must arise. Sewers of deposit should be reconstructed, and surface gratings not fixed in narrow streets. Shafts should be fixed to the tallest buildings. High factories and churches might well be used for fixing the shafts to, and the gases so delivered could not do harm. The law should allow of local authorities fixing sewer vents to the houses. In drains the disconnecting trap should be of a self-cleaning nature.

#### ARCHITECTURAL AIDS TO SANITATION.

The President of the Engineering and Architecture Section was Mr. W. Henman, F.R.I.B.A., of Birmingham. He spoke upon the important part taken by architects in the question of sanitation. Engineers and architects were, he said, the active agents by whom sanitary science was practically applied in permanent works for the benefit of mankind. The function of architects was not alone to produce artistic designs and decorations, but, by a careful application of sanitary science, a knowledge of natural laws of the nature and properties of building materials, of the earth's surface on which they built, and of the air they all breathed, so to design and construct the edifices they erected that, without being devoid of suitable artistic expression, they might be convenient in arrangement, safe in construction, free from sanitary defects, or such as might cause bodily hurt, mental trouble, or untimely death. That the public had not always, and did not even now in every case, demand this, must be evident. Too often, through ignorance, or on grounds of false economy and favouritism, was the 'prentice or inexperienced hand employed. Consequently, as individuals either could not or would not care that safe and healthy buildings were erected for their use, the Legislature had stepped in, and, by various Acts of Parliament, local by-laws, and numerous officials, endeavoured to safeguard individuals and communities. The effect of this system was, perhaps, as good as could be expected; but it appeared to him unduly to relieve many of personal responsibility, which it would be better they should bear. But the greatest evil was the lack of impartiality in administration apparent in some localities, so that, instead of inspection and regulation, there was too often dictation and interference at the caprice of authorities or their officials, who might consider they had a right to interpret by-laws as they pleased, whether or not safety or health was in question. Moreover, in matters of sanitation there was much yet to be learnt, and there was reason to doubt the wisdom of many regulations which had from time to time been laid down in connection therewith. There seemed to be a law of evolution in sanitation, as in many another subject. Probably the greatest obstacles to the advance of sanitary science were popular prejudice and the unreasoning adoption of materials, means, and methods which might be good under certain circumstances or conditions, but the cause of evils when wrongly applied or employed.

#### HOUSE DRAINS.

In a paper on "The Construction and Ventilation of House Drains," Dr. A. Bostock Hill said the effect of the disconnecting traps between house drains and compound drains required by law was to obstruct the flow and precipitate

solids. The system now becoming common in the Midlands of ventilating the compound drain had the effect of driving off foul gases in proximity to dwellings, while the so-called inlets often acted as outlets for gas. Dr. Hill protested against the system of dealing with sewers, which, instead of preventing the formation of noxious gases, bottled them up and discharged them a few feet above the roofs of the houses.—A paper on a similar subject, "Combined Drainage: Its Pros and Cons," was read by Dr. J. Priestley (Lambeth). His conclusions were that where a scheme of drainage was simplified and the drains kept outside by means of a combined system it ought to be allowed. Where more than six houses were joined the main drain should be treated as a sewer.—In the discussion on these two papers the President, Mr. Harman, condemned the model by-laws of the Local Government Board. Those by-laws should be thrown into the waste-paper basket, and sensible and reasonable ones adopted in their place.

#### RIVER POLLUTION.

Mr. Christopher Childs, Lecturer on Bacteriology in relation to Hygiene at University College, London, contributed a paper on "The Prevention of Pollution of our Streams and Rivers." He said the evil of pollution had existed from time immemorial, and it was admitted that the Rivers Pollution Act of 1876 had generally and persistently failed in the purpose for which it was intended, and that pollution had continued and progressed unchecked in defiance of the law and of the many efforts made to reduce it. The chief difficulties in the way of the much-desired reforms were the ignorance and indifference of the people, the great cost of sewage purification, and the uncertainty with regard to the best means to be employed; last, but not least, the defects in the law itself, and the impotence of the measures provided for its administration. We could not hope for thorough and effective legislation until the people had been roused from this indifference; until they were made fully conscious of the disgusting contamination to which their water supplies were so commonly liable, were convinced of the consequent danger to which they were so constantly exposed, and insisted upon those reforms which would afford them reasonable protection. They had been accustomed to rely chiefly upon the water companies for securing them against the introduction of poisonous material into the water which the companies supplied and which the people had to drink, if they drank any water at all. But, under the existing state of the law, the obligations laid on the companies were so insufficient that the people had no ground for such confidence. The disastrous epidemics which had occurred in recent times had opened the eyes of the public to this fact, and roused them from their indifference to such an extent that the necessary reforms would be insisted upon at the earliest opportunity. Parliament also appeared to be ready for action, for, though the clauses proposed by Mr. Chaplin last June to be added—with a view to protecting the consumers—to 21 private Water Bills were withdrawn, the withdrawal was urged upon technical grounds, and all who spoke on the subject appeared to be ready to support those clauses if introduced in a public Bill. On looking at these clauses by Mr. Chaplin, he was astounded to find that the provision which, in his mind, was by far the most important one, had been entirely omitted—viz., the regular and constant inspection and supervision of all parts of the water supply, from source to distribution. Instead of that, the taking and examination of samples was entirely relied upon for the detection and prevention of pollution. Combined with thorough and regular inspection of the water supply, if it was true, chemical and bacteriological analysis could be of great service, for they could give indication of pollution which could not be detected merely by inspection. But if relied upon alone they gave a false sense of security. As a rule, water-borne outbreaks of typhoid fever occurred with explosive violence, so that most of the victims had imbibed the poison before the alarm conveyed by the means of analysis could possibly save them from infection. It was to be hoped that these reforms would be carried out as soon as possible, and that the serious omission with regard to inspection would be remedied.

A new railway map of India on the 48-mile scale is in course of publication at the Survey of India Office in Calcutta.





THE SUSSEX HOTEL, BEXHILL-ON-SEA.—MR. A. C. D. HICKS, *Architect*.

#### SUSSEX HOTEL, BEXHILL-ON-SEA.

**T**HIS building is to be erected in the centre of the rising seaside town of Bexhill by Mr. William Mayner. The building will be of red Keymer bricks and cement dressings, and the roof covered with Broseley tiles. The plan, although at present comprehensive, is capable of extension, and when the building is complete it will compare most favourably with hotels at other seaside resorts. It contains large coffee and smoking rooms, billiard-room, reading and drawing rooms, and private sitting-room. Ample accommodation is provided in 31 large and lofty rooms, with baths and lavatories on each floor. The hotel is fitted throughout with electric bells, and every other modern appliance. Ample cellars are provided for wines, stores, &c. The work is to be commenced at once, and carried out under the personal superintendence of Mr. A. C. D. Hicks, architect, Bexhill.

The Royal Drawing Society's Scholarship has been awarded to Miss M. Ryde.

#### CHIPS.

The purchase of the Norfolk Hotel and the Conservative Club premises, at Norwich, was completed on Thursday by a theatre syndicate, and tenders will at once be invited for the erection of the new building.

New Congregational Sunday schools are in course of erection at Minworth, near Sutton Coldfield, from plans by Messrs. Ingall and Son, of Birmingham. Foundation stones were formally laid on Wednesday in last week.

The Strand District Board of Works, at their last meeting, declined to accede to the appeal of Mr. William Willshe, late clerk of works and inspector of sewers, asking to be either reinstated in his former position or awarded a pension or gratuity.

Mr. R. J. Reece, M.D., one of the inspectors to the Local Government Board, held an inquiry in the Old Council Chamber, York, on Wednesday week, relative to the application by the corporation for sanction to borrow £2,500, for the purchase of the Muncaster House Estate, on the Malton-road, for hospital purposes. Mr. A. Creer, city engineer, submitted plans and particulars of the proposal.

The new rector of Hexham is pressing forward his Abbey Restoration Scheme with great vigour. According to a list just published, the donations already amount to £3,444 9s.—all obtained within the compass of one month.

The parish church of Caistor St. Edmund, Norfolk, was reopened this week, after extensive restoration of chancel and nave. Mr. J. S. Smith, of Lakenham, Norwich, was the builder.

New board schools at Goldsworth, Woking, erected at a cost of £7,000, from plans by Mr. S. Welman, of Godalming, were formally opened last week.

The parish council of Acomb, near York, have resolved to adopt the scheme of sewage disposal with the Knapton-road intercepting sewer submitted by Messrs. Fairbank and Son, C.E.

The harvest festival at Meerbrook was held on Thursday in last week; when a memorial window was dedicated which has been erected to the memory of the late Misses Taylor, of the Lower Lee. The subject is Martha and Mary, and the artists were Messrs. Heaton, Butler, and Bayne, of London.



## "BUILDING NEWS" DESIGNING CLUB.

AWARD OF PRIZES, 1897-8.

"CENTAUR" wins the first prize, having come in at the head of the list eight times, "Pantile" ranks second, and "Byd" takes the third place. The prizes consequently are awarded in the following order:—

"Centaur" (first prize), £10 10s., Mr. Edward G. Collins, 35, Heathfield-road, Handsworth, Birmingham.

"Pantile" (second prize), £5 5s., Mr. Ralph Knott, 90, Oakley-street, Chelsea, S.W.

"Byd," Mr. W. B. Y. Draper, St. Leonard's-place, York.

Hon. mention is accorded to "By Go" and "Dachs," who make a tie for the fourth place; and we commend "McGilligan" and place him fifth, as he ranked second on one occasion.

## LIST OF SUBJECTS AND RECORD OF SCORES.

A.—A Suburban Residence:—"Centaur," 1; "Pantile," 2; "Petticoats," 3; "By Go," 4; "Dachs," 5.

B.—Lodge and Stables:—"Byd," 1; "Bantam," 2; "Pantile," 3; "Gib," 4; "Petticoats," 5.

C.—A Public Library:—"Centaur," 1; "By Go," 2; "Maggot," 3; "Gossip," 4; "Pantile," 5.

D.—Small Suburban Church:—"Centaur," 1; "Byd," 2; "Pantile," 3; "Dachs," 4; "Thrusms," 5.

E.—Seaside Convalescent Home:—"Centaur," 1; "Dachs," 2; "By Go," 3; "Pantile," 4; "Saxon," 5.

F.—A Hillside Bungalow:—"Centaur," 1; "Pantile," 2; "Hotspur," 3; "Cadmon," 4; "McGilligan," 5.

G.—Dining-Room Furniture:—"Centaur," 1; "Pantile," 2; "Hotspur," 3; "Byd," 4; "Dachs," 5.

H.—Cottage Home for Waifs and Strays:—"Centaur," 1; "McGilligan," 2; "Pantile," 3; "Hotspur," 4; "Dachs," 5.

J.—A Model Farm:—"Centaur," 1; "Pantile," 2; "Swan," 3; "Hotspur," 4; "McGilligan," 5.

The twenty-first year's work of our Designing Club thus recorded affords a subject for congratulation, and particularly as we know that it has been the means during the past twelve months of introducing members of the club to those on the look-out for capable assistants, thus affording an immediate personal advantage of an eminently practical and mutual character. Besides affording this possibility of advancement, these trial essays of ours in design month by month give the student, living no matter where, an equal opportunity of competing for the prizes, and, consequently, identical chances of publication just the same as to those residing, say, in London, Liverpool, Manchester, or Birmingham. As a matter of fact, the designs sent in during the session have come from all parts of the country, though, strange to say, no Irish contributors are to be noted. Scotch pupils, however, are often notably excellent workers, and constantly come to the front by doing uncommonly good work. We need not recommend our Designing Club to them or to others equally enterprising, as the opportunity which it affords to the ambitious and industrious student is quite rightly recognised already, while the inquiries reaching us every day now are the best evidence of the widespread interest taken in its proceedings. We are aware of the possible shortcomings always more or less associated with elementary design, and the examples published are not put forward as models of planning; but, for all that, the proposals illustrated are generally suggestive, and not infrequently may be considered uncommonly good. We therefore recommence the new session with every assurance of renewed success. The co-operation of good contributors, however, can alone secure this, and that is why we have said this much here.

## RULES OF COMPETITION FOR SESSION 1898-9.

1. Drawings to be sent within 28 days after the publication of the particulars of each subject.

2. One or more subjects will be given every month, from which a competitor may choose.

3. The drawings to be executed in firm black lines on white drawing-paper, in sheets of the absolute size of 22in. by 14in., with no washes or tinting in colour whatever; outline to be the first consideration; but drawings may be slightly shaded with shadows executed wholly in line.

Sectional parts to be shown in ruled "hatching," or blocked in. The scales to be used will be given with each subject.

4. Drawings to be forwarded, unmounted, by post, care being taken to roll the short way of the drawing, as packages over 18in. long are not transmissible through the book post.

5. On entering the Class (which may be done at any time) each competitor is required to furnish his name and address, which must be written legibly on the back of each drawing as a guarantee of good faith, the *nom de plume* the author intends to adopt being boldly marked in plain lettering on the front of each separate drawing. The motto, once adopted, to be adhered to throughout the session.

6. Prizes of £10 10s., £5 5s., and £3 3s. will be awarded to the best series of designs. Our decision to be final.

7. Before awarding the prizes any contributor will be expected to furnish proof, if necessary, as to his age, and the time during which he has been engaged in professional pursuits, though no candidate need be strictly an architectural student. The same prize in future cannot be awarded more than once to the same student, and those who have taken a first prize cannot compete again.

8. We reserve the right of arranging the drawings for publication in any manner we deem necessary.

9. A critical notice of the designs sent in of each series will be given in an early issue following the receipt of the drawings.

## FIRST LIST OF SUBJECTS.

A.—A country house in brick and half-timber, to be erected on a hillside site at a cost of about £6,000. The accommodation to include a good hall adapted for use as a living-room as well, and to have a gallery connected with the first floor at one end, with space for a small chamber-organ. The area of this apartment to be, roughly, 24ft. by 19ft., and to open from a porch, and to have a good bay window besides. The drawing-room may be 15ft. square, opening out of the hall as an adjunct to it. The dining-room to be 20ft. by 16ft., or of that area. There must be five bedrooms and a night nursery. Two good bedrooms for maid servants. The man's room may adjoin the butler's pantry. Two bathrooms and two w.c.'s in the house, one being intended for gentlemen. The kitchen and offices and servants' w.c. outside to be of the usual character in keeping with such a house, but the isolation of smells from cooking to be provided for. The main accommodation to be on two floors. The chief suggestions to be observed in planning this house are comfort in arrangement, and refined considerations as to practical and artistic contrivance of the rooms in relation to each other, recognition of aspect, a sense of spaciousness without forgetting economy of space. Wasteful landings and cramped head-room in staircases to be avoided. The height of ground-floor rooms to be 11ft. 6in., and first-floor rooms 9ft. 6in. The hall to run up through both floors. The house to face south, but the entrance may be on the north side. View of north side, elevation of south side, and one end elevation, as well as one good section required. The geometrical drawings to be drawn to  $\frac{1}{8}$ th scale; the plans may be to  $\frac{1}{4}$ th scale. Quiet simplicity picturesquely treated will have a preference rather than ornate elaboration of design. Site falls one in twelve from north to south. From east to west it is level, and this is to be the long way of the building.

## PROTECTIVE METALLIC COATINGS FOR IRON AND STEEL.

A PAPER on this subject was read on Monday evening before the Society of Engineers at the Royal United Service Institution, Whitehall, Mr. W. Worby Beaumont, President, in the chair, by Mr. Sherard Cowper-Coles, Assoc.M.Inst.C.E., M.I.M.E., M.I.E.E. The author pointed out the comparative corrodibility of iron and steel under varying conditions, and the importance of the subject now that steel, which corrodes more rapidly than iron, is so largely used for structural purposes, and for building light craft, such as torpedo-boats. He then gave some interesting examples of cases where failures had occurred in engineering structures owing to the rapid corrosion of iron and steel. He then stated that up to the present zinc had been found to be the most effective coating, which was due to the electro-chemical

action set up between the steel and zinc. The author also explained that the electro-chemical action set up between two different metals made it necessary to carefully insulate copper sheathing from the steel hulls of ships, and rendered the direct application of copper valueless as a protective coating to iron and steel. A short history of the galvanising industry was then briefly given, together with details of the improvements that have been introduced from time to time. A comparison was drawn between hot and cold galvanising, and the results obtained when tried by the Post Office test for determining the thickness of zinc coatings. The method of cold galvanising was then fully described, and the methods of preparing iron surfaces for receiving the coating of zinc. A description was also given of some improvements in the acid treatment and sand-blasting for the removal of mill scale preparatory to zincing. The process of sand-blasting was fully described. The sand-blast apparatus consists of an air-chamber and hopper into which the air is forced at a pressure of about 5lb., and projected through a soft rubber tube fitted with a steel nozzle. It was stated that, the harder the surface, the more vigorously the small particles of sand or shot attacked it. Amongst the most useful applications of this process is that of sharpening files and frosting glass. The question next dealt with was the cost and output of various galvanising plants, and a description was given of a special apparatus for the treatment of wires and tubes. Some details were given of an American process, which has lately been tried with some success, for the more economical galvanising of wires. In this process, coils or bundles of wire are dipped in a bath of molten zinc, and are then placed in a centrifugal machine to remove the excess of metal. The vexed question of what the formation of zinc sponge is due to was discussed, and the results of some recent investigations were given. The author finally explained the best working conditions for electro-zincing, and gave a comparison of the actual and theoretical weight of zinc obtained for a given amount of electrical energy. In conclusion, attention was drawn to cadmium and copper as protective coatings for iron and steel, and their advantages and disadvantages compared with those of zinc were stated.

## KING'S COLLEGE ARCHITECTURAL CLASSES.

THE annual conversazione and distribution of prizes to the students of the Building Construction Classes and Architectural Studies and Wood Carving Classes at King's College, Strand, took place on Friday evening, the chair being occupied by the Rev. Archibald Robertson, D.D. The prizes were distributed by Mr. J. Classon Preston, Master of the Carpenters' Company. The report, read by Professor Banister Fletcher, F.R.I.B.A., stated that the competition for the Free Scholarship, the gift of the Worshipful Company of Carpenters took place in the college on the previous Monday last. Of ten candidates eight sat for examination. A. J. Wade was first with 104 marks out of a possible 120, and G. H. Briggs was second with 103 marks. The work of the remaining students was good, in fact four obtained more than two-thirds. The number of students entered attending classes had showed a steady growth year by year. In the session 92-93 there were 28 students, in 93-94 there were 42, in 94-95 there were 75, in 95-96 there were 120, and in 97-98 there were 145. The individual students making these 145 entries number 84. In the wood-carving day classes the instructor reported an extension of the list of pupils as compared with the previous year—63 as against 59 in 1896-97; while in the evening classes a slight increase in members was also announced, the number being now sixty. The judges reported that at the examination of the work submitted in both the day and evening classes there was a marked advancement in the craftsmanship. Mention should also be made of the results obtained by such students as sat for outside examinations, the proportion of failures being but 15 per cent. For Government appointments of surveyors, 3 sat, all passed; Surveyors' Institute, 1 sat and passed; while at the Institute of British Architects, 4 have become Probationers, 3 have passed the Intermediate, and others are preparing for the November examination for the R.I.B.A. degree. At the City and Guilds Institute, 5 sat, 4 passed; and for science and art examinations 4 sat and 3 passed. The Architectural History Class



was attended by the full number to which the class is limited; the following are the prize-winners:—F. G. Pain, gold medal; C. J. T. Dadd, silver medal and £3 in books; W. Marchment, bronze medal and £2 in books; and W. G. Trew, certificate of distinction and £1 in books. A gold medal is given because the student obtained first place in the examination for three consecutive years. In the Architectural History Drawing Class the number of drawings prepared was 50. The prize-winners are C. J. T. Dadd, certificate and £2 in books; and W. G. Trew, certificate and £1 in books. The establishment of the evening classes in the session of 1892-93 was, Professor Fletcher remarked, really a pioneer of the great educational movement that has resulted in the formation of the numerous huge polytechnics. In the face of this growing and keen competition the fact that they were enabled that evening to report such a record was most encouraging, the more so as upon looking over the list of teachers in kindred subjects held at the several polytechnics, they found therein men who had been through the King's College classes, and who must accordingly be strong competitors. With regard to the architectural studio, which is open every day and evening, it had continued to be of great use to the students. It has been attended by 18 students, and much good work has been done, while there had been a satisfactory increase of the day students. The possession of such a unique collection of models, drawings, diagrams, and photographs (the number added this year is 829) as existed at King's College, including the magnificent Scott collection, must always be an incentive to good work.

A movement is on foot for constructing a light railway through Mid-Suffolk. Messrs. Jeyes and Godden, Queen Victoria-street, E.C., are the engineers, and the proposal is for a light railway, starting from Ipswich, Bramford, or Claydon, and running north, touching Coddanham, Gosbech, Crowfield, Debenham, Southolt, Redlingfield, Stradbroke, Laxfield, Cratfield, with junction to G.E.R. at Halesworth or Harleston. The gauge will be the ordinary one.

The rapid rise of the land about Hudson Bay is said to be the most remarkable gradual upheaval of an extensive region ever known. Driftwood-covered beaches are now 20ft. to 60 or 70ft. above the water, new islands have appeared, and many channels and all the old harbours have become too shallow for ships. At the present rate, the shallow bay will disappear in a few centuries, adding a vast area of dry land or salt marsh to British territory in America.

A meeting was held on Friday in London of the Hull, Barnsley, and West Riding Junction Railway and Dock Company, for the purpose of passing a resolution for the creation of £200,000 further capital to take early advantage of the powers for the construction of the Hull and South Yorkshire extension line. The new line, if made, will give the company direct access to the collieries at Hickleton, Wath, and Manvers Main, and thus bring a considerable additional traffic over the company's system. The extension of the Alexandra Dock at Hull, and the construction of additional coal shipping appliances will be completed before the new line is finished. The company also contemplate erecting a foreign cattle and meat depot at Hull, similar to those at Deptford and Birkenhead.

New buildings are about to be erected for the Commercial Bank of Scotland in North Bridge-street, Edinburgh. The buildings will consist of four shops, with granite fronts and back saloons on the street floor. The three upper floors will be occupied by suites of chambers and workrooms, the staircase to be provided with an electric lift. There will be four suites of apartments on each floor, which will be approached by an external balcony. The offices will have oriel windows to the North Bridge. The staircase, passages, and lobbies are to be lined with white tiles and glazed bricks. Messrs. George Beattie and Sons, of Edinburgh, are the architects.

At Great Snoring, on Sept. 22, a festival service was held in the parish church, in connection with the harvest thanksgiving, for the benediction of a new pulpit, and in commemoration of the partial restoration of the edifice. The pulpit is erected in memory of the late Canon Lee Warner, of Thorp-land, and of Great Snoring, Norfolk. It is of carved oak, the carving being the work of Mr. Sampson, of Starston. The other work lately completed is the refooring of the chancel with square blocks of marble by Messrs. Cornish and Gaymer, of North Walsham, and the reseating of the nave in oak, partly new, and partly the old open seats of the 14th century, by Mr. Tutthill, of Fakenham, all from designs of Messrs. Wicks and Charlewood, architects, Newcastle-on-Tyne.

## BOOKS RECEIVED.

*House Drainage: its Inspection and Testing*, by RICHARD J. JENKINS, M.S.A., &c. (London: The St. Bride's Press, Ltd., Bride-lane, Fleet-street, E.C.) This is a reprint of articles that have appeared in the *Surveyor and Municipal and County Engineer*, and will be found of use to all employed in the supervision and testing of house drainage. All the important principles of drain construction, cement and clay joints, access to drains, their diameter, traps, outlets for ventilation, inspection chambers, intercepting and other traps, tests by smoke and water, &c., are treated from a practical point of view, and the several details are illustrated. Mr. Jenkins describes the construction of a useful-sized inspection chamber, and how the half-pipes should be laid and bedded. The several modes of testing are clearly described—a matter which most books on drainage shirk. The chemical test, as Kemp's or "Sanitas," is treated, and the author gives full directions, and a section is given of the drains and fittings, showing the mode of application. In addition to the water test, it is useful as a final test. The *modus operandi* is explained. The chapters on the design of closet apparatus, and the different types of closet, planning drains, &c., are reliable, and every practical detail of drainage is discussed. In fact, Mr. Jenkins touches upon just those practical questions about which treatises are usually silent. We recommend this little book to all sanitary inspectors and others.

## CHIPS.

Damage to the extent of £5,000 was caused by fire on Friday at the timber-yard of Mr. John Pye, builder, of Blackburn.

Lady Frederick Cavendish opened the St. Catherine's Home for incurables and cancer patients in Bradford on Saturday. The home has been erected at a cost of £10,000, by Mr. and Mrs. Cawthon, of Bradford, in memory of their son.

At a special meeting of the sanitary committee of the Middlesbrough Corporation, on Thursday, a report by Mr. J. Mansergh, C.E., with regard to the drainage of the town, and, more particularly, the preventing of the flooding in the Marsh district, was considered. The recommendations of Mr. Mansergh embodied a scheme which would cost £40,000. The borough surveyor was requested to prepare specifications for the new iron sewer in Marsh-road, this being a very small portion of the entire scheme.

A new Primitive Methodist chapel has just been opened at Ormesby St. Margaret, near Yarmouth. It seats 140 persons, and cost, with school-room at rear, £500. Mr. Beech, of Great Yarmouth, was the builder.

On Saturday evening, Mr. A. G. Boscawen, M.P., entertained some seventy workmen in the employ of Messrs. Wallis and Son, contractors, of Maidstone, who have been employed in the building operations of his new country seat, Hawarton, Speldhurst, to a dinner at the Red Lion, Lower Green, Rusthall. Mr. Boscawen took the chair, and was supported by Mr. Chas. Edward Powell, of London, the architect, Mr. F. Wallis, and others.

Mr. J. Freebairn Stow, at present surveyor to the urban district council of Bridlington, has been appointed surveyor to the Chertsey Rural District Council in succession to Mr. A. W. Smith.

The memorial stone was laid last week at Newtown, Mont., of a block of premises at the corner of the Cross and Seven-street, consisting of a bank and three shops with dwellings above. Messrs. Wood and Kendrick, of Birmingham, are the architects, and Messrs. E. Davies and Son, of Newtown, the builders.

St. Mary's Church, Peterborough, which is undergoing extensive internal restoration, will be reopened on Sunday, the 23rd inst. Mr. Furniss, of Peterborough, is the builder.

The erection of Messrs. Chubb's new lock works at Wolverhampton, close to the High Level Railway Station, has just been commenced, and the foundation-stone is to be laid on Monday next, the 80th anniversary of the foundation of the firm.

A church-house and hall are about to be built at the corner of Dee-street and Academy-street, Aberdeen, from plans prepared by Mr. Arthur Clyne, of that city.

New co-operative premises in Sturton-street, Cambridge, were publicly opened last week. The buildings have a frontage of 100ft., and are arranged round a quadrangle having a depth of 130ft. The buildings include shops, stables, with lofts above, cart-sheds, and pig-pens. Messrs. Thoday and Co. were the builders, and Mr. Vickers, of Leicester, was the clerk of works.

## OBITUARY.

MR. CHRISTOPHER OAKLEY, past president of the Surveyors' Institution and senior partner in the firm of Messrs. Daniel Smith, Son, and Oakley, auctioneers and surveyors, of Waterloo-place, Pall Mall, died on Tuesday, after a long illness, aged 61 years. He was one of the original members of the Surveyors' Institution, his name being the sixth on the serial list, and last year occupied the position of president. He was a Fellow of the Geological Society, a director of the Auction Mart Company, a member of the committee of the Estate Exchange, and one of the trustees of the Auctioneers' and Surveyors' Clerks' Provident Institution. In his professional capacity Mr. Oakley acted as agent to the Mercers' and Drapers' Companies, and also to the Earl of St. Germans' extensive estates in Kent. About 15 years ago Mr. Oakley was solely responsible, in his capacity as surveyor to the London, Tilbury, and Southend Railway Company, for the purchase of the whole of the land necessary for the construction of the company's fine block of warehouses in Whitechapel, as well as the land required for the line from Barking to Pitsea, and the lines from Southend to Shoeburyness and Grays to Upminster, and many other railway schemes. He was engaged in innumerable compensation cases, and was for many years one of the surveyors to the Board of Trade and one of the consulting surveyors to the Charity Commissioners. For many years, too, he had resided at Cromlix House, Chislehurst. Mr. Oakley had served on the Kent County Council, and was a member of the Kent Antiquarian Society. The funeral takes place to-morrow (Saturday) at 2 p.m., at Chislehurst parish church.

The sudden death occurred, on Tuesday week, at his residence, Holly Lodge, Crouch Hill, of Mr. EBENEZER LAWRENCE, the head of the firm of Messrs. Lawrence and Sons, builders, of Wharf-road, City-road. The deceased, who was in his 73rd year, had for the past sixteen years served on the committee of the Aged Pilgrims' Friends' Society, and in that capacity had taken a deep interest in the work at the Hornsey-rise Asylum. Mr. Lawrence visited this institution on Monday, Sept. 26, and appeared to be in his usual health; but on the following day he was seized with a fit of apoplexy, and died within a few hours. The deceased leaves a widow and family.

The death occurred on Wednesday in last week, at his residence, Weir Hall, Upper Edmonton, of Mr. FREDERICK SAGE, of Gray's Inn-road, the head of the firm of Messrs. Frederick Sage and Co., drapers' shop-fitters. The deceased, who was 67, was the oldest member of the shop-fitting trade, which in its present condition practically had its inception in him. He was the son of a village carpenter at Freston on the Orwell, was apprenticed to Mr. S. Simpson, builder, of Museum-street, Ipswich, and on the expiration of his articles went to London, with little more than the proverbial half-crown in his pocket. A casual request to execute an order in shopfitting led young Sage to make that branch of work a special study. He started in business for himself in Hatton Garden as a shop-upholsterer, and a few years later moved to Gray's Inn-road, where a large block of premises is now occupied by the firm, who employ over a thousand hands. Up to within a fortnight of his death he was at business as usual, but was then seized with paralysis of the nerves of the heart. Bronchitis supervened, and he succumbed on Sept. 28.

The sudden death of Mr. DAVIDSON HAINSWORTH, Inspector of Buildings to the Leeds Corporation, took place on Sunday morning at Blackpool. Mr. Hainsworth had been in indifferent health for some time. On Saturday he went to Blackpool to spend the week-end, intending to return to Leeds on Monday. Whilst there he caught a chill, which caused his death. Mr. Hainsworth was one of the oldest servants of the corporation, having been appointed in March, 1869. He was (says the *Leeds Mercury*) much respected, not only by his colleagues and the members of the city council, but by the local architects and builders, who regarded him as a straightforward and conscientious official. Since his appointment the work of the department had steadily increased. When he took office, about 40 or 50 plans were inspected per fortnight. Now there are something like 120. Mr. Hainsworth, who was 58 years of age, leaves a grown-up family, consisting of a son and four daughters.



### PROFESSIONAL AND TRADE SOCIETIES.

**LIVERPOOL ARCHITECTURAL SOCIETY.**—The first ordinary meeting for the fifty-first session of this society was held on Monday night in the New Law Library, Castle-street, Liverpool. Mr. W. E. Willink, C.C., M.A., A.R.I.B.A., president for the second year, took the chair. The President, in his opening address, touched upon the relationship that should exist between architects and the local municipal body, and also the public. In regard to the erection of public buildings, he quite agreed that "those who paid the piper should call the tune," yet, as he humorously remarked, "supposing the builders did not know music," was it not reasonable to contend that municipal authority should intervene and prevent any addition to the already unseemly aspect of Liverpool streets? Although such a position would prove a thorny theme, he expressed the opinion that the corporation should appoint an official who would be empowered to watch the erection of buildings offensive to the eye. Alluding particularly to the neighbourhood of Sefton Park, the president said that there were to be found edifices of all sorts and sizes, and the opportunity of preventing the erection of them had passed away. In regard to the relationship between architects and the public, he thought that the taste of the latter, concerning the erection of dwellings, was constantly advancing and rising, and the time would come when the opinion of "the man in the street" would be a powerful factor in forming their views, as architects, as to what was needed. Their aim should be to cultivate a warm and close sympathy between the public and those who served the public in the region of constructive art. Mr. Henry Hartley (vice-president) proposed a hearty vote of thanks to Councillor Willink for his address. It was thought that the president might have expressed an opinion on the matter of the new tramways and the system of erection that had been adopted. That day the members of the society had had the opportunity of viewing the tramway system from the Dingle to the Custom House. He did not hesitate to say that anybody interested in the beauty of these streets would, after traversing that route, conclude that the arrangements were distasteful and beauty-destroying in every manner and form. There were posts on each side of the streets with cross-wires and other wires running horizontally, and he could not imagine anything more offensive to the eye. The President, in expressing thanks, remarked that with reference to the question of the trams, when the suggestion about the memorial against the erection of poles was made, the city council had already decided to try the experiment. It was decided to erect one line as an experiment, but it was likewise agreed that as soon as the trams were running the opinion should be expressed as to the extension of the system throughout the city. He himself then felt that the only opinion that would be of any weight or value would be that given on the completed structure. He thought they might devote some evening to the discussion of the question, and also that of the widening of several streets of the city.

Brocklesby Hall, in North Lincolnshire, the ancestral seat of the Earl of Yarborough, was destroyed by fire six months since. The earl has now decided to rebuild the mansion, and the works will be commenced in about a fortnight.

A course of lectures and demonstrations for sanitary inspectors having been arranged at King's College, London, the introductory lecture will be given by Professor W. J. Simpson, M.D., on Friday next, the 14th inst., at 8.0 p.m. The chair will be taken by Mr. T. McKinnon Wood, chairman of the County Council.

The Metropolitan Tower Construction Company (Limited), which has partly constructed the "Watkin" Tower in Wembley Park, has passed into voluntary liquidation, owing to its inability to complete the tower, or to pay any part of the rent due to the ground landlords of Wembley Park. The sum already expended upon the incomplete tower is about £100,000, and the ground landlords of Wembley Park (The Tower Company, Limited) have felt some difficulty in foreclosing on the tower in order to secure the payment of the sum due to them for ground-rent. After lengthy negotiations, an agreement has been entered into, under which the uncompleted tower is to be practically sold to the Tower Company for the sum of £49,360. It is understood that there is no intention of completing the tower.

### COMPETITIONS.

**PIEBE HEARST UNIVERSITY.**—The jury which has been sitting at Antwerp since Friday last to consider plans for the great new University of California, which is to be erected at the expense of Mrs. Phebe Hearst, has just terminated its labours. The jurors were Mr. J. L. Pascal, president, representing France; Dr. Paul Wallot, vice-president, representing Germany; Mr. R. Norman Shaw, R.A., representing Great Britain; Mr. Walter Cook, representing the United States; and Mr. J. B. Reinstein, representing the University of California. One hundred sets of plans and designs were submitted. Eleven of them were found to possess such merits as to entitle their authors to the 1,200dol. each, and the right to enter into the final competition. The vote of the jury upon each of the plans selected is said to have been absolutely unanimous. Negotiations are in progress for the purchase of several plans, outside of those selected for the final competition, which were considered by the jury to be useful to the University. The names of the architects selected to enter the final competition are:—Barband and Banhain, Paris; E. Bernard, Paris; F. Blunshli, Zurich; D. Despradelles and Stephen Codman, Boston; Rudolf Dick, Vienna; J. H. Freedlander, New York; Heraud and Eichmuller, Paris; Howard and Cauldwell, New York; Howells, Stokes, and Hornbostel, New York; Lord, Hewlett, and Hull, New York; and Whitney Warren, New York. The members of the jury and the selected architects will be taken to California and entertained by Mrs. Hearst. In June, 1899, the jury will select the plan, which must be approved by the regents of the University of California. It is expected that all the buildings, which are estimated to cost £4,000,000 sterling, will be completed within the next twenty-five years.

**PLAYING-CARD DESIGNS.**—The Court of the Worshipful Company of Makers of Playing-Cards have adjudicated upon the 236 designs sent into the recent competition instituted by the company for the best designs for the backs of playing-cards to be issued by them during the coming year. Three prizes were awarded, the first, the "H. D. Phillips" Prize, being awarded to Mrs. J. E. Cook, Highfield, Wantage; the second to Mr. John Vinycombe, of Holywood, county Down; and the third to Miss S. Ruth Canton, 6, Beaumont-street, W. The design of Mrs. Cook will be reproduced for presentation by the company to their guests at the Master and Wardens' inauguration dinner in December next. The court highly commend the designs sent in by the following competitors:—Miss M. W. Thompson, Parkgate, Guisley, Leeds; Mr. R. W. Higham, Tytherton-road, Tufnell Park; Mr. R. Quiller-Lane, 73, Hammersmith-road; Mr. N. Van-der-Lyn, 16, Colherne Mansions, Bolton-gardens; Miss Elsie Hall, Melton Lodge, Havlock-road, Croydon; Miss Hunter, 62, Cleveland-square, Bayswater; Miss Ellen C. Griffith, Whyteleaf, Surrey; Miss M. A. Ramsay, Balmain, Goodrich-road, Dulwich; and Mr. F. W. Herrington, 61, Grafton-street, Fitzroy-square.

**WARRINGTON.**—Eighteen competitive designs were sent in from various parts of the country for the new constabulary offices, police and coroners' court, to be erected on the site of the old barracks in Arpley-street, Warrington. Mr. Bennett, president of the Manchester Society of Architects, who was appointed assessor on the nomination of the Royal Institute of British Architects, has awarded £100 for the first-premiated design to Mr. R. Burns Dick, Northumberland-street, Newcastle-on-Tyne. The corporation have also decided to appoint him as the architect, and he will, therefore, superintend the carrying out of his own plans. The second premiated design is that of Messrs. Tapper and Crouch, 12, Gray's Inn-buildings, London, W.C., who receive £50; and the third design is that of Mr. J. Lane Fox, Bond-street, Dewsbury, who receives £25.

The Bishop of Cloyne laid last week the foundation-stone of a new Church of the Holy Cross at Charleville. The style of the building will be 13th-century Gothic, and the internal dimensions are: nave and chancel 135ft., breadth across nave and aisles 60ft., breadth across transepts 80ft., height of nave 60ft. to wall-plate, and height of tower and spire over ground level 150ft. The total cost is estimated at £14,000.

### CHIPS.

A new Presbyterian church is being erected at Reading, and special consideration has been given to the ventilation, which will be carried out on the Boyle system.

The House of Nazareth, Cardiff, is being warmed and ventilated by means of Shorland's patent Manchester grates, the same being supplied by Messrs. E. H. Shorland and Brother, of Manchester.

Terms have been arranged between the Devonport Corporation and the Great Western Railway Company for the erection of a high-level bridge over Weston Mill Lake, and application will be to the Local Government Board for sanction to borrow the money.

At Heaton-on-Tyne a limited liability laundry company has been formed with a capital of £7,000 for building a laundry, dyeworks, and carpet-cleaning establishment. The plans have been prepared by Mr. W. L. Newcombe, of Newcastle, and the cost of the necessary buildings and all machinery is estimated at about £4,650.

The new Opera Comique in Paris, which is near completion, has cost £176,800. The Government originally—that is to say, in 1893—voted the sum of £140,000 for its reconstruction.

The west central window of St. Michael's Church, Linsithgow, has just been filled with beautiful stained glass, representing the Transfiguration of Our Lord. The window consists of six large figures; of these the central is the Saviour, having on his right Moses, and on the left Elias. In the lower division are figures of Peter, James, and John.

A profit of over £1,600 was realised on the Bradford Corporation electricity undertaking during the past half-year.

The railways in India aggregate 25,454 miles open and sanctioned, of which 21,156 miles are open for traffic, leaving 4,298 miles under construction or authorised. This was a net increase of 766 miles over the length of line open in March, 1897.

Foundation-stones of a new brewery have been laid at Newport, Salop. Messrs. Inskipp and Mackenzie are the architects, and Mr. E. Whittingham is the builder.

Mr. William Welch, the superintendent of the waterworks pumping-station at Aston, completed on Friday his term of service with the Birmingham Corporation, and retired on superannuation. Mr. Welch entered the service of the late Waterworks Company on the 1st July, 1863, as superintendent at Aston, and has held that position continuously since that date, first under the company and then under the corporation.

At the Northern Polytechnic, in Holloway-road, a new wing is in course of erection for the provision of a domestic economy side and a women's department, and before long a domestic economy day-school will be opened in the new building.

The Dean and Chapter of St. Paul's Cathedral have presented to the Hastings Museum one of the gates lately removed from the cathedral. The gates were cast in one of the forges of East Sussex, at Lamberhurst, according to tradition. That given to Hastings Museum is 7ft. high by 4ft. 6in. wide.

A stained-glass window, by Messrs. Heaton, Butler, and Bayne, has just been presented to St. James's, Upper Edmonton, by children. It occupies a single lancet in the west wall of the south aisle, and contains a figure of the patron saint, St. James the Great, with a predella of the children in the Temple singing Hosanna to Christ.

A convent chapel which the Little Sisters of the Poor have erected within their home for indigent old people in Gilmore-place, Edinburgh, was formally opened on Friday by Archbishop Macdonald. The church accommodates 300 persons. Erected in Romanesque style, from designs prepared by Mr. J. M. Monro, architect, Glasgow, its ground-plan is a simple oblong, with apsidal recess; but the walls have been carried to an unusual height, and the roof is circular-arched. The cost of the church has been over £3,000.

An inquiry was held at Winscombe, in the Assembly Rooms, on Monday, by Mr. H. P. Boulnois, M.I.C.E. (an Inspector of the Local Government Board), touching an application by the Axbridge Rural District Council for sanction to borrow £3,200 for works of water supply for the parish of Winscombe. Mr. A. Powell, C.E., explained his scheme.

A chancel screen has just been placed in the church at Bebington. It is from the design of Mr. Charles E. Deacon, architect, of North John-street, Liverpool, and is made of oak. The moulded pinnacled posts inclose much tracery and carving, consisting of five arcades, above which, in a moulded cornice, is foliage containing shields with emblems of the Passion. A pierced cresting surmounts the cornice, above which rises a carved cross. The whole of the work has been carried out from Mr. Deacon's designs by Messrs. Harry Hems and Sons, of Exeter.



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—LIBRARY, FOREST LODGE, TULSE HILL.—GARDENER'S  
COTTAGE, MORPETH.—TARN MOOR, HINDHEAD.—SUNDRY  
DRAUGHTS FOR GLAZIERS, ETC.—HOLLAND STREET  
SCHOOLS, ANCOATS, MANCHESTER.

## Our Illustrations.

WEST HAM TECHNICAL INSTITUTE AND PUBLIC  
LIBRARY.

THE drawing we publish this week illustrates the public entrance to the library, which comprises a newsroom, 110ft. by 33ft.; a reference library, 35ft. square; and a lending library with a public counter 60ft. long; also the necessary offices for the staff. The news-room is richly decorated, and has two friezes in plaster, modelled and painted by Mr. Fehr. The furnishings of this room are all specially designed and executed in oak. The reference library is decorated in a more subdued manner, with its furniture in walnut. The scheme and general design of the building was fully described and illustrated in our issues of Oct. 4 and 11, 1895, and this, with some slight modifications in the arrangement of the front block of the institute, has been adhered to. The exterior is in red Cranleigh bricks and Portland stone, with symbolical sculpture, excellently rendered by Mr. Birnie Rhind, A.R.S.A. The enriched fibrous-plaster work is executed by Messrs. George Jackson and Sons, and the ornamental iron railings and electric fittings by Messrs. Starkie Gardner and Co. The fireproof floors are Stuart's granolithic, and the heating is carried out by Mr. Henry Hope, of Birmingham. The furniture in the library and the institute is executed from the architects' designs, and the total cost of buildings and furniture is about £60,000. A museum, to which Mr. Passmore Edwards has largely contributed, is being erected at a cost of £7,000 on the eastern side of the institute, and will form a valuable adjunct to the appearance of the building when completed. The architects are Messrs. Gibson and Russell, of 11, Gray's Inn-square, W.C. The building was opened yesterday by Mr. J. Passmore Edwards.

HALL OF THE GROCERS' COMPANY: CHIMNEY-  
PIECE BY GRINLING GIBBONS.

THERE is not much to be said specially on this occasion about this characteristic piece of old woodwork. We gave an account of the hall of this famous Company some little while since, when we published our series of special photographs of most of the City halls (BUILDING NEWS, Vols. LXVIII., LXIX., and LXX., 1895-96). This chimney-piece is almost the only historic example of architectural work now remaining at the Grocers' Hall, which has been entirely rebuilt. The panel in the overmantel contains a lengthy inscription concerning the Company and its officers. The room in which the fireplace is situated is panelled in the way shown in the view, with a low dado, and the oak furniture corresponds, from the designs of the architect to the Company, Mr. H. C. Boyes, F.R.I.B.A. The photograph was taken for us by Mr. Sandall.

## LIBRARY, FOREST LODGE, TULSE HILL.

THE fittings of this private library are exceptionally rich in wainscot oak and bronze furniture. A feature is made of the sculptured chimney-piece, located within a recess at the end of the room. The ceiling is elaborated in plaster, with lantern lights in the centre. We gave an exterior view of the house on May 27th last, showing the building as lately remodelled and refronted by Messrs. Wimperis and Arter, the architects.

## GARDENER'S COTTAGE, MORPETH.

VERY little explanation is wanted in description of this cottage, and the plans of which, given with the view, explain its character. The walls are built of random rubble, and the roof is slated. Messrs. Boulds and Hardy, of Morpeth, were the architects.

## "TARN MOOR," HIND HEAD, NEAR HASLEMERE.

THIS house has lately been erected near the top of Hind Head, on land which slopes towards the south. Our illustration is from a drawing which was exhibited by the Royal Academy, and it shows the northern, or entrance front. From the southern garden front fine views can be obtained of the surrounding country, and on this side a covered ambulatory has been provided. The contractors were Messrs. Martin, Wells and Co., of Aldershot. The walls are of red brick. The outside walls were generally built hollow. The roofs have been packed with reeds between the rafters, as a non-conductor of heat, and they have been covered with Broseley tiles. The hall and chief sitting-rooms are heated by hot-water pipes, as well as having open fireplaces. The architect is Mr. Arnold S. Tayler, A.R.I.B.A.

## HOLLAND STREET SCHOOL, ANCOATS, MANCHESTER.

FOR this work a limited competition was instituted in 1894, and we now publish the design adopted by the board. The building provides for a mixed and infant school for 1,000 children—viz., 650 boys and girls, at 10sq.ft. each, and 350 infants, at 9sq.ft. each. In their report the architects state they have endeavoured to carry out the gist of modern school planning—viz., the spirit of the "hall passage system," the controlling idea in planning the same being openness of supervision. Every classroom throughout is entered directly from the central hall, which is completely under the control of the head master. Every teaching-room is correctly and amply lighted from the left-hand side and back. The cost, including covered playgrounds, &c., was about £10,000. Messrs. Woodhouse and Willoughby, of Manchester, were the architects.

## CHIPS.

The parish church of St. Peter, Tadley, is being restored and repaired; the builders are Messrs. Goddard and Son, of Silchester.

The urban district council of Llandudno have decided to organise a grand demonstration to celebrate the "switching on" of the electric light, which scheme has been completed at an outlay of £25,000. Mr. Preece is the electrical engineer, and everything will be ready to turn the light on by Monday next.

Preparations are being made for turning the corners of the Skegness Marine Gardens near the Pullover, and the work of excavation will shortly commence for the Jubilee Clock Tower. Lord Willoughby de Eresby, M.P., will lay the foundation-stone on October 22.

The town council of Aberdeen, in accordance with the provisions of the Housing of the Working Classes Act, made an application to the Secretary for Scotland for an arbitrator to decide as to disputed properties in Exchequer-row area. Lieutenant-Colonel Frederick Bailey, R.E., Edinburgh, has accordingly been appointed to adjudicate the claims of the parties affected by the scheme.

Lord George Hamilton, M.P., Secretary of State for India, has consented to lay the foundation-stone of the new free public library which is to be built at Acton at the cost of Mr. J. Passmore Edwards. The ceremony will take place early in November.

Complaints are being made by the local timber merchants at Newport, Mon., as to the insufficiency of accommodation for deep draught vessels at the Old Dock. The timber trade of Newport has been steadily growing for some years past, and has acquired very considerable proportions. Whilst the Dock Company have been spending large sums on the Alexandra and South Docks, where the chief business is coal exporting, little or nothing has been done to the Old Dock, where nearly all the discharging is done.

The Bishop of Rochester on Saturday opened a new reredos in St. Barnabas' Church, Clapham Common. The reredos is of Caen stone inlaid with polished alabaster. The sculptured group represents "The Last Supper," with carved canopies, and is in the Early Decorated style.

At the last meeting of the city corporation of Chester it was announced that the Duke of Westminster had presented to the city three acres of ornamental ground near Curzon Park, known as the Dingle.

A provisional order is to be sought next session for a pier to be constructed at Lynmouth, to be constructed from plans by Mr. T. Milward, C.E. The scheme is that the pier (a screw pile one) shall run out from the eastward—at Blacklands, near the Manor House—upwards of 1,000ft., and the end will be of double-face construction for the convenience of steamer traffic up and down the channel. At the end of the pier will be a bandstand and pavilion, and it is also intended to erect a few shops as well. Communication with the pier will be by a 16ft. wide roadway, which will come out at the Countisbury-road, a short distance from the Torrs Hotel. The cost will be about £25,000.

At the South-Western (Chelsea) Polytechnic an endeavour is being made to secure sufficient contributions for the erection of additional buildings, which are much needed to meet the increasing work of the institute. In the day engineering department a civil engineering section has been added to the sections for mechanical and electrical engineering. The day college for men now comprises a general as well as a technical department. The day college for women, which was established during last session, has made considerable progress, and a commercial section has been added to the sections in science, art, languages, and domestic economy.

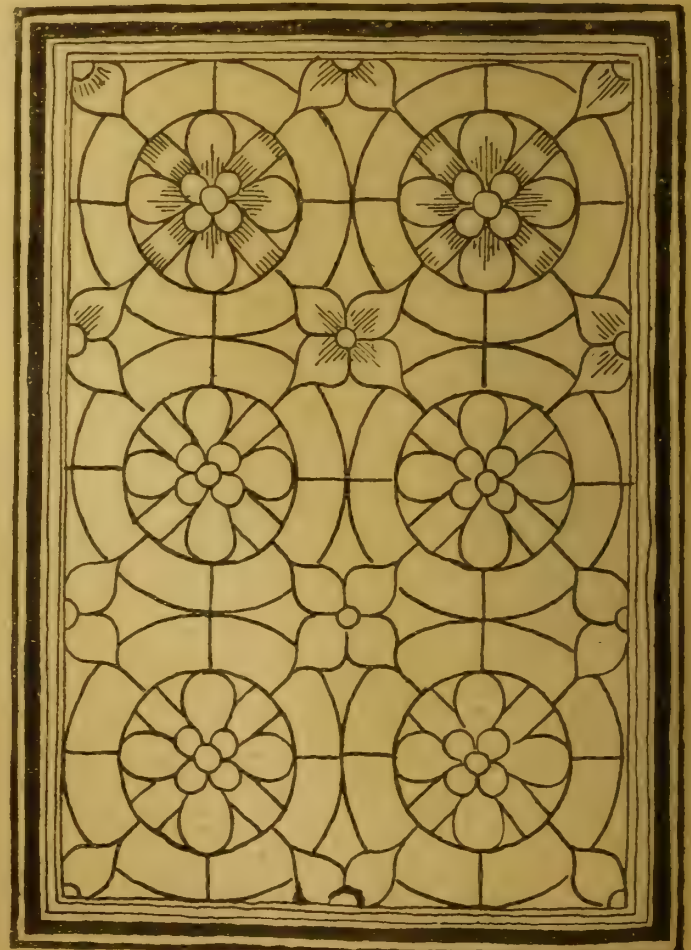
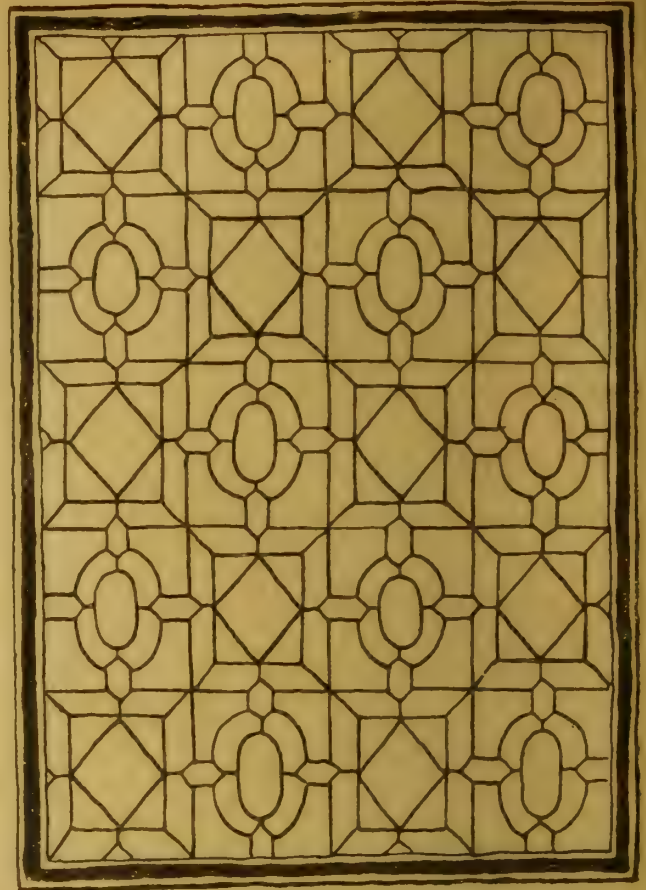
During the progress of excavations which have been carried on at the new park which adjoins Selby Abbey Church, in preparing for the laying out of the grounds for the urban district council, the contractor, Mr. J. C. McQuone, has made several discoveries. A carved stone, apparently a portion of the ancient cloisters of the abbey, has been unearthed, as well as some large worked stones supposed to belong to the foundations of some of the monastic buildings formerly associated with the abbey; a fine diamond-shaped red brick and a Manchester halfpenny, dated 1793, in a good state of preservation, were also dug up. These relics are being treasured and kept for further investigation.

A proposal is on foot for connecting the tram system of Liverpool by an electric light railway with the tram service at Prescott, which extends to St. Helens and Haydock, and so to provide a through service for passengers, and also for goods of a light description. The scheme is being promoted by the Lancashire Light Railway Company, and their proposal is to construct a line from the boundary of Liverpool at West Derby, and thence along the main road through Huyton-with-Roby and Knowsley to the boundary of the latter place and Prescott, a total distance of 3 miles 8-80 chains. The system will be worked by electricity conveyed to the cars by overhead wires, and a generating station and sidings are to be constructed at Huyton, which is about the middle of the length. An inquiry into the proposal was held on Saturday before the Light Railway Commissioners, when evidence in support of the scheme was given by Mr. John T. Wood, M.I.C.E., the engineer, who estimated the constructional outlay at £21,655.

The foundation-stone of the Bond Memorial Chapel, which is to be built in Adelaide-terrace, New Benwell, Gateshead, at a cost of £4,000, was laid on Saturday. The new edifice, which replaces an iron chapel, is designed to accommodate 800 persons on the ground floor and in two galleries. There is a gallery behind the rostrum for the choir, with organ gallery adjoining, and there are three vestries. The walls will be of rubble-stone, and the doors, windows, and angles will have stone dressings. The internal woodwork is to be of pitch-pine, and the building will be heated by hot-water radiators. The contract is let to Mr. Thomas Hutchinson, of Elswick-road, and the architect is Mr. John W. Dyson, Grey-street, Newcastle-on-Tyne.

The new school buildings erected at Nanpean for the St. Stephens-in-Branwell School Board were opened last week. They occupy the site of the old school, an additional piece of land being added. The accommodation is for 220. The main school-room is 40ft. by 18ft., with boys' and girls' classrooms, each 20ft. by 18ft.; there are also infants' schoolroom, 26ft. by 22ft., and cloakrooms. The buildings are of St. Stephens granite. The school and classroom floors have been laid with wood blocks, and the corridors have tiled floors and dadoes. The building was designed by Mr. Sampson Hill, of Redruth, architect to the Board, and the work was carried out by Mr. F. G. Gilbert, of Trelion, mason, and Mr. T. J. Richards, of St. Stephens, carpenter.





SUNDRY DRAUGHTES FOR GLAZIERS.—(See p. 490.)









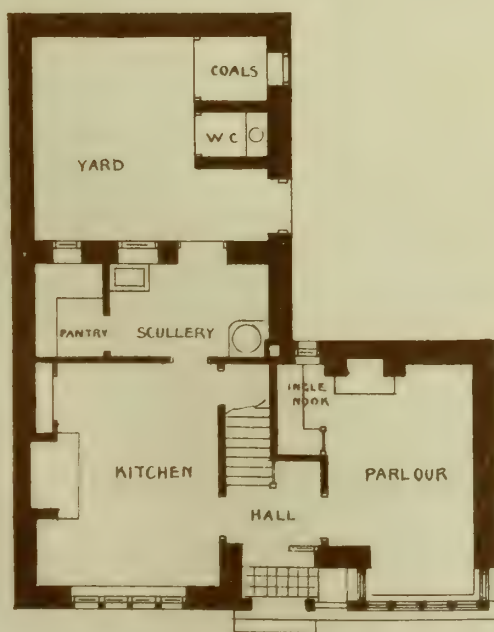
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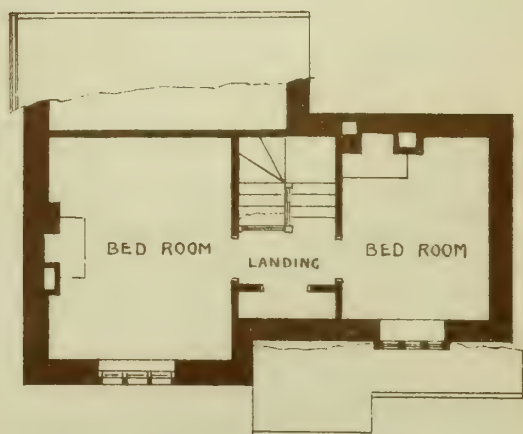


## CARDENERS COTTAGE MORPETH

BOULDS & HARDY, ARCHITECTS, MORPETH.



GROUND PLAN.



FIRST FLOOR PLAN.

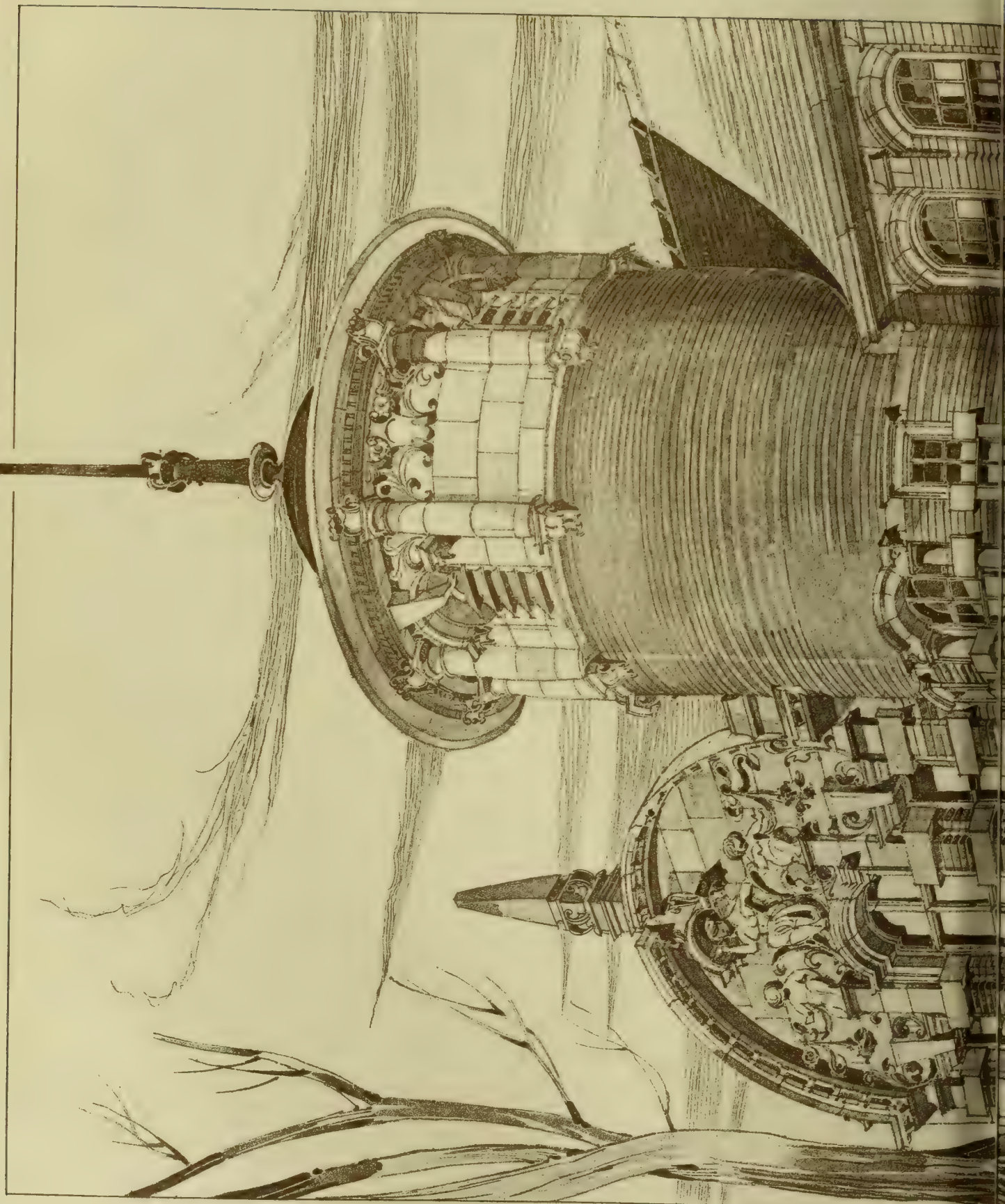
















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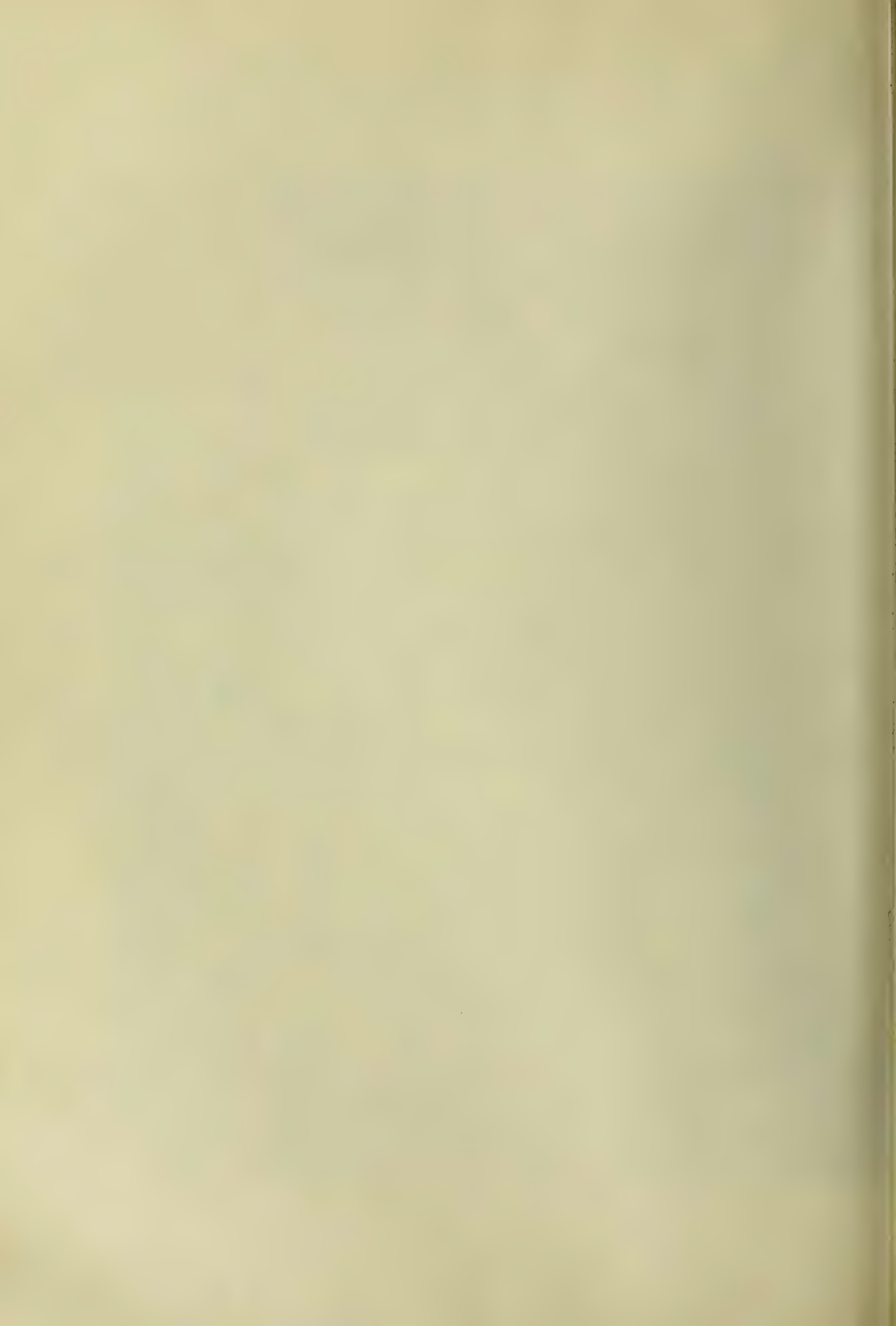
*The Library Entrance.*

J. S. GIBSON & S. B.  
RUSSELL ARCHTS.  
11 GRAYS INN SQ.

OPENED BY MR. J. PASSMORE EDWARDS' YESTERDAY OCTOBER 6<sup>TH</sup> 1898.

"PHOTO-TINT" BY "THE" "PACIFIC" "PRESS" "LONDON"



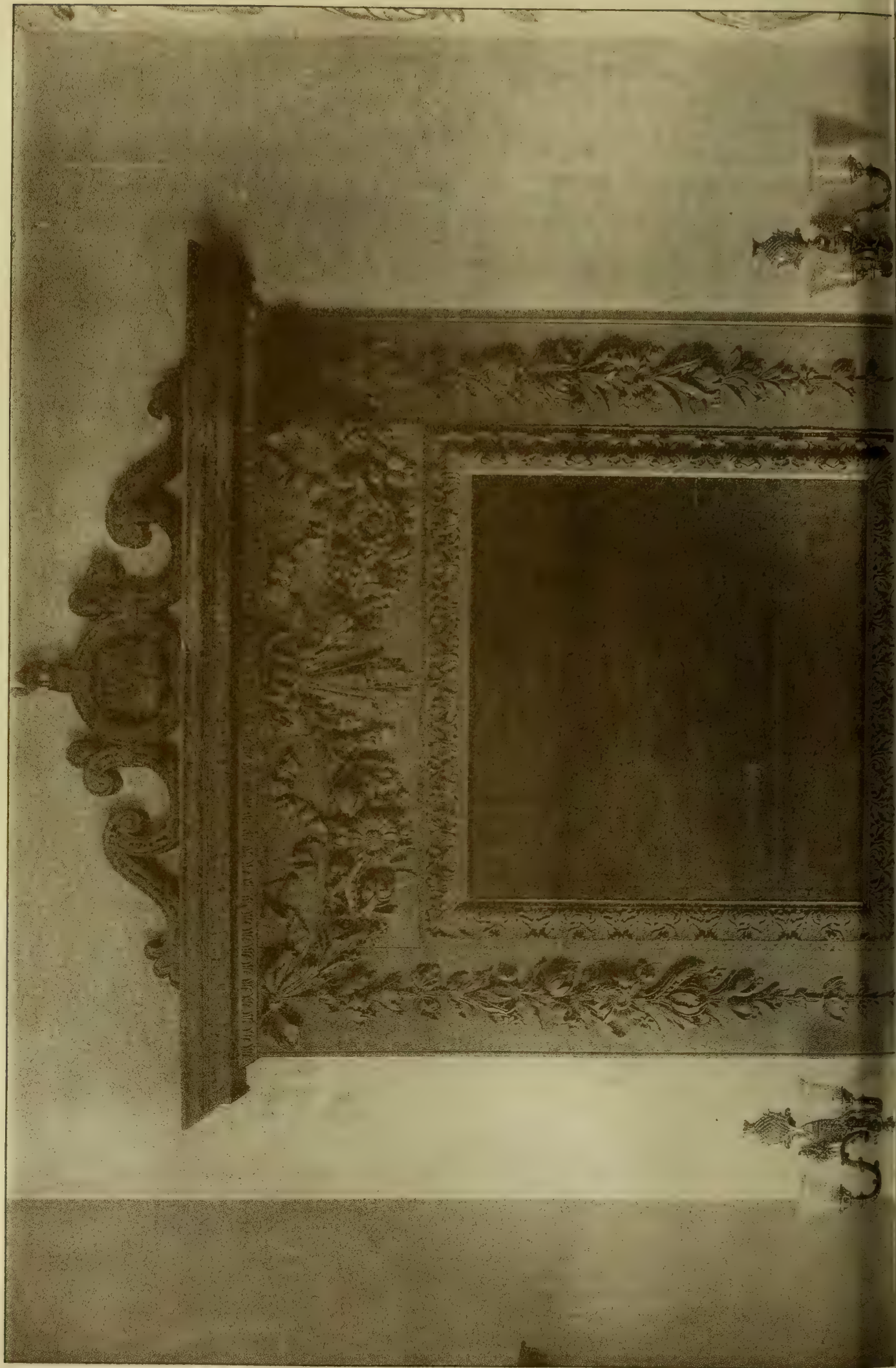




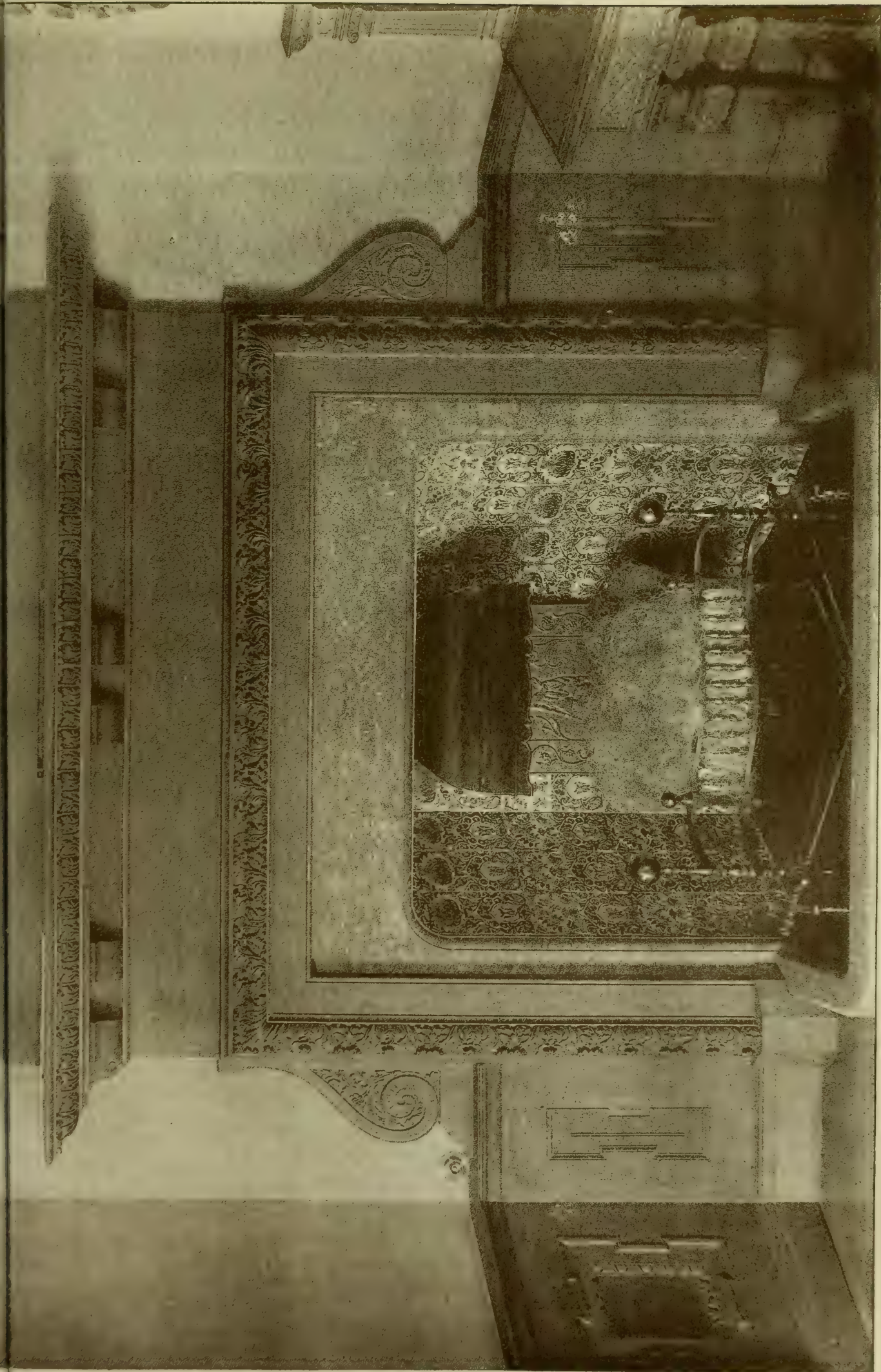




THE BUILDING PEWS, OCT. 7, 1893.







"PHOTO-TINT" by James Akerman & Queen Square, London W

THE HALL OF THE GROCERS' COMPANY      CHIMNEY-PIECE BY ORIENTAL GIBBONS IN THE COURT ROOM









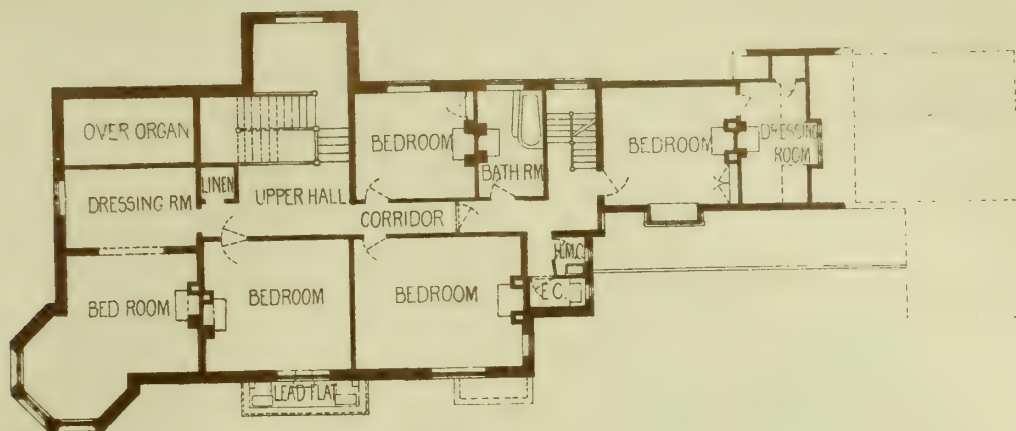




GROUND FLOOR PLAN.



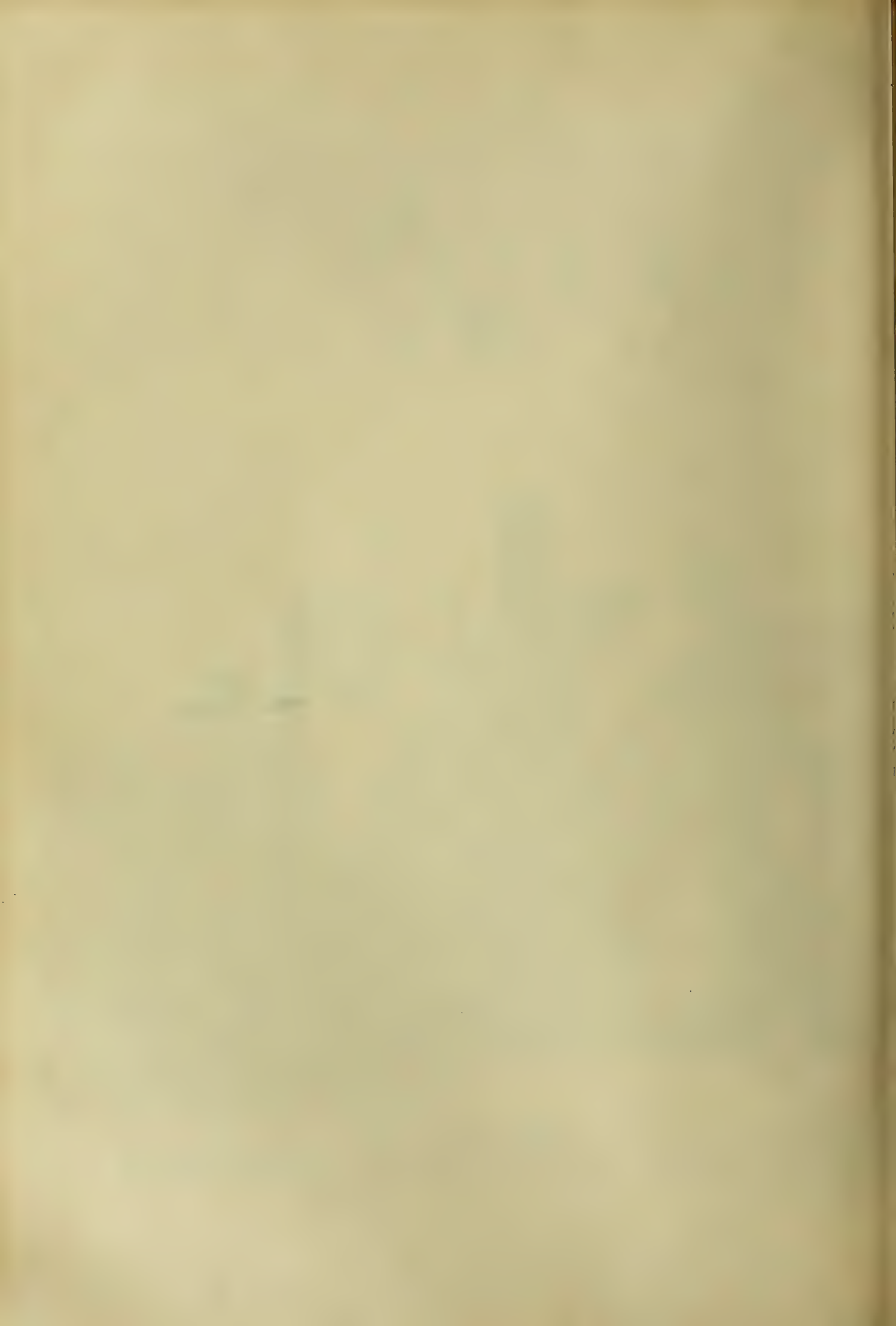




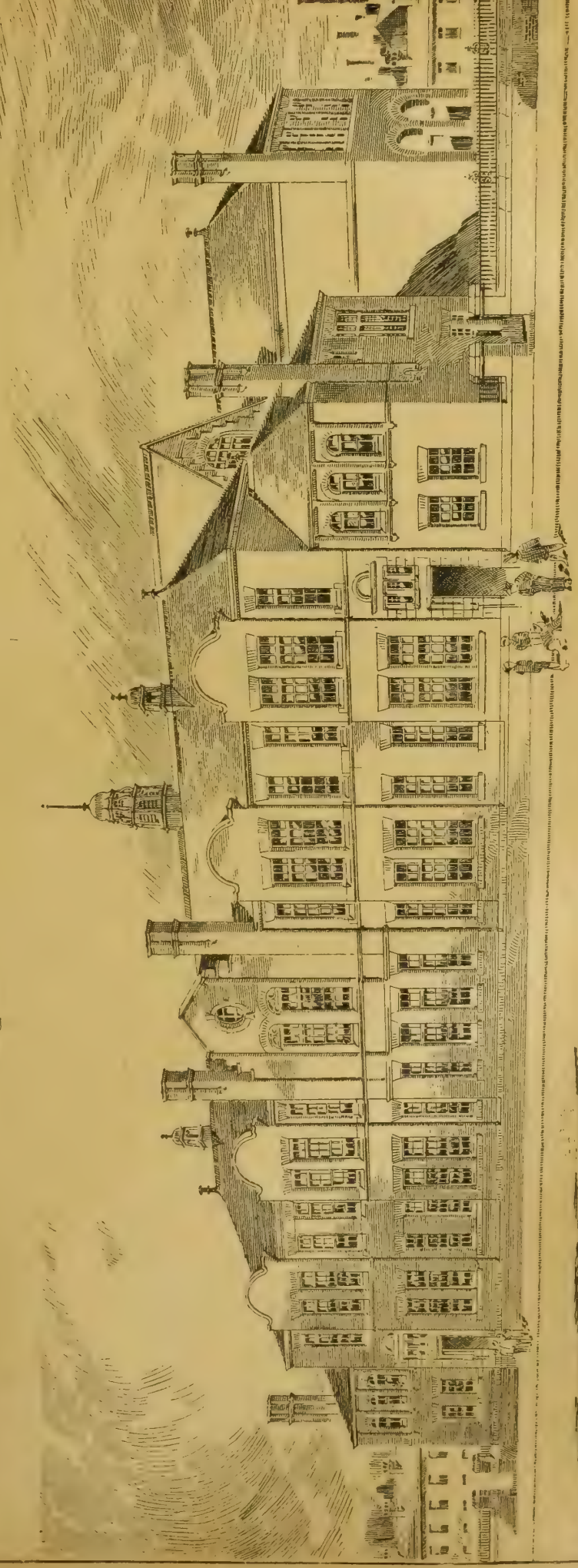
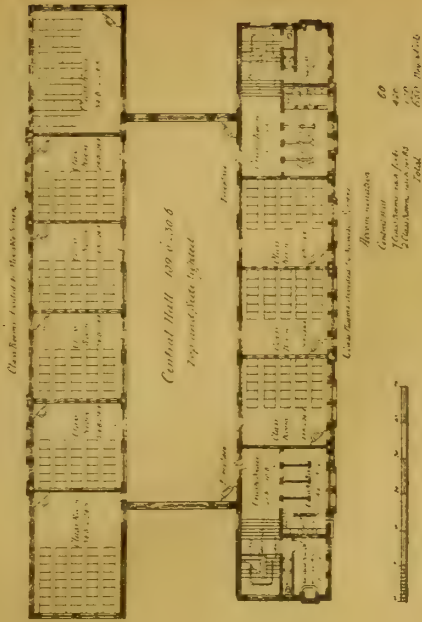
FIRST FLOOR PLAN.











HOLLAND STREET SCHOOL, ANCOATS, MANCHESTER.—MESSRS. WOODHOUSE AND WILLOUGHBY, Architects.



## TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the BUILDING NEWS, 332, Strand, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

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The charge for Competition and Contract Advertisements, Public Companies, and all official advertisements is 1s. per line of eight words, the first line counting as two, the minimum charge being 5s. for four lines.

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Front-page Advertisements 2s. per line, and Paragraph Advertisements 1s. per line. No Front-page or Paragraph Advertisement inserted for less than 5s.

Advertisements for the current week must reach the office not later than 3 p.m. on Thursday. Front-page Advertisements and alterations in serial advertisements must reach the office by Tuesday morning to secure insertion.

## SITUATIONS.

The charge for advertisements for "Situations Vacant" or "Situations Wanted" is ONE SHILLING FOR TWENTY-FOUR WORDS, AND SIXPENCE for every eight words after. All Situation Advertisements must be prepaid.

## NOTICE.

Bound copies of Vol. LXXIV. are now ready, and should be ordered early (price Twelve Shillings each), as only a limited number are done up. A few bound volumes of Vols. XXXIX., XL., XLVI., XLIX., LI., LII., LVIII., LIX., LXI., LXII., LXIII., LXIV., LXV., LXVI., LXVII., LXVIII., LXIX., LXX., LXXI., LXXII., and LXXIII. may still be had, price Twelve Shillings; all the other bound volumes are out of print. Most of the back numbers of former volumes are, however, to be had singly. Subscribers requiring any back numbers to complete volume just ended should order at once, as many of them soon run out of print.

RECEIVED.—G. H.—W. P. J. M. and Son.—C. R. R.—F. R. S.—A. S. Co.—J. H. W.

## Correspondence.

## ADVERTISING ARCHITECTS.

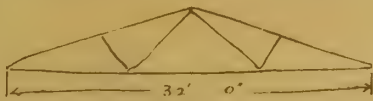
To the Editor of the BUILDING NEWS.

SIR,—There are many ways in which architects advertise besides through the medium of the newspapers or trade journal. If anyone cares to walk through the streets of any town where building is continually going on, he will only need to keep his "peepers" open to see any number of advertisements. "This site is secured for a building from the plans of A. Hopeful, A.R.I.B.A.," is not by any means an uncommon subject for the signwriter's art. Modesty that forbids ½ in. letters printed on paper is not shocked by letters a foot high on a hoarding. Perhaps your illustrations and descriptions of buildings being erected might be considered a good advertisement, if instead of buildings it was soap that was being shown. I fancy that many well-known manufacturers would like to have their commodities described as well and as thoroughly as you do architects' plans and elevations, and maybe they would be willing to consider it so much an advertisement as to pay a sum for it. Therefore when any obscure and unknown but talented architect does break out into advertisement, I think he may be treated with kindness if he is really in need, and as "Vira" says he is a needy and wanting brother, I have nothing but sympathy to offer him, and hope he may get what he needs. I have not said anything about architects letting nice ornamental panels into pillars about where they would catch the eye, as to anyone who has passed a building in which one is placed can see that is an obvious advertisement. —I am, &c., EYES OPEN.

## Intercommunication.

## QUESTIONS.

[12064.]—Steel Roof Truss.—I should esteem it a great favour if some reader will give the scantlings of a steel roof truss, a sketch of which is shown below? And



also the title of any reliable book giving description and scantlings of such steel roof?—J. FORD.

[12065.]—Safe Load on Loft Floor.—What safe distributed load (in the shape of corn and hay) could be carried on a loft floor over a stable. The area of floor is 41ft. by 18ft. There are four cast columns, each 9ft. long, 4½ diam., and ¾ in. metal acting as stall posts with 8in. by 5in. steel girders over same (27lb. per foot), ends supported and fixed in brickwork. The external walls of stable are composed of two 4½ in. with 2½ hollow, bonded with wall ties. All walls are built in mortar.—E. A. H.

[12066.]—Mildew Stains.—Does any person know of a method of taking mildew stains out of chrome pictures without destroying the colours (Marcus Ward's prints), and the best of methods to do the same with engravings, without injury to the paper?—E. Y. F.

[12067.]—Mortise Locks.—I should like to know of any recently improved or patented mortise locks suitable for good doors, and the price and name of manufacturer.—K.

[12068.]—Church Seats.—Are there not instructions published relating to seating churches and other fittings by the Incorporated Church Building Society? Should be obliged by the name of publication or address of society.—A. DESTANER.

[12069.]—Revolving Doors.—Can any correspondent furnish me with particulars of these, and their value compared with ordinary doors. Are they costly?—G. H.

[12070.]—Ornamental Timber Gables.—Information on the mode of constructing timber gables with stucco panel-work is not found in ordinary works. I should like to know how those erected, for example, on Lord Radnor's estate, Folkestone, are constructed. Any particulars will oblige.—A COUNTRY STUDENT.

[12071.]—Oak.—Can any reader inform me how to blacken oak to be used in inside joinery work?—W. H. S.

## REPLIES.

[12050.]—Adjoining Walls.—Perhaps I did not make my question clear, knowing nothing of the subject. My gable-end goes to the extent of my plot of building land. Between it and the nearest existing gable some new houses are being built. The builders have paid for the use of the other gable, and pinned into it with a 4½ in. wall. They have said nothing to me, but are building a 4½ in. wall against my gable, not putting it or pinning into it in any way. What I am doubtful about is, Should they not build a 9in. wall, or pay for the use of my wall? Or is a person allowed to build a wall any thickness?—D.

[12054.]—Worm-Eaten Furniture.—The best remedy is to mix together turpentine five parts and phenol one part. Turn the holes well up, and with a brush take up enough at a time and rub to-and-fro over the holes, when the liquid will flow down into their burrows. Continue until well saturated. The holes may be filled up after with beeswax, dissolved in turpentine, thickly made, which would check any further boring. Turpentine and linseed oil applied in the same way would also do in place of phenol; but the latter would destroy the larvae thoroughly. If the furniture is much damaged and likely to fall to powder, run a solution of shellac in methylated spirits into the holes, which will unite the parts and the powder and make solid.—E. Y. P.

[12054.]—Worm-Eaten Furniture.—Soaking in benzoline is the generally applied remedy; or rub tallow in the holes, and warm the furniture. Oil is death to the insects. Repeat this treatment a few times, then fill up with plaster, and polish over. (3) Rub the furniture well with mercurial ointment, and afterwards fill up the holes.—HARRY HEMS.

[12054.]—Worm-Eaten Furniture.—Paraffin dropped into the holes is said to kill the insects, and to preserve the wood from further attack.—L. E.

[12054.]—Worm-Eaten Furniture.—The only remedy for this is by fumigation, for which I think there are special places, as no kind of wash is of the least use.—H. L.

[12055.]—Building Construction.—Mr. W. Busbridge, of "Grasmere," Herbert-road, Plumstead, published the details of building construction at 3d. per sheet some years ago. Mr. Mitchell, of Regent-street Polytechnic, publishes a very fine set of sheets of building construction, and these may be had through Messrs. Cassell and Co., Ltd., of La Belle Sauvage, Ludgate-hill, E.C.—L. E.

[12055.]—Building Construction.—I believe the lithographed sheets referred to are still published by Mr. W. Busbridge, of 96, Herbert-road, Plumstead, who will, no doubt, be able to supply all information as to price, &c.—H. B.

[12057.]—Boundary Walls.—If the projections are over the land in a legal sense, then "J. E. O." can cut them off; but he should first make sure that the builder of the first house did not leave a space outside the face of his wall. The matter is not treated of in ordinary books on light and air, as the two things have no connection; but if information on the latter subject is sought, consult the works of Professor Banister Fletcher and Professor Kerr.—H. LOVEGROVE.

[12058.]—Heating Bathroom.—Gas is much more efficient in every way and far superior in heating power to oil. A small gas-fire could be used to heat the bathroom.—L. E.

[12058.]—Heating Bathroom.—If "Monk" is not satisfied with the result of heating by an oil-stove, he should have a small fireplace in the room. I am assuming that he seeks to warm the room, and not the bath.—H. L.

[12060.]—Lych-Gates.—No illustrated work exists treating upon lych-gates; but back numbers of the BUILDING NEWS for the last thirty-five years contain the finest series of lych-gates, illustrated and described, procurable.—HARRY HEMS.

[12060.]—Lych-Gates.—There is a fine example of a lych-gate executed in oak standing in the churchyard of St. Margaret's, Lee, S.E. Old Eltham Parish Church has another example of lych-gate, while I believe there is one in Chislehurst worth studying; but I have never seen it, so cannot vouch for the fact. Oak is certainly the best timber to make lych-gates of, as they should, to my mind, be made to last; and, being exposed to the weather very much, fir timber would not be likely to last half the time that oak would.—L. E.

[12060.]—Lych-Gates.—There is a very good gate at the parish church, Beckenham, Kent, and several have been illustrated in the "B. N." from time to time. If funds will permit, by all means use oak.—H. L.

[12061.]—Casement Stays.—Gunmetal is the best material of the two mentioned. As "A Builder" does not say whether the stays are required for a drawing-room or elsewhere, I should advise him to visit a large ironmonger's, where he can see a good many to select from.—L. E.

[12061.]—Casement Stays.—I advise "A Builder" to visit one of the large firms and see the kind most suitable for his purpose. I have used Tonk's wedge casement stay in brass.—H. L.

[12062.]—Buff Terracotta.—The colour usually "flies" in terracotta. Without prejudicing "A" in his choice, I could recommend Messrs. Stiff and Sons, of Lambeth, for some fine work in this respect; and also he will find they execute their ornaments in a remarkably clean manner.—L. E.

[12062.]—Buff Terracotta.—"A" should write for particulars to Mr. J. C. Edwards, of Ruabon, or Messrs. Cliff and Sons.—H. L.

[12063.]—Lining Vaults.—On p. 27 of No. 2,282 of the "B. N." will be found particulars of something to suit "Thomas."—LOUIS ERMOLD.

[12063.]—Lining Vaults.—"Thomas" should write for particulars of White's hygienic rock.—H. L.

## CHIPS.

At the last meeting of the Birmingham School Board a letter was read from the secretary of the Birmingham Master Builders' Association, calling attention to a statement reported to have been made by a member at the last meeting, to the effect that members of the association had agreed to charge an advance of 10 per cent. on building materials. No agreement had been arrived at to charge an advance of 10 per cent. or any other rate, and tenderings would go on as usual on the merits of the particular work to be tendered for.

Mr. Holman Hunt and Mr. Alfred Gilbert, R.A., have been elected honorary members of the Royal Society of the British Artists. At a general assembly of the society, held on Monday last, Mr. Wilfrid Ball, Mr. Archibald Christie, Mr. Tom Browne, and Mr. Georges were elected members.

The memorial-stone of the new Welsh church of St. David, which is in course of erection in Limegrove, Oxford-street, Manchester, was laid on Monday by the Earl of Egerton of Tatton. The architects are Messrs. Preston and Vaughan, Diocesan Chambers, Manchester. The style adopted is Early Perpendicular, and the materials employed are red brick, with Ruabon terracotta dressings. The plans include nave and aisles, with chancel and vestries on the south side. Chairs will be provided for the worshippers instead of pews. The church will accommodate some 400 persons. The builder is Mr. R. Carlyle, jun., Ardwick.

St. Thomas's Roman Catholic Church, Fulham, S.W., which has been redecorated throughout under the supervision of Mr. W. J. N. Westlake, was solemnly reopened on Sunday. The entire cost of decoration has been defrayed by the rector, in commemoration of the Golden Jubilee, which occurs this year, the church being opened by Cardinal Wiseman in the year 1848.

Major-General H. D. Crozier, R.E., Local Government Board inspector, has held an inquiry into the application of the Maldon Rural District Council to borrow £10,775 for the carrying out of the Parleigh water scheme, which includes the parishes of Althorne, Cold Norton, Hazeleigh, Latchingdon, North Frambridge, Parleigh, Stow Maries, and Woodham Mortimer.

The death occurred on Monday, after a month's illness, of Mr. Jeremiah Jowett, sanitary inspector and surveyor to the Lancaster Rural District Council, a post he has held for a large number of years. He was a great cyclist, and although 69 years of age he went from place to place on his bicycle in the performance of his duties, having covered between two and three thousand miles each year for some time.



## Building Intelligence.

**ABERDEEN.**—St. Mary's church, the "lower church" of St. Nicholas, Aberdeen, was reopened on Saturday after restoration. The chapel forms the crypt of the ancient parish church of St. Nicholas, once the largest parish church in Scotland. It consists of a nave, with north and south aisles, of one bay each, the nave being prolonged eastward by a semi-octagonal apse, from which it is separated by a strong, low, round arch. The chapel is vaulted throughout in stone, and is the only ancient example of ecclesiastical stone-vaulting in Aberdeenshire. Mr. A. Marshall Mackenzie, A.R.S.A., Mr. G. Gordon Jenkins, and Mr. William Kelly, three leading Aberdeen architects, were appointed to carry out the work. It was fortunate public attention had been directed to the chapel, for dry-rot had set in, and had even begun to infect the ancient carved oak, with which the chapel is so rich. In a very short time many of these unique and beautiful panels would have been hopelessly decayed. The seating, made up in 1837 out of the gallery fronts and benches belonging to the old church of St. Nicholas, has been taken out. The lath and plaster has been cleaned off the walls and the vaulted ceiling, revealing the fine stone vaulting, with its moulded ribs rising from carved stone corbels, and marked at the intersection by beautiful bosses. The removal of the lath and plaster from the west walls has displayed some splendid vaulting, which adds six new spandrels to the roof. Two old staircases were discovered which once led up to the choir of old St. Nicholas church, and they have now been laid bare. The floor of the transepts, as well as the nave, has been laid with granite, part of which was gifted by granite merchants in the city. The ancient carved woodwork, dating partly from the beginning of the 16th and mostly belonging to the 17th century, has been carefully preserved. Some of it has been used to form an oaken dado round the chapel, and a portion has been utilised to form a high wall-back and oak canopy to the pulpit. There are three windows in the apse of three lights each, and one window of two lights each in each of the transepts, and the mullions of these have all been renewed. It is intended to fill the windows with stained glass illustrative of episodes in the life of the Virgin Mary. The chapel will be lighted with electricity, and seated with chairs.

**AXMINSTER.**—The parish church was reopened last week on the completion of works of restoration which have been in progress for two years past. They comprise the rebuilding of the upper portion of the tower; the recasting, retuning, and rehanging of the peal of bells; the improvement of the clock in the tower; the restoration of the chancel, and the provision therein of a new roof in oak; the erection of oak choir stalls, and the retuning of the organ. The new peal, like its predecessor, consists of eight bells, but is much heavier, having been recast in additional metal by Messrs. Mears and Stainbank. The bells have been placed in a new oak cage, carried on new oak beams, and provided with new fittings throughout, while a new oak floor has been placed underneath. The rehanging, &c., has been done by Mr. Harry Stokes, of Woodbury. The clock has been refixed, and provided with two new copper dials, each 6ft. in diameter. It has also been fitted with Westminster chimes. The architect has been Mr. G. Vials, of Crewkerne. Mr. W. Dart, of Crediton, supplied the chancel stalls, and Mr. G. Cloud, of Axminster, has been the contractor for the whole of the work unconnected with the bells.

**BRISTOL.**—The Greig-Smith memorial operating theatre was opened on Friday at the Bristol Royal Infirmary by Sir William McCormac. It has been remodelled from designs and plans by Mr. W. H. Thorp, F.R.I.B.A., of Leeds, the architects being Messrs. Wilkins and Sons, of Surrey-street, Bristol. Mr. K. J. Osborne acting as clerk of works. The department comprises the following accommodation:—Principal operating theatre with students' gallery, smaller operating theatre, anæsthetic room, and surgeons' room, all on the ground floor; small ophthalmic operating room on the third floor. The principal operating theatre, size 21ft. 4in. by 15ft. 6in., and 26ft. 6in. high, is lighted by two ranges of windows, with a north aspect; and additionally top lighted by means of a large skylight, glazed with Mellowes' patent glazing. At a height of about 8ft. from

the floor is a projecting gallery carried round three sides of the room, for the use of medical students. It is constructed of steel framework, floored with concrete and marble terrazzo, and protected by a metal balustrade with a bronze handrail. The gallery is provided with narrow teak seating at the sides of the wall. The walls, to a height of 15ft., are lined with glazed tiles, the upper part ivory white in colour, and the lower, up to the level of the floor of the students' gallery, of a light jade green tint, with darker line borders of the same colour. The remainder of the walls and ceilings are plastered with Portland cement and finished to a fine smooth surface with Parian cement. Between two of the windows a bronze medallion portrait of the late Mr. Greig-Smith, modelled by Mr. John Fisher, of the Kensington Government School of Art, Berkeley-square, has been fixed to the wall. The small operating theatre, size 16ft. 9in. by 12ft. and about 14ft. high, is side-lighted only. It has no students' gallery. The anæsthetic room is 16ft. 9in. by 9ft., and about 14ft. high. The total outlay has been £2,700.

**CHURCH GRESLEY.**—A Wesleyan chapel at Church Gresley has just been completed. The west end is flanked by large octagonal pinnacles, with traceried pedimental heads and finials. The doorways are richly moulded with bands of diaper ornament in tympanum. The central window is a three-light traceried window, with single lights each side of it. The dressings are of terracotta. The roof is of pitch-pine, with hammer-beam principals. All interior fittings are of selected pitch-pine. The windows are glazed in diamond lead quarries. The work has been carried out by Mr. Charles Venning, of Swadlincote, from the design and under the superintendence of Mr. Robert C. Clarke, Prudential Buildings, Nottingham, at a cost of £1,600.—The board schools have also just been opened. They consist of two separate blocks, one a mixed school for 210 boys and 210 girls, the infants 290. Each school has a central hall, and the class-rooms are grouped round the hall, which has glazed floor. There are the usual cloak and lavatory arrangements and teachers' room. The dressings are of terracotta, and the roofs tiled. The works have been carried out by Mr. Charles Venning, of Swadlincote, at a cost of £7,000, from the designs and under the superintendence of Mr. Robert C. Clarke, Prudential Buildings, Nottingham.

**EDGBASTON.**—The new Church of St. Mary and St. Ambrose, Edgbaston, was consecrated on Friday by the Bishop of Worcester. It is Gothic in style, and is erected at the corner of Pershore-road and Raglan-road. It provides accommodation for over 700 worshippers, is faced with red brick with terracotta dressings, and has Bath stone dressings in the interior. It consists of a nave 90ft. long, with a chancel 36ft. long, north and south aisles, shallow north and south transepts, a choir vestry with organ over, an apsidal projection at the west end forming a baptistery, and a south porch. A tower and spire, 150ft. in height, are in course of construction at the north-west corner, and are expected to be completed, together with a peal of tubular bells, by next Easter. The windows are filled with Flamboyant tracery. The floor of the body of the church is wood, the aisles being paved with Ruabon quarries. The seats are of pitch-pine, with oak-top rails. The cost, exclusive of fittings, will be £8,000. The special gifts include a carved pulpit in Caen stone, the work of Messrs. Bridgeman, of Lichfield. The architect was Mr. J. A. Chatwin, and the work of building was carried out, under the superintendence of Mr. G. Day, by Messrs. Collins and Godfrey, Tewkesbury.

**FALKIRK.**—The Marquis of Lorne, opened on Friday a new high school for the town of Falkirk. The principal features of the main front, which has a northern exposure, are three gables, which are treated in a free manner, with transomed windows, surmounted by carved pediments, and flanked by pilasters. The centre gable is of a more ornate character, with carved pediments and scrolls, a clock opening forming the central feature. The east and west elevations are similar in style to the front, with gables at either end. The entrances are in these elevations, and are approached by flights of steps, flanked by stone balustrades. The ground floor of the school is occupied by the junior department. The class-rooms, six in number, can be converted into nine by glass sliding partitions. In addition there is cloak-room and lavatory accommodation, beside a private room for the head-

master. On this floor there is also situated the gymnasium, as well as the rector's business room. The school is planned on the central hall system. By means of sliding partitions, the central hall, junior department, hall, and gymnasium, can be thrown into one apartment when occasion arises. On the upper floor of the school are situated the class-rooms of the senior department, and chemical and physical laboratories, with large lecture-room. Space has been found for art and music rooms by raising the building to three stories in height at both back and front. The class-rooms are heated by low-pressure hot-water pipes. A new departure in Falkirk is the teaching of joinery, &c., in school. The accommodation of the school is:—Junior department, 426; senior department, 515—total, 941. The total cost will be about £13,000, and the architects are Messrs. A. and W. Black, Falkirk.

**LANCASTER.**—The foundation stone of a wing for cripples and epileptics, which is being added to the Royal Albert Asylum, was laid last week. The annexe is to be built at the south-east angle of the Brooke wing, and will be about 150ft. long and two stories high, the ground floor for the accommodation of 50 cripples, and the first floor (which is level with the ground floor of the main building) for 50 epileptic patients. The plan is on the pavilion principle, and each floor consists of a day-room, 54ft. by 32ft. at the end, with a smaller room opening out of the main room; two dormitories, one 60ft. long and the other 41ft. long and 27ft. wide, projecting at right angles from the main corridor; a stone staircase, and lavatory, bath-room, &c., in separate blocks with a disconnecting corridor. A sitting-room and a bedroom are provided on each floor for a married couple as attendants. The floors of the corridors and offices will be fire-proof, laid with wood blocks and tiles, and the walls lined partly with glazed brick, all the angles being rounded. There will be a hydraulic lift, and a large emergency cistern in the tower over the latrines. The heating will be by hot water from steam heaters supplemented by fresh-air grates, and extract ventilation flues built in the stacks, with steam coils at the top. The materials used and the style of architecture will correspond with the present buildings. The cost of the new block, without furniture, is estimated at £15,000. Messrs. Austin and Paley, of Lancaster, are the architects.

**LEEDS.**—The new fever hospitals erected by the Leeds Corporation at Manston, at a cost of about £40,000, were opened on Saturday. The site, which is some 98 acres in extent, is about three miles from the city. The principal entrance in the Tadcaster-road has on the left the porter's lodge, and on the right the mortuary. Two sets of double gates guard the entrance, one with a wicket-gate, being worked by a system of levers from the porter's room in the lodge. Some little distance along the drive and on the left is the mansion, to which have been added offices for clerk, a waiting-room for patients' friends, store-rooms, servants' mess-room, and the hospital kitchen. Directly opposite the mansion and some 400ft. distant are four double pavilions, three of which are for the treatment of scarlet fever, the fourth being a temporary nurses' home. The pavilions are arranged in diamond form, their long axes running north and south, with a distance of 124ft. clear between the east and west pavilions, and 230ft. between the north and south pavilions. The four pavilions are connected with the administrative block, and the laundry by an open covered corridor, broken at intervals to allow an ambulance drive to pass completely round each pavilion. At the north-west corner of the grounds are the laundry, boiler and engine houses, disinfectant and disinfecting-rooms, and near them a small isolation pavilion for six patients. On the east side of the estate (832ft. distant from the mansion) are two small-pox pavilions. One of these is a permanent brick structure, the other a wooden temporary erection; a short distance away are a mortuary and a laundry. The three pavilions for scarlet fever are each one story in height, and each contains two wards of ten beds, and a small ward of one bed. The two main wards are each 65ft. by 25ft., giving the following spaces and area per bed:—Linear wall space, 13ft.; floor area, 162-5ft.; cubic space, 2,280ft. Accommodation is provided in the new premises for 66 scarlet fever patients, 58 small-pox cases, and 6 isolation cases, a total of 130.

**OAKWELL.**—The joint fever hospital at Oak-



well, which has been constituted of representatives of Birstall, Gomersal, Birkenshaw, and Drighlington, has passed plans, subject to the approval of the Local Government Board, for the erection of hospital buildings at Foxhall, Birstall. A Local Government Board inquiry is to be held with reference to the application of the board for approval of the plans and site, for sanction to borrow £13,000, and for consent to the application of Gildersome to be included within the hospital area. The plans, which have been prepared by Mr. J. W. Burrows, architect, of Birstall and Morley, show that the hospital will consist of five blocks—namely, administration block, scarlet fever pavilion, isolation pavilion, typhoid pavilion, and laundry block. The site, which is eight acres in extent, is to be inclosed with a wall, and the grounds will be laid out with roads and footpaths to each block. Electricity is to be used for lighting, and the drainage will be treated on the spot on the Dibdin principle.

**PONTEFRAC.**—The ruins of All Saints' Church, as well as that portion still used for services, have caused a good deal of anxiety to the churchwardens of late, and at their instruction an inspection has been made by Messrs. Demaine and Brierley, Lendal, York, who have reported that in regard to the tower the squinch arches are weakened by the ashlar having been cut away from under some of the stones; the arch of the south-west angle appears to have recently moved a little, but not seriously, though new ashlar should be inserted where the old is cut away and the joints carefully cemented; that the key-stones of all the belfry windows have opened a little, and should be cemented also; that at the north-east and south-west angles slight fractures on the outside at both of the small square-headed windows are apparent, but are not serious; and that the original ringing-floor should be restored, so as to stiffen the walls, and should be of a framed construction in order to tie the building together, the present dilapidated condition being a source of weakness. The report recommended that the general restoration of the outside stonework should be undertaken before very long.

**SHOTLEY BRIDGE.**—The foundation-stone of new cottage homes in course of erection at Shotley Bridge, for the Gateshead Board of Guardians, was laid on Friday last. The buildings consist of six double cottages, or rather semidetached villas, accommodating in all 184 children. The institution will be governed by a superintendent, who will reside in the administrative block. Behind that block are the workshops, where will be blacksmith's, carpenter's, shoemaker's, and tailor's shops, and to the left will be a hospital. Each cottage will have downstairs a good day-room, and at the back a large kitchen. Upstairs will be two well-lighted and well-ventilated dormitories, each of the dormitories containing seven beds. There will also be a small spare bedroom, which will be occupied by a girl when she approaches the age of sixteen. The cottages will be fitted with bath and lavatory accommodation. Mr. W. Lister Newcombe, of Newcastle-on-Tyne, is the architect, Mr. W. Campbell Tyrie the contractor, and Councillor J. Patison the clerk of works.

**WORKING.**—Lord Onslow has formally opened the new Conservative club in Commercial-road. The building is in the Renaissance style, and is of red brick with Bath stone facings. The porch contains carved brickwork of original design, set off with Bath stone. Over the porch is a balcony with stone balusters and carved brick panels. On the ground floor is the vestibule, 10ft. by 7ft., and to the right is the committee room, 17ft. by 14ft., and a servery. To the left, on entering, are the reading room, 28ft. by 17ft. 6in., and a central hall, 24ft. by 9ft. At the rear are the cloak-room, scullery, lavatories, and offices. Below the ground-floor are wine and beer cellars. A broad pitch-pine staircase leads the way to two billiard-rooms, one measuring 27ft. by 17ft., and the other 25ft. by 20ft. There is also a card-room, 15ft. by 14ft. On the top floor are three rooms, the private apartments of the caretaker. At the back of the club is a large bowling green. Messrs. J. Harris and Son have erected the building from the designs of Mr. H. A. Whitburn.

Mr. William Garland, retired builder, one of the Conservative members of the Barnstaple Town Council for the North Ward, died on Sunday after a long illness, aged 75 years.

### LEGAL INTELLIGENCE.

**IN RE J. W. MACKINTOSH.**—The bankrupt attended for public examination, his accounts showing total liabilities £29,541, of which £12,081 are unsecured, and no available assets. In March, 1889, he started as a speculative builder on the Kinnaird Estate, North Woolwich, where, and at other places, he has since erected various houses and buildings, including 28, Bush-lane, E.C., from which latter place he transacted his business until March last, when, owing to the action of the petitioning creditor and to want of capital, he ceased business, and has since been maintained by his friends. The examination was closed.

**GOMERSAL WATERWORKS ARBITRATION.**—The award in this arbitration was made on Monday by Mr. S. H. Crowther, C.E., of Huddersfield, the amount being £8,410. On behalf of the district council, the valuation was fixed at between £3,000 and £4,000, and the valuers for the company put in an estimate as high as £18,000. The costs of the arbitration will be paid by the district council. Before arbitration was resorted to, the company offered to sell for £10,000, but the offer was afterwards withdrawn.

### CHIPS.

The stone-laying of a new Wesleyan chapel at Netherside took place on Sept. 26. It is a brick building, with Bath stone dressings. It has a western narthex, with handsome moulded doorway and traceried side window, with two three-light traceried windows over it, and a wheel window in the gable. The roof is open-timbered. It is being erected by Mr. Charles Venning, Swadlincote, at a cost of £600, from the designs of Mr. Robert C. Clarke, Prudential Buildings, Nottingham.

At Macclesfield, on Monday, a museum, presented to the town by Mr. Pownall Brocklehurst, of Macclesfield, and Miss Brocklehurst, was formally handed over to the corporation with public ceremonial. The building and endowment will cost the donors £10,000.

The United Asbestos Co., Limited, have just issued a revised price list, in which many important reductions are announced in their well-known "Salmander" decorations.

In the list of receiving orders announced in Tuesday's *London Gazette*, the name appears of Bernard Braham, of Liscard and Egremont, described as architect, builder, and contractor.

The ancient church of Greyfriars at Elgin, which has been purchased by the Marquis of Bute, was reopened after restoration last week. The glazing has been executed by Messrs. Lavers and Westlake, of London.

Alterations and additions are to be made to the Bromham Schools, in Bedfordshire. Plans are being prepared by Mr. George P. Allen, architect, of Adelphi Chambers, London.

At Tuesday's meeting of the London County Council, it was announced that no tenders had been received in reply to the Council's invitation in respect to the erection of two blocks of working-class buildings on the Boundary-street area and some cottage dwellings at Brook-street, Limehouse.

A vestry meeting for St. Margaret's parish, King's Lynn, was held on Thursday last week at the Town Hall, to consider the plans for a new reredos to be placed on the east wall of the chancel of St. Margaret's Church, the cost to be defrayed by a legacy left to the church by the late Mrs. Blencowe. The plans, which were passed, have been prepared by Mr. G. F. Bodley, A.R.A., and the cost of the work will be about £1,000, which is the amount of the legacy.

For some time past the New North Free Church, Forest-road, Edinburgh, has been undergoing extensive internal alterations. The electric light has been introduced. The heating apparatus has been replaced by one which includes present-day appliances. The windows are treated with simple designs in mosaic glass by the Glass-Stainers' Company, Glasgow.

The city council of Birmingham accepted, on Tuesday, the gift for the art gallery of a painting of "Elijah," by the late Sir Edward Burne-Jones.

The highways committee of the London County Council have resolved to recommend to the Council the purchase of the whole system of the London Tramways Company for a sum of £850,000.

Mr. G. F. Watts, R.A., is following up his Jubilee suggestion that a record should be kept of the heroism in every-day life. With the co-operation of the Vicar of St. Botolph's, Alergate, he proposes to make a start in the garden, formerly churchyard, called the "Postman's Park." His idea consists in the erection of an open gallery which will contain memorials of humble heroes and heroines in terracotta. Alice Ayres, the servant who died to save the children in the Gravel-lane fire, is to be the first subject for public honour.

The Penybryn new Congregational church, Wrexham, was opened on Sunday. The building is situated in Salisbury Park, and the cost, including school accommodation, amounts to about £5,000. The chapel will seat about 500 worshippers, and the school will accommodate about 300 scholars.

At the last meeting of the East Ham Urban District Council, the works committee reported that they had seen Messrs. Cheers and Smith, the authors of the first premiated design for the proposed public buildings, and they were of opinion that the buildings they have designed for East Ham could be erected for the amount provided by the Council—£55,000. The report was approved.

Four members of the Royal Commission on Sewage Disposal—Sir Richard Thorne Thorne, K.C.B. (medical officer to the Local Government Board), Major-General Phipps Carey (chief engineering inspector to the Board), Colonel Harding, and Mr. Cotton (chief engineering inspector to the Local Government Board for Ireland), with Mr. F. J. Willis (secretary to the commission)—visited the Exeter septic sewage works at Belleisle and Eveleigh's on Thursday last week. They were received by the town clerk, the city surveyor, and the medical officer, and made an inspection of considerable length. On Monday the Royal Commissioners visited the Manchester Sewage Works at Davyhulme.

At Monday's meeting of the city council of Wells the general purposes committee reported that inasmuch as the successful architect's estimate of a proposed new hall and post-office, built according to his own designs, would only cost £4,850, and the lowest tender was £9,192, they had written asking the architect to return the £25 premium paid him.

The Marquis of Zetland laid the memorial-stone of the Kerse Church, Grangemouth, on Friday. The building is estimated to cost £4,500. It is seated for about 750 people, is designed in the Gothic style, and consists of nave and transept, with a semi-octagonal recess at the west end, making the building cruciform on plan. Messrs. Goodair, of Falkirk, are the contractors.

Mr. J. Mansergh, C.E., sat at the Hotel Victoria, London, on Thursday and Friday last week, as umpire in an arbitration, which has been proceeding for several days past, to fix the price to be paid by the Corporation of Morley for the acquisition of the undertaking of the local gas company. Mr. Corbet Woodall, C.E., and Mr. T. Newbigging were engaged as arbitrators, the first for the Corporation and the second for the company. The valuers for the company assessed the value of the undertaking at about £133,000, and the Corporation valuers at about £80,000. The umpire reserved his award.

The foundation-stone of the new wing of the Technical College, which is attached to the Albert Memorial Museum at Exeter, was laid last week. The building will have a frontage of 24ft. towards Upper Paul-street. This front, three stories high, will be built in Pocombe stone and Ham Hill dressings, in harmony with the adjoining additions to the museum, erected a few years ago. The new building will contain five class-rooms, a physical laboratory, students' reading-room, east room with staff and apparatus rooms, lavatories, and offices. The buildings have been designed by Messrs. Tait and Harvey, of Exeter, and the contractors are Messrs. Ham and Passmore.

A pulpit, an altar rail, and sanctuary steps have just been fixed at the Roman Catholic Church of the Sacred Heart, South-street, Exeter. On Sunday they were used for the first time. The sanctuary steps are three in number, and of polished Devonshire marble. The altar rail is of similar stone. Each side is divided by piers into five compartments, and the rail is moulded and carved with inscriptions. The compartments are filled with gilded copper grills, and in the centre is a shield with emblem symbolical of the Passion. The pulpit is composed of Derbyshire and Devonshire marble and Beer stone. It is moulded, and in the niches are statues of the four Evangelists, and Saints Ambrose, Augustine, Gregory, and Jerome. The work was designed by Mr. C. E. Ware, and was executed by Mr. H. Read, of St. Sidwell's Art Works, Exeter, who is also at work upon a shrine, also designed by Mr. Ware, which will be fixed in the position occupied by the old pulpit.

At a cost of about £1,500, the ancient parish church of All Saints, Ryther, has been restored, and has been reopened by the Archbishop of York. The chief feature of the work lay in the taking down of the roof, which had been put up during the last century to cover by one span the nave and aisle. In its place two new roofs have been substituted, being facsimile of those which formerly existed over the chancel and the chantry. The floor of the chancel has been lowered 14in., so that the bases of the pillars might no longer be buried. The tracery in the new east window is Late Decorated. The work has been carried out from plans by Mr. C. Hodgson Fowler, F.S.A., architect, of Durham.



## Our Office Table.

In the first two paragraphs on page 449, in this column, in our issue of Sept. 23, relating to the recent litigation with respect to Abbey Mansions, Victoria-street and Orchard-street, Westminster, we made, inadvertently, two errors, which we wish at once to correct and to apologise for. It was stated at the commencement of our first paragraph that "on the 21st inst. an order was made by the London County Council for the removal of these mansions," and at the end of the second paragraph that "Mr. Marsham had on the return of the summons of the 22nd inst. made an order for the removal of the turret." Both statements were obviously incorrect, and were made without verification of the facts, on a report then before us, founded on careless misapprehension thereof. We are informed by the solicitor to Mr. Pawley and Mr. Rickard, that, if any settlement of the buildings has occurred, it is of the slightest character; and that "the peat-like earth" recently excavated, was taken, not from below the original foundations, but merely to allow of certain internal works being executed.

We regret to learn that Mr. Edgar Farman, the first honorary secretary and now the solicitor to the Society of Architects, and secretary to the Architects' Registration Bill Committee, met with a serious and painful accident on Tuesday, which will confine him to bed for some time to come. Mr. Farman is also the hon. secretary of the recently-formed Association of Bloodhound Breeders, and had taken an active part in organising an experimental meet of the members, which took place on Tuesday at Brown Moor, Ravenscar, some twelve miles from Scarborough. He was riding one horse up to the trial ground, and leading another, when the led horse kicked out and broke Mr. Farman's thigh just above the knee.

The lectures of the Professors of the Royal Academy will be delivered as under at Burlington House:—On the 10th (Monday next), 13th, 17th, 20th, 24th, and 27th inst. by Prof. Church on materials and methods of painting, and the conservation of pictures; on the 31st inst., and the 2nd, 4th, 7th, 9th, and 11th of November by Prof. Anderson on human anatomy. The same lecturer will continue this course on the 14th, 16th, 18th, 28th, and 30th of November, and the 2nd of December. Sir W. B. Richmond will discourse on poetic and realistic design on January 9th next; on the art of Burne-Jones on the 12th; on Titian and Tintoretto on the 16th and 19th; on style on the 23rd; and on character in portraiture on the 26th of the same month. Prof. Aitchison will continue his series of lectures on architecture on January 30th, February 2nd, 6th, 9th, 13th, and 16th. The lectures on sculpture have yet to be arranged for.

The question of Architects' Registration seems to be making more rapid headway in the various provinces of Canada than it appears to do in the Mother Country. The Quebec Architects' Act came into operation on the 1st September, on which date the period allowed for registration under the Act expired. Upwards of 100 applications have been received from persons desiring to register, and thereby be authorised to use the title "Architect." The Council of the Province of Quebec Association of Architects have been busily engaged of late with these and other matters pertaining to the operation of the new law.

The requirement for thoroughly independent tests with fire-resisting materials and systems is now to be met by a testing station organised under the auspices of the British Fire Prevention Committee, where the investigations will be carried out reliably in an essentially practical manner, and on scientific lines. The committee's testing station will be near Regent's Park, within easy reach of the West End, and the necessary arrangements are already being made to inaugurate the first series of tests. Systematic research work in the question of fire resistance has as yet only been commenced in the States, and the testing station in question will be the first of its kind in Europe. The preliminary arrangements have been in the hands of Mr. Edwin O. Sachs, acting for the executive, and Mr. Fredk. E. Farrow, acting for the commercial section. The tests in each case will be undertaken by the executive in conjunction with representatives of the council and the general body of members,

and the reports will take the form of statements of facts, supplemented by diagrams and photographs, duly attested. The first test will be with ceilings, and the first makers to have ceilings tested will be the Asbestos and the Asbestic Co. and the Expanded Metal Co.

The Yorkshire Union of Artists' eleventh exhibition was opened to the public on Saturday in the Leeds Municipal Art Gallery. Altogether over 600 pictures are exhibited by members of the society, and more than 70 of these have been hung in the Royal Academy, while a number of others have been at this year's Paris Salon. All the pictures are hung well within range of the spectators' vision. The exhibitors include W. P. Frith, R.A., A. Kinsley, R.I., R.B.A., R. Vicat Cole, A. W. Bayes, R.P.E., R. Jones, Gilbert Foster, R.B.A., W. Edwin Tindall, R.B.A., Edgar Bundy, R.I., W. Hill, Lester Sutcliffe, George Wright, &c. The arts and crafts department comprises a variety of working drawings for ecclesiastical and domestic decorations, and various decorative designs and models. The exhibition will remain open until Dec. 24.

ONE of the few remaining landmarks in Whitehall passed out of existence on Saturday. This was Vanbrugh House, in Whitehall-yard, which was built by Sir John Vanbrugh in 1796, and familiarly known as "the Pill Box," in consequence of its diminutive size. Prior to 1831, it was the residence of Lord Stuart de Rothesay, but in that year it was taken over by the then recently-established United Service Institution, which, together with its famous museum of naval and military relics, was housed there until 1895, when the Queen granted the use of the historic banqueting house of the Palace of Whitehall, to which a new southern wing was added, from the designs of Messrs. Ingress Bell and Aston Webb. The old building, which stands on the site of the quarters allotted to the officers of the Jewel House, has now been demolished to make room for the erection of the new War Office, on ground formerly occupied by Carrington House.

In a letter to the *Times*, Mr. H. J. Powell, of the Whitefriars Glassworks, discusses the question of technical education in London, in which he remarks that if the technical training in the elementary and secondary schools is thorough, the boys can be retained longer at school without injuring their prospect of success in skilled trades or handicrafts. If, moreover, the boys remain longer at school and the secondary schools are efficiently equipped and organised, the need for polytechnics of the present type and of the existing ramification of evening schools and classes will gradually disappear. Great progress has, he points out, undoubtedly been made since the passing of the Technical Instruction Act; but technical education still requires to be defined, and there is still a tendency to create new institutions without regard to an organised system or to future wants. What appears to be needed is the general recognition that technical training is an essential part of education, and should be continuous from the board school to the university.

The annual convention of the National Association of Master House Painters will be held at Liverpool on Tuesday, Wednesday, and Thursday next week. On Tuesday the proceedings will be opened by a reception at the City Hall, and an address by the president, Mr. Alexander G. White, and a business meeting of delegates will be held afterwards. On Wednesday, among the papers to be read and discussed are: "The Present Position of the Decorator," by Mr. Molton; "Notes and Queries on Modern Decorative Design and Colour," by Mr. Alex. Rottman; "The Consolidation of Our Trade Interests," by Col. R. J. Bennett; and "Three Months' Working of the Workmen's Compensation Act, 1898," by Mr. J. Corbet McBride. A reception by the Lord Mayor of Liverpool will be held at the Walker Art Gallery in the evening, and various excursions are arranged to take place on Thursday.

MR. HOWARD CONSTABLE, who a few years ago was a competitor for the position of supervising architect of the United States, is the author of a scheme for the erection of windowless tall buildings on expensive sites. It is proposed to furnish such buildings with entirely artificial light, instead of a combination of natural with artificial light, as at present. Ventilation would be provided by a system whereby fresh air would be brought in from the roof in pipes, and conducted in proper quantities to the various rooms throughout the building, while the impure air

would also be expelled through pipes, which might be charged with chemicals so as to destroy disease germs with which it might be impregnated. The advantages claimed for this style of building are that the space now required in such buildings for a central court for lighting purposes would be available for use, and would add considerably to the revenue; that the absence of window openings in the outer walls would greatly lessen the fire hazard; that all rooms in such a building would be equally desirable; that smoke and foul air which now enter through windows would be excluded, and, it is suggested, that if the architect were relieved from the necessity of figuring out the problem of how to successfully light so many scores of rooms, he could make his façade much more beautiful. Mr. Constable admits that the public is not likely to immediately fall in with his ideas, but proposes that his theory should at once be put in practice by reducing the number and size of window openings in buildings of this class to be erected in the future, and by glazing them with wire mesh glass, which would resist the action of fire.

THE report of the Local Government Board for 1897-8 has just been published in a blue-book. The details of the working of the Local Government Act of 1888 and County Council work generally are dealt with very fully. The local taxation licenses last year realised £3,342,685, and probate duty and estate duty grant £2,077,438, thus exceeding the estimate by no less than £633,989. Since 1871 the Local Government Board has sanctioned the borrowing of £84,533,996 by urban and rural authorities. The amount sanctioned in 1897 was £5,886,562. Up to 1890 the loans seldom amounted to £3,000,000 in one year; but since then they have been considerably more. In several instances during the year the board were called upon to decide complaints made to them under section 299 of the Public Health Act, 1875, as to local authorities having made default in providing their districts with sufficient sewers, or with a proper supply of water. The district auditors made during the year ended the 31st December, 1897, one disallowance in the accounts of a town council; 506 disallowances and surcharges in the accounts of urban district councils and their officers; six in the accounts of joint hospital boards; 11 in the accounts of sewerage and water boards; one in the accounts of a port sanitary authority; 331 in the accounts of rural district councils and their officers; 13 in the accounts of highway boards and their officers, and the separate accounts of waywardens; 173 in the accounts of surveyors of highways; and 320 in the accounts of school boards and their officers. In the great majority of the cases the surcharges were confirmed, but remitted.

THE extension of the borough boundaries of Bolton, brought about by the passing of the Bolton, Turton, and Westhoughton Extension Bill, which received the Royal assent on August 12, came into operation on Saturday last. One urban district council area, Astley Bridge, and ten townships, Tonge, Brightmet, Darcy Lever, Great Lever, Middle Hulton, Over Hulton (part), Deane, Lostock, Heaton, and Smithills, now form part of the municipal borough. A population of 38,000 and a statute acreage of 13,000 have been added to the borough, making the population 160,000, and the acreage 15,861. The councillors are increased from 48 to 72, and the aldermen from 16 to 24, thus making the number of municipal representatives 96. Additional accommodation has had to be provided in the council chamber for the increased number of representatives. The rural district council authority is dissolved; the Turton District Council area now includes Belmont, Bradshaw, Edgeworth, Entwisle, Harwood, Longworth, and Quarlton, and Westhoughton takes over that portion of Over Hulton not added to the borough.

BRICK manufacturers in the neighbourhood of Toronto are, says the *Canadian Architect*, all operating their works at full capacity, and find difficulty in keeping pace with the demand. Many of them have orders ahead which will require the balance of the season to fill. At present it appears that little, if any, stock will be carried over, and builders who do not now succeed in buying sufficient material to meet their requirements until next year's stocks can be put on the market, are likely to experience a time of enforced idleness when the season of 1899 opens. The unexpected extent to which building enterprise has revived in Toronto the present season, after several years of unexampled dulness, found the



brick manufacturers with no surplus stock on hand.

THE trade in Burma teak with India was good throughout the year 1897-98. There is an ever-increasing demand for it, especially in Bengal and in the East Coast ports. Owing to smaller imports from Siam, the Bombay trade in Burma teak did not suffer as it would otherwise have done through the reduced consumption caused by plague and famine, which produced conditions generally adverse to trade. First-class timber varied in price in the Indian markets during the year from 85 rupees to 90 rupees a ton, and lower classes in proportion. There was also a strong demand for teak in Europe for shipbuilding, railway, and other purposes during the year. The engineering strike obstructed business for a short time, but did not adversely affect prices in the home market, which stood firm at about £11 to £12 10s. for squares, and £11 to £13 10s. for "Europe quality" planks. There was no change in freights, the regular line steamers' rates being 42s. 6d. for squares, and 40s. for planks, sailing vessels getting from 35s. to 40s. all round.

The memorial-stone of a Liberal club was laid in Bolton-street, Lower Brixham, on Friday. The ground dimensions are 20ft. by 66ft. The front is to be of red brick, with white brick dressings. Central bay windows will light up the reading and billiard-rooms, and the club will be approached by steps. On the first floor will be a reading-room, book-store, billiard-room with open roof, 24ft. by 14ft., and living-rooms, while in the basement are to be placed a skittle-alley, 30ft. by 16ft., and lavatories. The contractors are Messrs. Hosgood and Wills, of Brixham, and the cost of the building will be £560. The plans were prepared by Messrs. Bridgman and Bridgman, architects, of Torquay and Paignton.

The unveiling of the new panels in the Royal Exchange by the Lord Mayor has been fixed for Monday next, at half-past twelve o'clock. One of the panels—the gift of the Corporation of London—is by Mr. Seymour Lucas, R.A., and depicts William the Conqueror granting a charter to the citizens of London. The other, by Mr. Sigismund Goetze, has as a subject the offer of the Crown to Richard III. at Baynard's Castle.

Rugby School Chapel was reopened on Saturday afternoon, after enlargement of the west end, as a memorial to the late Rev. P. Bowden Smith, an assistant master at Rugby for forty years. The part of the old chapel, built in Dr. Arnold's time, which was left when the chapel was rebuilt in 1872, has been removed, and the main building completed in keeping with Mr. Butterfield's designs, at a cost of £4,600. A memorial medallion of the late Archbishop Benson, sculptured by Mr. A. Bruce Joy, and designed by Mr. T. G. Jackson, R.A., has been placed in the south transept, also a stained-glass window in memory of Dean Gouldburn, a former head master, designed by Mr. C. E. Kempe. The builders were Messrs. Parnell and Son, of Rugby, at a cost of £4,600.

Two stained-glass windows have just been placed in the Oldbury Wesleyan church, near Birmingham. The windows are memorials to the late Ezra Hadley, of Oldbury, and deceased members of the choir respectively. Subjects, "The Ascension" and "Choir of Angels." The windows were designed and executed by Mr. J. W. Camm, at his studio, Smethwick, near Birmingham.

The new church schools at Perranarworthal were opened by the Bishop of Truro on Tuesday week. They are built of local stone with granite facings. The main room is 36ft. by 18ft., the height being 14ft. The room accommodates 140 children. On the west side there are two small classrooms. The work has been executed from plans by Mr. Swift, of Truro. Mr. E. Barnicoat, of Mylor, has done the masonry, and Messrs. J. and G. Row the carpentry.

The thirteenth anniversary of the consecration at St. Augustine's Church, Edgbaston, was celebrated on Sunday by the unveiling of three new stained-glass memorial windows. The chief is the window at the west end, the characters represented being in the "Te Deum." A smaller window in the north transept depicts the "Sermon on the Mount," and another in the south aisle, in three lights, represents "Ruth and Naomi," "Our Lord at Bethany," and "Baptism of Lydia."

Wednesday next, the 12th inst., will be the sixtieth anniversary of laying the foundation-stone of the Southampton Docks, and the directors of the London and South-Western Railway propose to commemorate the occasion by the laying of a coping stone at the south-west corner of the new deep-water quays, now rapidly approaching completion at that part. The stone will be laid with Masonic honours by Mr. W. W. B. Beach, M.P., Provincial Grand Master.

## MEETINGS FOR THE ENSUING WEEK.

MONDAY.—University College, Gower-street, W.C. Introductory Public Lecture to the Classes of Architecture and Construction on "Students' Difficulties," by Professor T. Roger Smith, F.R.I.B.A. 7.30 p.m.

TUESDAY.—A.A. School of Design. Preliminary Meeting Addresses by G. H. Fellowes-Fryne, Aston Webb, and Cole A. Adams. Convention at Liverpool of National Association of Master House Painters.

WEDNESDAY.—Convention at Liverpool of National Association of Master House Painters.

THURSDAY.—Carpenters' Hall Lectures. "Site Foundation and Sanitary Requirements," No. 1, by Professor T. Roger Smith, F.R.I.B.A. 7.30 p.m.

FRIDAY.—Glasgow Technical College. "Life as a Foreman of Works on the Gold Coast," by James Jardine. 8 p.m. Architectural Association. Discussion Section. "Church Restoration," by C. E. Mallows. 7 p.m.

## THE ARCHITECTURAL ASSOCIATION.

CLASSES commence OCTOBER 10th, 6.30 p.m. Pamphlet, containing full particulars and nomination forms for membership, may be obtained on application to the Hon. Secs. at 56, Great Marlborough-street, W.

E. HOWLEY SIM } Hon. Secs.  
G. B. CARVILL }

## CHIPS.

The Lambeth Vestry have resolved to apply to the County Council for permission to erect a statue of the Queen in the inclosure on the east side of Lambeth Bridge. The statue is the gift of the late Sir Henry Doulton.

The Chester town-hall, which was partially destroyed by fire in March of last year, is now almost completely restored, and a meeting of the town council will be held on Wednesday next in the new council-chamber.

Monday saw another tangible step taken at Grimsby towards the completion of the Harbour of Refuge Scheme—viz., the building of 43 almshouses on the plot of freehold ground given by Mr. Grant Thorold. Thirty-two houses have now been completed, and are occupied, giving shelter to some 115 widows, orphans, and aged poor.

The Bishop of Manchester consecrated, on Monday, a new chancel for the parish church of St. Nicholas, Newchurch-in-Rossendale. The scheme provides additional accommodation for 55 persons.

A destructive gas explosion took place on Saturday night at 52, Lorrimer-avenue, Ford, Devonport. The house is owned and occupied by Mr. Cecil Stowe, architectural draughtsman, employed in the borough surveyor's department of the Devonport Corporation. The explosion is attributed to a fractured gas-main immediately outside the front door. It is presumed that the main had sunk at this point, causing the fracture. The house is one of the block built by the Dockyard Workmen's Building Company. When the estate was laid out an old lane was blocked up and a new street made in its place, and it was at the point where the lane was blocked that the gas-main had broken. From the main the escaped gas had travelled into the house, and hence the explosion.

Considerable improvement was shown in the returns from the Auction Mart last week, the aggregate of the business done amounting to £81,970, or considerably more than double that recorded for the same period last year. The chief item was the sale of a residential estate of 600 acres in Sussex, but satisfactory prices were secured for shop properties and other investments in the Metropolis and suburbs. In the provincial markets there has also been considerable activity, the demand for agricultural land maintaining the improvement recently noticed.

The Sutton National Schools, St. Helens, Lancs, which have been enlarged at the cost of about £3,400, were formally reopened on Saturday by Lord Stanley, M.P. The schools now provide accommodation for 1,300 children. The work of enlargement was carried out by Mr. Thos. Woods, builder, St. Helens, from plans prepared by Mr. B. F. Biram, architect, St. Helens. The cost of extension has been about £3,400.

The memory of the late rector of St. Michael's, Heavitree, Exeter, the Rev. Sackville H. Berkeley, M.A., has been perpetuated by the erection of choir stalls and an eastern stained-glass window, which the Bishop of Exeter dedicated on Wednesday week. The work is from the design of Mr. E. H. Harbottle, F.R.I.B.A., the diocesan surveyor, from whose pencil are also the new chancel and tower erected some few years ago. The subject is "The Resurrection." The new clergy seats and desks and the choir stalls are of oak. The ends are carved with varied designs of foliage and tracery, and the fronts contain much carving and pierced work. The work has been carried out from the designs of Mr. Harbottle by Messrs. Harry Hems and Sons, of Exeter.

## LATEST PRICES.

IRON, &c.			
	Per ton.	Per ton.	Per ton.
Rolled-Iron Joists, Belgian.....	£6 0 0	to	£6 10 0
Rolled-Steel Joists, English.....	6 10 0	"	7 0 0
Wrought-Iron Girder Plates.....	5 15 0	"	6 10 0
Bar Iron, good Staffs.....	7 0 0	"	8 0 0
Do., Lowmoor, Flat, Round, or Square.....	17 0 0	"	17 5 0
Do., Welsh.....	5 15 0	"	5 17 6
Boiler Plates, Iron—			
South Staffs.....	7 17 6	"	8 5 0
Best Snedshill.....	10 0 0	"	10 10 0
Angles 10s., Tees 20s. per ton extra.			
Builders' Hoop Iron, for bonding, &c., 28 15s.			
Builders' Hoop Iron, galvanised, 215 10s. 0d. per ton.			
Galvanised Corrugated Sheet Iron—			
No. 18 to 20. No.			
6ft. to 8ft. long, inclusive gauge.....	£10 15 0	to	£11 0 0
Best ditto.....	11 5 0	"	11 10 0
Cast-Iron Columns.....	£6 0 0	to	£8 10 0
Cast-Iron Stanchions.....	6 0 0	"	8 10 0
Rolled-Iron Fencing Wire.....	7 0 0	"	8 0 0
Rolled-Steel Fencing Wire.....	7 0 0	"	7 10 0
" " Galvanised.....	10 10 0	"	11 10 0
Cast-Iron Sash Weights.....	4 0 0	"	4 2 6
Cut Clasp Nails, 3in. to 6in.....	8 15 0	"	9 15 0
Cut Floor Brads.....	8 10 0	"	9 10 0
Wire Nails (Points de Paris) 0 to 7 8 9 10 11 12 13 14 15 B.W.G.			
8/6 9/0 9/6 10/3 11/0 12/0 13/0 14/9 16/9 per cwt.			
Cast-Iron Socket Pipes—			
3in. diameter.....	£5 10 0	to	£5 15 0
4in. to 6in.....	5 0 0	"	5 10 0
7in. to 24in. (all sizes).....	4 15 0	"	5 0 0
[Coated with composition, 2s. 6d. per ton extra; turned and bored joints, 6s. per ton extra.]			
Pig Iron—			
Cold Blast, Lillleshall.....	105s.	to	110s.
Hot Blast, ditto.....	57s. 6d.	to	62s. 6d.
Wrought-Iron Tubes and Fittings—Discount off Standard			
Lists f.o.b. —			
Gas-Tubes.....			75p.c.
Water-Tubes.....			70
Steam-Tubes.....			62½
Galvanised Gas-Tubes.....			60
Galvanised Water-Tubes.....			55
Galvanised Steam-Tubes.....			45
10cwt. casks. 5cwt. casks.			
Sheet Zinc, for roofing and work- ing up.....	£23 0 0	to	£24 0 0
Sheet Lead, 3lb. per sq. ft. super.....	15 0 0	"	16 0 0
Pig Lead, in lwt. pigs.....	14 2 6	"	15 2 6
Lead Shot, in 28lb. bags.....	17 10 0	"	18 10 0
Copper Sheets, sheathing and rods.....	62 0 0	"	63 0 0
Copper, British Cake and Ingots.....	54 15 0	"	55 15 0
Tin, Straits.....	75 2 6	"	76 2 6
Do., English Ingots.....	77 0 0	"	78 0 0
Spelter, Silesian.....	21 17 6	"	22 2 6

## TIMBER.

Teak, Burmah.....per load	£13 0 0	to	£15 10 0
" Bangkok.....	10 10 0	"	14 10 0
Quebec Pine, yellow.....	4 5 0	"	6 5 0
" Oak.....	4 0 0	"	6 0 0
" Birch.....	4 0 0	"	5 15 0
" Elm.....	5 0 0	"	6 0 0
" Ash.....	4 5 0	"	5 10 0
Dantisc and Memel Oak.....	2 0 0	"	4 0 0
Fir.....	2 10 0	"	4 10 0
Wainscot, Riga p. log.....	4 5 0	"	6 5 0
Lath, Dantisc, p.f.....	4 10 0	"	5 10 0
St. Petersburg.....	5 0 0	"	6 10 0
Greenheart.....	8 0 0	"	8 10 0
Box.....	4 5 0	"	15 0 0
Sequoia, U.S.A. ....per cube foot	0 1 8	"	0 1 10
Mahogany, Cuba, per super foot			
lin. thick.....	0 0 5	"	0 0 6½
" Honduras.....	0 0 4	"	0 0 6½
" Mexican.....	0 0 4	"	0 0 5
Cedar, Cuba.....	0 0 4	"	0 0 4½
" Honduras.....	0 0 3½	"	0 0 4½
Satinwood.....	0 0 5	"	0 1 0
Walnut, Italian.....	0 0 3	"	0 0 7
Deals, per St. Petersburg Standard, 120-12ft. by 1½in. by 1½in. —			
Quebec, Pine, 1st.....	£18 0 0	to	£24 10 0
" 2nd.....	13 0 0	"	16 10 0
" 3rd.....	6 0 0	"	9 10 0
Canada Spruce, 1st.....	3 10 0	"	10 10 0
" 2nd and 3rd.....	7 10 0	"	8 10 0
New Brunswick.....	7 0 0	"	8 0 0
Riga.....	3 0 0	"	9 0 0
St. Petersburg.....	9 10 0	"	14 0 0
Swedish.....	9 10 0	"	16 0 0
Finland.....	9 10 0	"	10 0 0
White Sea.....	10 10 0	"	17 15 0
Battens, all sorts.....	5 0 0	"	15 0 0
Flooring Boards, per square of lin. —			
1st prepared.....	£20 9 6	"	£20 16 0
2nd ditto.....	0 8 0	"	0 13 0
Other qualities.....	0 6 3	"	0 7 0
Staves, per standard M. —			
Quebec pipe.....	£35 0 0	"	£42 10 0
U.S. ditto.....	210 0 0	"	220 0 0
Memel, cr. pipe.....	180 0 0	"	190 0 0
Memel, brack.....			

## OILS.

Linseed.....per ton.	£17 2 6	to	£17 12 0
Rapeseed, English pale.....	23 5 0	"	23 10 0
Do., brown.....	21 15 0	"	22 5 0
Cottonseed, refined.....	15 10 0	"	16 5 0
Olive, Spanish.....	28 10 0	"	29 0 0
Seal, pale.....	20 5 0	"	20 10 0
Cocoonut, Cochin.....	27 10 0	"	28 0 0
Do., Ceylon.....	24 0 0	"	24 5 0
Palm, Lagos.....	22 5 0	"	22 10 0
Oleine.....	18 15 0	"	19 15 0
Lubricating U.S.....per gal.	0 6 8	"	0 7 6
Petroleum, refined.....	0 0 5	"	0 0 5½
Tar, Stockholm.....per barrel	1 0 0	"	1 5 0
Do., Archangel.....	0 12 6	"	0 15 0
Turpentine, American... per ton	23 15 0	"	24 0 0



# THE BUILDING NEWS

## AND ENGINEERING JOURNAL.

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FRIDAY, OCTOBER 14, 1898.

### INCORPORATION OF NEW PRODUCTS.

THE man who can select and arrange his materials is he who is now the most successful practitioner. Invention, either in a constructional or artistic sense, is no longer the sole desideratum. Can it be otherwise when so many of the materials of building are manufactured and converted for the purpose? Our building industries are ever growing and developing. Every year some new product or, perhaps, new application is evolved. Chemical analysis and the application of machinery have even introduced to the architect's notice artificial stones that for hardness and texture surpass many natural stones. Scientific research and laboratory experiments promise a revolution in the application of glass to our buildings, and one or two recent products are on the market; the resources of science and industry have been turned to several valuable fire-resisting materials, and all these inventions have made it more possible to construct buildings that will vie for durability and resourcefulness with any of those of a previous age. The architect can no longer sit down and say "What are these new products and inventions to me?—they cannot alter or improve my art; they are merely modern productions, and have no value to the real artist." But in this spirit many are still to be found, who affect to think art is unalterable, and cannot be developed; that we must not invent any new style, but keep on imitating what we have, much in the same spirit as those who always go back to primitive times and teaching—the first three or four centuries A.D., for instance—as if nothing afterwards was true or worth having. This fossilised view of things, which sees no growth or development in architecture or in theology or any other thing, is inimical to all advancement or change of circumstances. Such people have the boldness to assert, for instance, that we have had no true religion or worship after the first century of our era; that everything has grown corrupt since that time, and therefore our churches should go back to that early model. Others, among them many architects, pin their faith to all done before the 15th century—that since then art has declined; and still another class can see nothing to admire that has been introduced by moderns—that since the Renaissance all has been chaos and confusion. These believers in the archaic cannot distinguish between what is vital and immutable in all art, and those things that necessarily undergo variation and change as circumstances alter. Thus we had curious sticklers for ancient bolts and hinges, even when more modern and better fittings were introduced; men who would persist in giving us Mediævalism in woodwork, ornament, carving, and metalwork although our artists had produced something more suitable and appropriate; others who preferred antique designs for metal fittings to any modern manufactures. And the same spirit still lingers with many of us who discard modern invention and manufacture. Of course, many new things are atrociously bad in design, as, for example, a good deal of the new woodwork and cabinet-making of the bazaars, many of the patterns for locks and hinges and door handles one sees in the ironmonger's catalogue, a very large quantity of the stock designs for register stoves and grates and mantelpieces, of so-

called "art tiles" and decoration; but these are happily becoming less obnoxious. What we say is that if architects of the sort we are describing had not withheld their patronage of the modern industries, but had shown the true spirit of adapters and selectors, much less of the rubbish we have noticed would have been in existence. The ancient craftsman never separated the design from the material he worked in, and he took care to impart to the least fitting the smallest piece of metal-work, such things as hinges, and locks, and handles, a meaning and character in harmony with the building as a whole. It is not so now. Many architects select their fittings and metal-work, their gas pendants and electroliers, their door furniture from trade lists without the slightest reference to the design, and hence we see so much that is crude and out of harmony in our buildings. Quite a new era of architecture has opened, an age of appropriating a variety of trades now carried on independently of architects, and the man who desires to become successful in his profession must not think it beneath him to select and arrange those materials and fittings, even if they appear somewhat too modern for him. It would be hardly wise for him to discard mortise locks for his doors because he thinks rim locks can be made more artistic fittings. People have come to like a mortise lock as a neater and less cumbrous fitting, though it certainly is weakening to the middle rail of door, and cannot be made ornamental. The ordinary butt hinges which we employ to hang doors are certainly not ornamental, but they are simple and strong; so it is with many modern wood fittings: they are anything but artistic, their moulded work is scanty and poor; but they are more adapted to our modes of working, and it is better for the architect to see how they can be made to agree with the joinery of his interior than that he should set his face against them, and allow the contractor to do what he likes. Only in a few buildings is it permitted the architect to design his fittings and his metalwork, and this means a large expenditure in patterns and models. The ordinary practitioner must be contented to select a great many of such things from the manufacturer's stock. Is this, we hear someone say, the ideal of the future? Are invention and design in such matters things of the past? There is little doubt we have arrived at such a stage. In the near future very much of what formerly belonged to his profession—in the design of woodwork, ornamental plasterwork, fittings of iron and brass—will be turned out by special processes; and it is largely so now. The details of the architect's work are gradually assuming such definite shapes, and, as it were, becoming stereotyped by repeated use, and competition and prices are becoming so keen and oppressive, that the things are being manufactured and kept in stock which once formed part of the architect's vocation. Only to mention such details as plaster ceiling-ornaments and wood joinery, Inigo Jones, Chambers, and Adam Brothers made designs for ceilings, enrichments, furniture, which are now special branches. With brickwork at the exorbitant price of £16 to £18 per rod, it is almost impossible for the average architect to spend much on enrichments or modelling, or to design his own details of finishing. The fact remains, however, that in the future the architectural practitioner must not think it beneath his duty to make himself more familiar with the details and fittings of his building; further, it seems probable that with the development of building industries, one of his chief duties will be the selection and incorporation of manufactured goods into his designs and specifications. And from the art point of view we need not trouble much about the coarseness and vulgarity of manufactured goods. These are

defects which time will right. Our manufacturers are fast rising to the occasion. The designs for wood fittings, for iron and metal work, are fast improving. Real artists to direct and to execute are necessary. The charm of good design lies in this: that we clothe current thought in current shapes. The manufacturer's article, like a bolt or a door-handle, is better for being frank and honest; his cheaper patterns are often truer than those of high price, where ornament has been added, or some old pattern copied. The great thing is to clothe modern ideas in modern dress, and if our building is designed on this principle, it will be easier to make our fittings and details follow suit. No doubt it is hard to apply this rule in a building designed after a Mediæval or Queen Anne model; the strictly modern door-knocker or grate looks absurdly out of place in it. The professional stylist is to blame for the discrepancy.

### MODEL SPECIFICATIONS.—XXXIV.

IRONMONGER, FOUNDER, AND SMITH.

MANY special fittings for window sashes and casements are worth the attention of the architect before finishing his specification, and he cannot do better than obtain the illustrated catalogues of a few well-known manufacturers of such articles, such as those we have named. Each of these fittings has some special merit of its own. We give several sections of improved metal water-bars for casements, some for those opening inwards as Nos. 7 and 9, and Nos. 8, 10, &c., for outward opening casements. No. 7 bar is hinged to sill, and falls down when the casement is opened. As it is closed the tongue-shaped piece screwed to bottom rail, shown in section, catches the hinged bar, and lifts it up in the position shown. No. 10 is a good form of bar, some of these are supplied by James Hill and Co. Nos. 12 and 13 are sketches of casement fasteners. In selecting brass or gunmetal stays, the simplest is often the best; iron stays soon corrode, and give way at the joint, and one of the best for ordinary use is Hill's fluted bar single-jointed brass stay.

Our other sketches show details of barge-boards from old examples: the latter two are from the porch and lych-gate of Saltwood Church, Kent, with section of barge-board. The details of seat and bench-end are from a modern London church. The following are a few other clauses for special fittings in this trade:—

14. *Water-Bars for Casements.*—The casements, lettered (or numbered) on drawings, to have patent improved water-bars of brass fixed to oak sills to design; or to have Hill's brass water bar, No. 2104r (see section 10), fitted to all casements opening outwards. Or—

Fitted to all casements opening inwards with brass water-bars No. 2102r (see section 7), hinged to sill, to fall down when casement opens. Or—

The casements of drawing-room windows opening inwards to be fitted with the N.A.P. "wet and draught excluder," of quality "E" rolled iron (see section 9); or the casements to be fitted with the N.A.P. wet and draught excluder of solid rolled brass (or of quality "A") with  $\frac{1}{2}$  in. brass rod (or of quality "B" or "C").

15. *Sash and Casement Fittings.*—For sash and casement fittings see clauses 1 to 12 in last issue. For any special fittings name the manufacturer and number of pattern, or Boobyer and Sons, Hills, or other approved brass sash openers, lifts, and fasteners (or two top catches, two catch lifts, two brass cased pulleys, and one best thread cord, with four handles of china or ebony (or gunmetal), per set complete 15s. 6d. Give width of top rail of bottom sash, or provide Meakin's patent sash fastener, with cords, handles, &c., p.c. 20s.)

16. *Stays.*—The casements opening outwards to be fitted with strong brass (or gun-metal stays) 12 in. (or 15 in.), or Leggett's patent, p.c. 33s. to 40s. per dozen. Or—

Strong stays for casements opening inwards of polished brass 12 in. (or 15 in.) long, p.c. 6s. 9d. The bar to be fluted.



17. *Casement Fasteners.*—The casements of rooms to have brass (or gun-metal) fasteners right handed (see sketches 13 or 14), or Nos. 2991, or 2514, or 2519, Hill's catalogue. If a particular pattern of sash fastener is required, specify any good pattern, as a plain oak or ebony knob, cog action, with angle plate.

18. *Casement Bolts.*—These are generally after the espagnolette kind, and any catalogue will give a large variety to choose from, plain and very ornamental. Brass is the best, but iron is generally used, with steel shoots. Specify polished brass casement bolts, with brass (or steel) shoots, 6ft. (7ft. or 10ft.) long; hinged lever handle, No. 1320, Hills, or No. 1319R,  $\frac{1}{2}$ in. iron bolt, triple action, p.c. 6s.

19. *Fanlight Gearing.*—Provide and fix to fanlight over shop partition, hung at the bottom to open inwards, the N.A.P. No. 34M screw-fanlight gearing, with both cord and rod actions; (or to fanlights hung at the top to open outwards). The N.A.P. Window Co., Ltd., Victoria-street, No. 19, all in brass with screw-gearing, p.c., 13s. each; and provide and fix to front entrance Hill's patent brass fan opener, with rod and cord action, No. 1903R, for light hung at bottom and opening inwards, and brass fittings complete. The rod to be 18in. long, p.c. 15s. 6d.

In specifying fanlight openers, the width of light, how hung, length of screw, width of frame, whether flush with light, whether to have rod or cord, and whether on right or left, and other particulars as to mouldings or projections on transom, so that rod and cord may clear the same, ought to be given; or quote No. in catalogue. Many difficulties and delays in ordering would be obviated if architects gave a detail or sketch in every such case.

For large or heavy fanlights, rods and cranks are desirable. The clause may be as follows:—

Provide and fix complete Hill's improved cross-rod opener to entrance-door, fanlight hinged at bottom to fall inwards, all to be of brass except the rods, No. 2648, p.c. 28s. 6d., or with quick-action lever handles. (State length of down rods.)

20. *Lantern Gearing.*—The ten lantern lights to be fitted with approved continuous gearing-rod (or cord action), and the skylights above to be provided with a patent cord-action gearing brass screws, and fittings (state length of down cord, No. of lights and how hung; if rod, state length of rod); or the lantern-lights to be actuated by rods and levers, chains, or cords, as shown by detail, the endless cords to be extra strong for screws  $\frac{1}{2}$ in. diameter, and special brass pulleys and handles to be provided, supplied by James Hill and Co. Or—

Provide and fix to lights hung at top to open outwards, the N.A.P. screw fanlight gearing, No. 19, all in brass.

21. *Rim Locks.*—To all doors of upper floors provide 6in. rim locks, two iron (or brass bolts); or provide and fix Hill's patent reversible rim locks, two levers, with brass furniture approved.

For doors of second floors provide and fix 6 $\frac{1}{2}$ in. reversible moulded brass rim locks, two (or four) levers, with brass furniture to be selected.

22. *Mortise Locks.*—The doors of rooms on first floor to have patent 5in. reversible mortise locks, with two brass bolts and two levers; or Hill's special 6in. "villa mortise locks," two brass bolts, two levers, and brass bushed.

23. *Front Door Locks.*—The entrance door to have a Hobbs and Co.'s 6in. (or 8in.) drawback lock, brass bolt gunmetal bushed, with two (or four) levers and brass moulded knob, p.c. 16s. or 19s.; or a 7in. mortise locking latch, brass bolt, and bushed (four levers), p.c. 20s. Or—

Provide and fix Hill's 217R mortise locking latch, 6in., four levers.

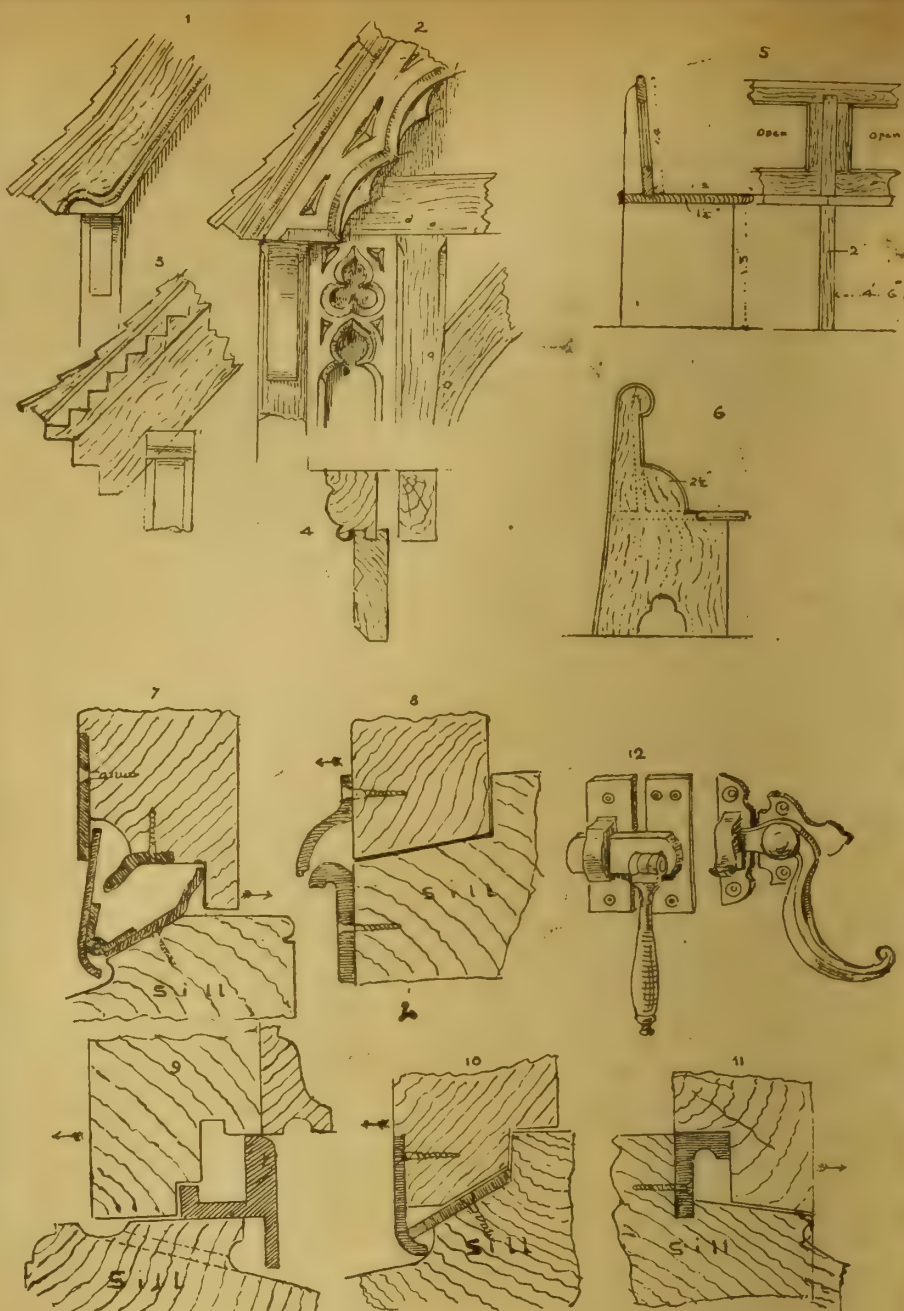
24. *Night-Latch.*—The front door to have a patent rim reversible night-latch, 2 (or 4) levers, brass bolt, and 2 keys, p.c. 6s.; or a 5in. brass-knob night-latch, all brass, and stop-catch with 2 keys, p.c. 19s.

25. *Folding Door, &c.*—Provide and fix to folding door Hill's "Combination" bolt, with 2-bolt mortise lock and furniture, p.c. 60s.

The sliding doors to have a superior brass mortise lock in sliding door, with two hook bolts and pin, p.c. 7s. 6d. complete.

26. *Cupboard Locks.*—The cupboards to have japanned iron cupboard locks (or provide Hill's cupboard locks), 3in. (or 4in.); specify No.

The lavatories to have 2 $\frac{1}{2}$ in. brass sunk slide flush latches, with knobs complete.



27. *Office and Shop Door.*—The office (or shop door) have an improved brass (or nickel-plated) door-latch, with ebony (or other) handles complete, p.c. 20s., to be approved.

The swing doors to have a polished bronze metal thumb-latch and furniture complete, to be approved (see also clauses 4, 9, &c.)

28. *Spring Hinges.*—Each leaf of door of offices to be hung with A. Smith and Stevens's (or J. H. Boobyer and Son's) brass double-action onset steel spring hinges, p.c. 35s. (or 50s.) a pair, and to have two handsome brass (or electro-plated) handles, p.c. 15s. (or 25s.) each; a brass padlock, chain, and staple, bolted through door with nuts; two brass or ebony door-stops on brass or electro-plated letter-plate, engraved, and letter-plate and movable oak letter-box; or the handles to be approved gunmetal pillar-handles, with plates engraved "Push" and "Pull," approved by architect.

29. *Brass Hooks.*—The dresser to have two dozen of 1 $\frac{1}{2}$ in. brass cup hooks, and the dresser drawers to have each a pair of bronze drawer pulls. All necessary screws, escutcheons, staples required complete.

#### FOUNDER AND SMITH.

Generally.—All the cast and wrought iron to be of the best quality for their respective purposes. The castings to be made of strong grey No. 3 pig iron cast from second melting. The wrought iron to be the best Staffordshire, or equal in quality thereto, capable of bearing a tensile strain of 22 tons per square inch before fracture, and a cross strain of 11 tons without permanent set.

In specifying rolled-iron joists, the architect is supposed to have completed his detail drawings and sections, giving the span, length, depth, weight per foot run, the latter being calculated from formulae, or obtained from any of the tables furnished by such firms as Measures Brothers, Ltd., Homan and Rodgers, C. C. Dunkerley and Co., Messrs. Dennett and Ingle, &c. For large plate girders, with angle-iron stiffeners, wall plates, drawings ought to be made, giving depth, thickness of flanges, &c., and these ought to be referred to in the specification.

For columns of cast iron the height, diameter, and thickness of metal must be given. Refer to detail of capital and base. The same with stanchions; give size of stanchion in section, thickness of metal, and show section or specify the weight of stanchion.

Iron roof-trusses should be described in reference to the drawings, though each member may be separately specified.

The clauses for castings may quote from a manufacturers' catalogue. A mixture of irons is perhaps the best and most reliable to specify; but when tests are important, the following clause may be used:—

Test-bars, 1in. square and 15in. long, are to be cast from all runnings from cupolas used for these



castings, and to be deposited with architect or clerk of works, and the bars are to be tested under his directions; or such test-bar placed on supports 1ft. apart, to bear a load of one ton in centre without fracture.

The following are a few general clauses:—

1. **Cast Iron.**—The cast-iron columns, stanchions, base-plates are to be cast of the best quality soft grey cold-blast No. 3 pig-iron, twice melted in a cupola furnace and well fluxed. The contractors will be required to prove that the metal used is as specified. The contractor is to test any bars that the architect may require made at his own expense, and proper care is to be taken that the columns (or other castings) are made from patterns to allow for contraction and equal cooling of the parts; the thicknesses of metal shown in detail drawings to be strictly maintained, and the lengths to be exactly those figured in drawings.

The castings to be perfectly straight, and out of winding, and the thickness uniform.

All the columns and stanchions to be cast in a vertical position, and the cores of columns to be accurately adjusted to insure a concentric casting.

All castings are to be free from flaws, cracks, sand-holes, and other defects, and to be delivered clean without painting. All defective castings, or those not in accordance with the drawings and specifications, will be rejected, and must be removed and replaced with new and proper castings at the contractor's expense.

All bearing surfaces to be turned axially true, the bolt-holes to be drilled out in their right positions and sizes.

The contractor is to provide all templates for bolt-holes to girders, and all that is necessary for fixing.

The following are a few of the lighter items specified under this head:—Air-bricks, iron gratings to areas, iron stall gratings, spiral staircases, rain-water pipes, eaves guttering, angles, swan-necks, plinth bends, crests, and finials of cast iron, railings, spiral staircases, skylights, iron casements and frames, kitchen ranges, and cooking apparatus. Most of these things are better selected from a trade catalogue or the manufacturer named, as air-bricks, gratings, spiral staircases, rain-water goods, iron casements, and kitchen ranges. Such firms as the St. Pancras Ironwork Co. issue designs and price lists for railings and gates, balcony railings, verandahs, spiral staircases, &c. For iron or metal casements reference may be made to such firms as James Hill and Co., the N.A.P. Window Co., Ltd., Messrs. Burt and Potts, and others whose names appear in our directory; for register grates, mantels, baths, balcony and other railings, the Coalbrookdale Co. may be consulted, or the goods be selected from the catalogue of Young and Marten.

2. **Bolts.**—All bolts to be of wrought iron with nuts, heads, and washers.

3. **Columns.**—The columns supporting the first floor to be cast hollow of lin. metal, 6in. (or 8in.) diameter, with caps and bases as per detail. The bases to have lin. square stubs, and the caps to have brackets two (or four) to each column. The caps to be securely bolted to girder above by  $\frac{1}{2}$ in. screws. Or—

The columns to be cast according to the detail drawings with caps and bases. The columns to be hollow of lin. thickness of metal, 6in. (or 9in.) external diameter. The bases to have base-plates planed and cast on the shaft, with four lin. projecting lugs. The base-plate to be 18in. by 18in. square, bedded in neat cement (or on 10lb. lead seating) on a tooled York or Scotgate stone base, secured with four  $\frac{1}{2}$ in. diameter bolts, nuts, and heads. The top plate to be planed and bolted to girder with four  $\frac{1}{2}$ in. bolts, heads, and nuts. The cap to have four brackets as shown. (If the caps and base are moulded it should be stated.)

#### STUDENTS' DIFFICULTIES.\*

NOTHING worth doing has ever been done without overcoming difficulties. In some rare cases there is so much energy or so much genius that difficulties may be said to disappear, which means that they are little felt; but they always have to be encountered, and in all ordinary cases they are very sensibly formidable, so that perseverance and effort are necessary to grapple with them. The perseverance and the effort that I have just named are invaluable

qualities, and, like bodily strength and agility, they improve by exercise; consequently the overcoming of difficulties has a most salutary effect on the growth of mind and of body alike; but, for all that, no man would be willing, or perhaps would be wise, to create difficulties in the way of his progress in life and knowledge for the sake of improving his mind in the same way that people set themselves to climb high mountains, or to swim, or cycle over long courses in order to strengthen the body. Now and then one meets with an acknowledgment on the part of a successful man, that if he had not had so bad a start he could not have run so successful a course; and were men perfectly candid, this acknowledgement would be more frequent. Do not, therefore, I beg you, look upon difficulties as misfortunes. In themselves they may be bad, but their compensations are extremely valuable. There are some difficulties which are so formidable as to be absolutely obstacles—to stop you and say "No Road." These are, fortunately, very rare, and, in fact, there is hardly anything seeming to be an obstacle which cannot be either got over or got round. An example of an insurmountable obstacle would be the loss of sight. Many other difficulties may be described as hindrances, not obstacles. They rarely grow out of the nature of the study on which you embark; but usually they are outside circumstances that interfere with progress. You are prevented by them from getting along as fast or as far as you can, but you are not stopped altogether. An example of this, and one that at the present day occurs pretty often, is living too far off. If it can be in a reasonable manner remedied, it should. If it cannot be altered, it must be accepted as a hindrance, and time and engagements must be laid out so as to make the best of it. Another similar sort of hindrance is not having a proper place to work in at one's lodgings or one's home. That is a hindrance, but it is not a very fatal one. It is possible to do a good deal of good work in your bedroom with the drawing-board on the washstand, as I know from experience of my own student days. Now we come to difficulties proper, by which I mean those arising out of the magnitude or arduousness of the study, or out of the inadequacy or uncertainty of the means and appliances, or out of insufficient previous training, or want of natural aptitude and so forth. The final difficulty which we will try to deal with, is one which many young men encounter at the threshold of professional or business life. It is the one due to the shifting of their conditions. My meaning put plainly is that at school, and to some extent at college, time has been mapped out for you, studies have been prescribed, and have been directed towards a definite goal. The goal has been, usually, the successful passing of some examination, such as the Oxford Middle Class or the London Matric., or perhaps the B.A. Every study has been selected for you, and the timetable, the classes, the books studied have been all arranged so as to contribute to your success in your examination. The examination has been passed—let us hope with credit—and the student who has chosen architecture will, at least in England, find no similar collegiate machinery provided for taking entire charge of him for the next three or four or five years, and preparing him for the exercise of the profession that he has chosen. Let me express the earnest hope that you have gone a good way and with success along the beaten track, or (dropping the metaphor) that your general education is good. A badly or insufficiently educated youth is at a terrible disadvantage in the battle of life if he wishes to enter a profession. It is a disadvantage that comes very near being a disqualification in the present day more than at any previous time. All I can say is that it is not irremediable; but it will involve loss of time on the one hand, as part of the time that should be devoted to special studies must be given to making up defects in general knowledge, and it will also involve some permanent disadvantage, because the lost opportunities can only at best be partly made up for in after-life. On the first sign-post I would write up in bold letters, the single word

#### "DRAWING,"

and for a considerable part of the course other sign-posts bearing the same inscription ought to be established. What I mean by sign-post No. 1 is, that the first, the most urgent, the most important matter is to acquire skill—considerable skill—in drawing. You cannot learn your profession—you cannot practise your profession—unless you can

draw—and draw well;—and this is the first, the most urgent, the most important object-figure to keep before you. Drawing is, so to speak, the "language" of an architect's studies and of his work. If you cannot draw at all, it is no use troubling about architecture till you have remedied this defect, and if you can draw tolerably it is just as necessary for you to work hard to improve yourself, because for our purpose "tolerably" will not do at all—a man must draw excellently if he is to do any good at what you gentlemen are taking in hand—*e.g.*, as far as the use of instruments, you ought not to rest until you can draw with them with as much ease and as perfectly unfettered as if you had only a pencil in your hand. I take it that most youths who go as pupils into an architect's office have shown some aptitude at drawing. It is pretty generally known that drawing is an essential; but it is but rarely realised how essential it is. Without drawing, you cannot learn your art. A man planning a building has to put together a number of parts—some structural, some ornamental—all of which must be familiar to him. To go back to an illustration just made use of: If an Englishman is to engage in business in France he must master a large number of foreign words, phrases, and idioms, and these must be fixed firm in the memory and so known as to be familiar and easily made use of. Similarly, a large number of forms, dimensions, ornaments, and features of buildings must get rooted in your minds before you can do anything at all in architecture. There is only one way of committing these things to memory—that is, by drawing them. The merest commonplace of building have to be mastered, and are mastered to a large extent unconsciously while at work on drawings and tracings in the office. The most refined and elaborate ornaments are learned in the same way by drawing them. Hereafter, when the mind is well stored, you may become able to learn a good deal from buildings by simply inspecting them; but for years to come set it down in your mind that anything of architecture which you have not drawn you have not learned. Again, it is only by means of the pencil that the planning and composing of a building can be accomplished, or that the necessary indications can be given to the men who have to estimate at cost or to erect it—and there is no other way of showing a client or the public what it is that you would build, save making a drawing—or drawings. Set it down, then, that good drawing is the first essential. In office work you may learn—probably will—a good deal about geometrical drawing, and how to use instruments and work to scale; but you will learn quicker and better and steer clear of bad habits if you attend a drawing class—such as the one which, established by the Carpenters' Company, is carried on in the evenings at this college, under Mr. Elsey Smith, and Mr. Sterling. In this class the method of overcoming many difficulties which architectural and geometrical drawing presents are shown, and there is an opportunity of becoming familiar with more important architectural forms and ornaments.

#### "DESIGNING."

Another difficulty which lies in wait for the student, and will be more properly mentioned later, is that of originating plans and treatment of buildings—designing buildings, as it is called. From the first remember that acquiring a thorough mastery of geometrical drawing, and storing the memory with architectural forms and features are the groundwork of success in this essential part of our art. Let me interpolate a word here in favour of the study in such a class of those features of Classic architecture known as the Orders—that is to say the columns and parts adjacent to them as used by the architects of Greece and Rome. Nothing in the world has been so carefully and repeatedly refined and reconsidered. Nothing in art has been so often employed and has furnished so many suggestions, and there is no more useful study in the early style of an architect's career than the Orders, both as studies of draughtsmanship, and as a groundwork for a knowledge of the decorative part of architecture. But mechanical drawing with instruments is only part of the necessary equipment. You should master the drawing of the figures carried at any rate far enough to enable you to draw the antique from the round fairly well if you are to do much as an architect. The sureness of hand and eye, freedom of line, sense of proportion, and power of

\* By Professor T. ROGER SMITH, F.R.I.B.A. An opening address to the students of the Architectural Classes at University College, Gower-street, W.C., delivered on Monday evening, the 10th inst.



delineating what you see which the study of the figure gives cannot be dispensed with, and cannot be got so well in another way. I do not think it is requisite for a student of architecture to go on to work from the life, though it is good for him; but at some period a mastery over such difficulties as perspective presents, and familiarity with free-hand drawing in pen and ink will be of great value, as will practice in drawing architectural ornament. There are many schools of art where the study of the figure can be conveniently pursued under good teaching, so that a student need not have much difficulty in finding out how to get this part of his training. Supposing the student to have entered an office—which is the usual course? The second finger-post that I would set up for him should be inscribed

"OFFICE WORK AND ROUTINE."

You hope to be engaged hereafter in planning buildings—arranging for their erection—preparing drawings and written specifications from which they are to be erected, and their ornament executed, and in supervising their erection, and in correspondence, interviews, estimates, accounts relating to them. Now this is precisely what is going on in the office where each man is engaged, and it is in order to learn this that you are placed in offices. Every chance of taking a part in the work that is going in is a lesson in what you hereafter will have yourselves to do. It is, therefore, unwise to shirk any part of office work however simple. But I have two pieces of advice to offer on this head. The first is try to understand what you are doing. It is impossible to get to understand every bit of routine at once; but do not be content to remain in ignorance for long together of the meaning of the words you copy or the drawings you trace. The other piece of advice only applies to some students: Lay yourselves out for varied work. In a large office, if a fellow becomes expert at some one thing, he may find himself invited to do it over and over again. In a small office there is the great advantage that almost of necessity the same man has to be put to do many different sorts of duty, the more varied the better. It is often difficult for a pupil, and very difficult for a clerk to get to see much of the buildings themselves that may be in course of erection. I can only say, Embrace every opportunity that you can of going to the works, or to any works in progress, and to builders' workshops, and make opportunities if possible. A trifling work—even three or four hundred pounds' worth of work—if a student can visit it twice a week and use his eyes and his tongue, and make notes of everything and sketches of everything, is simply an invaluable opportunity for him who learns all it has to teach.

DO NOT DESPISE TRACING.

If you make tracings you will have under your eyes and through your hands drawings which you—as beginners—could not possibly make. If you make an effort to understand what you trace, tracing may be instructive. If you make a point of turning out well-drawn and well-finished tracings, it will be of no small use as an exercise in draughtsmanship. Similarly, do not avoid copying documents and endorsing letters, or taking charge of the names and messages of callers. You will learn thereby what kind of correspondence and interviews arise out of buildings, and what kind of things are the reports, specifications, statements of accounts, and other such formal documents which are needed from time to time. And if you follow the rule of trying to understand what you copy you may find a prize unexpectedly, even if it be only a hint. For example, one of the matters which has been of use to me in my own practice has been the study of sound. My attention was directed to this study solely in consequence of having to write a fair copy of a report on the acoustics of a public hall when I was a young pupil, and the result has been a very interesting and, to some extent advantageous, professional study, which, but for that hint, I might never have thought of taking up. Do not despise any point of routine. It is of very great importance to carry on your practice, when you do practise, in accordance with customary routine—to prepare the usual drawing to the usual scales, to obtain estimates in the usual way, conduct the work in the usual manner, and so on. It would take too long to explain why this is so—perhaps you will accept it as the teaching of my rather long experience; and if you believe me when I tell you that there is a value—a great value—in accepted routine, then

you may very well understand that it is quite worth while to get thoroughly familiar with what is going on in the office, for that is the routine of an architect's practice, or, at any rate, an important part thereof. Later on the methods to be pursued in order to estimate and check the cost of a building will have to be mastered. In most cases this will not claim grave attention very early in your career, and you will not need to make provision for mastering it early; but whenever you take it up I may say with confidence that no better means of mastering the principles and practice of the art of estimating is open than that afforded by the Estimating Classes held by the indefatigable Mr. Burr in this college, and established here by the Carpenters' Company.

EXAMINATIONS.

On the next finger-post you will find inscribed "Institute Examinations." There is a good deal to be learned which you cannot expect to learn within the four walls of the office when you are endeavouring to require familiarity with the practice of architecture and of construction, and must study out of the office, and it is most important that this study should be systematic. Each one of you should from the first set to himself a scheme of study, appropriate certain hours of spare time to it, and when the scheme has been made stick to it tenaciously. Now (as has been hinted) this originating a scheme of study is a real and serious difficulty to many students. No doubt the habit of study has been acquired, but it has been on definite lines laid down by others. Now you have to lay down the lines for yourselves, and in doing so you can have no better guide than by the programme of the examinations, which I hope you will all consider it necessary to pass, and which you will have to pass before you can become members of the Institute of Architects. When these examinations were set up, one of the objects was that they should serve as finger-posts. I fear that all examinations are apt to become goals instead of finger-posts; but, notwithstanding, they point out what to study. Your studies are a means to an end; but that end is not passing an examination, but the fitting yourselves to fight the battle of life with credit and success as architects. Accepting this Institute programme as a finger-post—that is to say, as telling you what to study—there still is the question

HOW TO STUDY.

and I will begin by dealing a little with the question of private study. The student who has to make his own scheme of study must settle how much of his time can be devoted thereto. He must not forget that a time for recreation is quite essential; but he must not allow himself to suppose that all the time out of office hours is recreation time. The private-study time will have to be appropriated between four divisions—(1) drawing, (2) architecture, (3) construction, (4) collateral studies. It is very wise not to undertake too much at once; in fact, within limits, the fewer subjects at one time the better. The fortunate man who has acquired a habit of early rising, and keeps it up, has a great advantage over his fellows, and if he can get a clear hour or hour and a half of early morning six days in the week, will be able to do a great deal of private study undisturbed. Some evening classes he must, of course, take up, and if, like most of us, the student does not find morning work practicable, he must devote some time each evening, say, if possible, two hours for five evenings in the week to work either in classes or at home. If he is preparing for the intermediate examination, he may fairly expect to be allowed to devote part of the hours spent at the office to drawing some of the subjects which have to be worked up for this examination. The student should, from the day when he begins preparation till the day of examination, constantly give attention to drawing. What are called, quaintly enough, testimonies of study are required of him in the shape of eleven well-executed sheets of drawings—seven art drawings, four structural ones. If he can draw well enough at the outset, the most useful course will be to do the art drawings in his first year, and the structural ones in the second, for the reason that the art-work is more easily understood by a student who is already well-grounded in draughtsmanship, and, speaking broadly, if the first year is devoted to art, and if he begins by working upon the "Orders" of architecture and the required specimens of

Gothic, and after a time turns to materials, construction, and the collateral subjects, I believe the course that will be of most ultimate service will have been followed. A man who is arranging his own time should not forget that it is bad to have too many irons in the fire, and that "one thing at once" is a good method. I need not say that a student working alone requires a few good textbooks to keep on his own shelves, and that access to a good library for the purpose of occasionally consulting books of reference is useful. But you work best with your own books and at your own place. The uncertainty what books to use may in some cases be classed as a student's difficulty. A rather long list of books of reference accompanies the particulars of the examinations published by the Institute, and I may perhaps best refer you to that list. In the course of this lecture a few books will be named, and it is a point on which any instructor will be glad to afford guidance. Perhaps I may usefully add that books and papers on some special point often afford both more interesting and more complete information than general guides. For example, Scott's "Westminster Abbey" is more interesting reading than Rickman's "Gothic Architecture," and very instructive, and many of the papers read before the Institute of Architects contain information of the greatest value, and all the more striking because only some one portion of the great field of architectural study is illustrated.

THE SUBJECT OF DESIGN.

does not at first present itself to you; but as you become more and more familiar with the nature of the profession you have adopted, you become aware that the next important power to acquire is the power of originating the idea of a building—creating a building out of nothing, so to speak; and, generally speaking, the men who succeed best as architects are the men who do their best—*e.g.*, who make the best designs. How is a design made? How can one set about learning to design buildings? Is it not very difficult?—are questions which every thoughtful student asks himself as time goes on. Some years ago I devoted one of these opening lectures entirely to endeavouring to answer such questions as these, and what then took an evening cannot well be disposed of in a few minutes now; but yet the outline of an answer must be attempted. It is almost unfortunate that the word in use for preparing the scheme of an intended building is not either "contrive" or "compose" rather than "design," for whatever may be possible to extraordinarily gifted men, all that is within the reach of most of us is a rearrangement of known materials. "Design" seems to imply that the whole thing is new; the very reverse is nearer the truth. Little or nothing of any modern architectural design can be new if the building is to be good. When you have laid in some of the material out of which your design is to be made, the first step has been taken. The second consists in constantly trying to make use of that material, only not undertaking formidable and ambitious flights at first, but being content with what is moderate and gradually advancing. In trying to evolve design, remember that a building is a whole, though the system by which we have to represent it—namely, a set of geometrical drawings—directs attention to only one part at once. The dispositions reside in the plan, the exterior in the elevation, the interior in the sections; but both section and elevation grow out of the plan, and no one of these, then, is in the smallest degree independent of the other, for the disposition of plan, the exterior, the interior are all features of one building. The plan, as the key to the contrivance of the building, and to almost all the arrangements which make it fit for what is required of it, is the first thing to consider, and yet while the plan is being evolved, the question of what kind of interior and what kind of exterior can grow up upon those walls, be reached by those doorways, be lighted by those windows, and be supported by those piers and those arches must never be lost sight of. It is possibly regrettable that there is not a systematic course of study of design open to students like that pursued in Columbia University in the United States. The Architectural Association has always honourably kept this point in view in its provision for students, and its classes of design have been of assistance to many. Outside of this, the best advice I can give you is, Constantly increase your stock of material with which to erect your buildings on paper, and as constantly try to make something out of them. Do not so



much strive to be original as to be good, and remember that the subtlest, but also the most potent, element in the success of a good architectural design is its good proportion. On my next finger-post is written

UNIVERSITY COLLEGE, LONDON.

There are several institutions in London, and I am glad to add that there are now not a few in the provinces where the student can get good assistance in his work. The most prominent in London are the Royal Academy, the Architectural Association, King's College, and University College. The last finger-post, which I will set up in guiding you what to study, will bear the single word

#### BUILDINGS.

You do not master botany without collecting plants, or geology without field-days in parts of the country where rocks can be studied on the spot. Just so to know architecture you must visit buildings, and draw them and measure them, and to know construction you must visit works in progress and workshops and quarries, and not only take sketches and notes, but if possible spend a few months at the bench learning something practically of joinery or carpentry as they are carried out in real work. This is of the utmost importance, and please remember that if you set a machine to look at a building for you, you are not examining it with your own eyes, by which I mean that taking a photograph of it will not be of the same service to you as making a drawing. I doubt whether the kindest advice to an amateur photographer going on an architectural tour be not to leave the camera behind! Among students' difficulties is one which is often troublesome at first—namely, the uncertainty how to set about useful sketching when you first get to a building. How to begin. In fact, perhaps the best plan is to go with some friend who has some experience, and try to do what he does. But this may not be possible, and if he is much ahead of you as a draughtsman, may be disheartening. So the following suggestions may be of help to you. First avoid perspective. It may be all very well hereafter; but for a long time, and in many cases for all time, the most useful drawings to make are geometrical ones. Select a small and manageable part of your building—say a single feature. Measure part of the plan of it, lay that down to scale there and then on your block or in your book, and then put up an elevation and a section—measuring as high as you can reach, and judging as well as you can—with the help of a rule hung vertically, the heights to which you cannot reach; show separately the ornaments and above all the profiles of the mouldings, measuring the groups of mouldings where accessible, and when all that is done you will find that you understand the feature. In short, let your procedure be with the solid building, before you strive to produce a set of sketches such as would serve to build it from. Reduce it back to such elements as it would occupy in a set of working drawings. Afterwards if the spirit moves you to make a perspective sketch, it may be useful as a crowning effort, and taking a photograph of it may be interesting and pleasant; but neither the one nor the other will do you so much good as the geometrical sketches will have done.

#### IN CONCLUSION.

Construction as well as architecture is best studied by working at it personally. Six months in a joiner's shop is, as has been said, of very great value to the young architect; so would a few months in a trade training school, like the one which the Carpenters' Company maintains near here in Titchfield-street, though the actual work is the best. Occasional visits to a work in progress are useful, and systematic visits are still more so. Best of all is being attached to a work as a kind of extra clerk of works, or something of that sort, and seeing it right through. If you get a chance of that sort take it, and while there make notes of everything and sketches of everything. There is, as you must recognise, much to learn, much to see, and in all this there is difficulty; but with method and determination it is certain that the difficulties will disappear—nay, you may hope to make them auxiliaries. I cannot forbear adding that success in professional life cannot be secured by attainments alone, even if accompanied by talent, or even genius. Character is an important, an essential, element, on the basis of which the prosperity of a professional career must rest. I have known a

man of the highest attainments, and perhaps the most brilliant endowments of all the architect, who began life at the same period that I did, yet, thanks to a weak and untrustworthy character his career was a failure; and I could point to another (nay, to many others) beginning with a less complete education, more slender powers of design, and altogether with far fewer gifts, who, thanks to energy, diligence, good sense, and, above all, straightforwardness, have accomplished a prosperous and honourable career as architects. It is often not easy to say precisely why a prosperous man has done well, for it is often clear that his success has been achieved in spite of disadvantages or deficiencies that must have told heavily against him; but it is very rare indeed that the key to such an enigma cannot be found in the personal character of the man himself, for in the long run it is usually the best man who wins.

#### THE CENTRAL LONDON RAILWAY.

A VISIT was made by a party of the members of the Society of Engineers on Tuesday morning last, to the Central London Railway Works at the Post Office Station, E.C. The constructive work of the Central London Railway was divided into six contracts. Beginning at the west end at Shepherd's Bush, the first three contracts were let to Mr. John Price, whose work extended to the Marble Arch. From thence to the General Post Office includes two contracts, both of which were secured by Messrs. Walter Scott and Co., of Newcastle-upon-Tyne. Contract No. 6 extended from the General Post Office to the Bank, and was let to Mr. George Talbot. This includes the General Post Office Station and the Bank terminus, as well as the important work beneath the roadway in front of the Mansion House. The line runs throughout almost entirely in the London clay, the exceptions being where it passes up through the gravel at the western end, and also the length extending from Berners-street, Oxford-street, to Red Lion-street, Holborn, where the tunnels run along the line of junction between the Reading beds and the clay. The former consists of green and red marl, with patches of rock, but, not being water-bearing, compressed air is not required for the working. Air at moderate pressure was, however, used where the tunnels come to the surface at Shepherd's Bush. A part of the line which has received a good deal of consideration is that which crosses the Holborn valley and runs under the Viaduct. Here the tunnels keep in the clay, even in passing under the site of the old Fleet Ditch; but the dip of the ground naturally brings the line closer to the surface. In consequence of this and the superincumbent pressure of the Viaduct, it was determined to use compressed air along this section as a matter of precaution, and not with any idea of excluding water, which it was not anticipated would be met with. The line consists of two tunnels for the up and down lines respectively. The usual diameter of these is 11ft. inside. Where there are stations the tunnels are enlarged to 21ft. 2in. in diameter, so as to take platforms, &c. There are also cross-over tunnels of 25ft. internal diameter for the purpose of connecting the up and down lines, and affording shunting facilities. The rail-level in the station will be 80ft. to 90ft. below the surface, and passengers will be conveyed to the platforms by lifts, which it is proposed shall be worked electrically. After leaving the stations, the tunnel runs down at a gradient of 1 in 30 for a distance of about 300ft., whilst the gradient in approaching is 1 in 60 for about 600ft. This puts the station about 10ft. higher than the main length of line. The figures vary somewhat, but those given may be taken as general. Starting at the surface, the first operation is the sinking of the shafts, which, in the completed work, will give passengers access to the line. In each station there are two shafts, each 23ft. in diameter, and one of 18ft. diameter, and as the company have taken as little surface land as possible on the line of route, where land is so supremely valuable, the site is pretty well crowded, the shafts occupying about half the available area. The shafts are lined with cast iron, and the first part is put in by bolting the segments together and sinking the rings bodily by means of weighting—baulks of timber being placed across for the purpose—whilst excavation is carried on from the interior. No great weight is required to sink the rings, the gravel being fairly free as a rule. When the

clay is reached and has been penetrated for a foot or two underpinning is started; the clay being removed to the net diameter of the shaft and the segments lowered down and put in position singly beneath the work already in place. Each ring, as completed, is grouted at the back to fill up any space between the iron and the earth. The bottom of the shaft is formed by 2ft. or 3ft. of concrete. All shafts were sunk by the aid of steam locomotive cranes. When the shaft is finished, the head-gear, which is to be used throughout the tunnelling operations, is erected. At the Post Office Station steam winches are used for raising and lowering the temporary cages in the shafts; but at the Bank and other stations hydraulic lifts are used, the power being taken from the mains of the London Hydraulic Power Company. At all stations every precaution is taken to avoid creating any nuisance by noise or otherwise to the surrounding householders. The clay is brought up in ordinary tubs by the cages on to a raised platform, and tipped through tumblers into the carts. The bulk of the spoil is taken to wharves on the river, to be carried by lighters to Barking, where it is being deposited for reclamation purposes. Of the iron lining for the tunnels, bricks, lime, cement, &c., about 60 loads per day of 24 hours are, on an average, sent down at each station. The permanent passages of the stations, which will afford accommodation for passengers, leave the lifts at a height of about 10ft. above the rails. It is, therefore, necessary in all cases to drive a temporary passage at the level of the rails in the tunnel. These passages are of 8ft. internal diameter, and have all been iron-lined. On the line of tunnel being reached, a break-up is formed, and a cylindrical chamber, iron-lined, is constructed in which to erect the tunnelling shield. This chamber, which is, in fact, the first part of the tunnel formed, is 15ft. in diameter and 7ft. long, being somewhat larger than the tunnel proper. In this chamber the shield is erected. The shields used in constructing the tunnels have worked admirably throughout. They are of two kinds—namely, a large shield 22ft. 10in. outside diameter, which is used for the stations, and a smaller shield, the ordinary diameter of which is 12ft. 8in., although there is a slight variation in the latter, in order to meet the case of tunnels requiring to be made of larger diameter in parts of the line that are on a curve, and where, therefore, extra clearance has to be allowed to the rolling stock. The length over all of the station shield is about 6ft. 10in. The shell or skin is formed of strong steel plates carefully fitted and strongly riveted together, and strengthened by two strong cast-iron rings. Each ring is made up of 22 segments, the joints of which are accurately machined and strongly bolted together, the front ring forming a cutting edge. The inner ring forms the main body of the shield, on which are fixed 22 hydraulic rams. Between these two rings comes a strong steel diaphragm plate, to further augment the rigidity of the whole. The rams each consist of a ram with its cylinder or case, and a crosshead for the end of the ram, the latter of which is formed to bed on the flange of the tunnel rings. The rams are coupled together, and are in communication with hydraulic-pressure pumps by means of a series of pressure and return-pipes, in which are fixed shut-off valves to each ram, so that any one or more rams may be disconnected, and the direction of the forward movement of the shield thus controlled. In these pipes are also placed two reversing valves, the use of which is to direct the flow of pressure-water, so as to either force the rams in or out as required. The return water from the ram-cylinders is delivered back into the supply-tanks of the pressure-pumps, so that it is used over and over again. The structure of the shield is further strengthened by two vertical and three horizontal stringers formed of steel plates and channels, these being strongly connected at their ends to the body of the shield. The station shields are provided with what are called hydraulic erectors, that are used for lifting into position the segments of the cast-iron rings forming the tunnels, ready for bolting together in their permanent position. The erectors consist of an hydraulic lifting cylinder pivoted on a strong centre, which is securely bolted to one of the vertical stringers. The lifting cylinder is fitted with a ram, which has a head on the end of it so constructed as to be readily attached to the tunnel ring segments. There are two turning rams attached by chains to a wheel on the pivot of the lifting-cylinder, by which means the latter is turned to any required position. The erectors are operated



by suitable valves geared up to hand's conveniently placed on the floors of the shield. The operation of the shield may be described as follows:—When the ground in front is sufficiently removed to allow the shield to be pushed forward, the water-pressure is admitted to the rams, the heads of which are against the last ring of tunnel-plates put in. As the rams move outwards, they push the shield forward. After they have made a full stroke, the shield has been advanced a sufficient distance to allow a ring of tunnel-plates being put together in the back portion of the skin of shield after the rams have been forced back into their cylinders. The ring of tunnel-plates is then securely bolted together and to the last ring, and the operation for the getting in of the next ring proceeded with. The small or ordinary tunnel shields are similar in construction to the large station shields. This skin is formed of two thicknesses of steel plates, the total length of the shield being 7ft. The front or cutting end is formed of a strong circular cast-iron ring, divided in halves, on which are secured steel knives, made in short segments, and forming a perfectly true circular cutting edge. The knives are so arranged that they can be adjusted to cut a slightly larger diameter than the body of the shield, if necessary. Behind the cutting-edge ring comes a strong bulkhead, in which is a heading-out hole 6½ft. high by 5½ft. wide. At the back of the bulkhead there is a strong ring of cast iron made in six segments, having flanges which form the joints between each segment. These joints are securely bolted together, and the ring is also well bolted to the skin of the shield. On this ring are secured hydraulic rams similar to those on the large shields, one on each segment of the ring, or six in all. These are connected by pressure and return pipes to two hand-pumps, each fixed to strong water-tanks securely bolted into the shields. The working of these rams is the same as that described for the large station shields. The hand-pumps are fitted with compound rams, one ram being larger than the other. The object of this is that by a simple arrangement the larger rams can be operated, while the pressure required is excessive, as is always the case when the rams are only being pumped in after having advanced the shields to their full length; and sometimes when the shield is in places where the resistance to its progress forward is not excessive. The movement of the shield by the larger rams is naturally much faster than when the smaller ones are used. When greater pressure is necessary, the smaller rams are thrown into gear, thus making the working of the pumps lighter, but the movement of the rams is correspondingly slower. Each hydraulic ram is fitted with a shut-off valve as described for the large shield, and a reversing-valve is also used, so that the rams can be moved outwards or inwards as desired, the return water being delivered into the pump tanks as it leaves the ram cases. In operating the ordinary tunnel shield, after it has been erected in the chamber provided, the first thing to do is to drive a heading in advance 7ft. or 8ft. If the ground be hard, the whole of the clay is removed in front of the shield for the distance of one ring, or 20in., with the exception of an annulus of from 1in. to 2in., which is left for the cutting-edge of the shield to take away. Before the shield is moved forward a number of pointed pieces of timber are placed horizontally in front of the shield, their pointed ends being inserted in the face, and their other ends abutting on the shield. As the latter is forced forward by the hydraulic rams, the clay is loosened by these piles, being broken down into the heading, and the miners then get through the shield and remove the earth. When the shield has been pushed forward sufficiently far by the rams—the latter pressing against the completed end of the iron lining as an abutment—the next ring of lining is erected inside the tail of the shield, and, having been bolted up, the shield can be again moved on. The annular space between the earth and the iron lining, left by the advance of the shield—it being remembered that the ring of the lining is erected inside the tail of the shield—is filled up by grouting, which is forced through holes purposely made in the lining by means of compressed air. The rate of progress varies from two to four rings erected per shift, or from 40in. to 80in. completed for 10 hours' work. The method of working the larger shield is not greatly different in principle to that of the smaller

one, excepting that no advance heading is driven. The interior of this shield is divided up by two vertical girders and three horizontal platforms, and there are the rams with tables supporting the face, as already stated. The earth is removed from the face by hand, and is thrown on to the platforms, and from thence to the waggons beneath. There are the piles for breaking up the earth, as in the smaller shields. The progress is usually from one to two rings per 10 hours, but the rings are 18in. long. At the Bank Station the general arrangement of shafts and tunnels is the same as at other stations, but the upper station or booking hall is, from its situation, of an exceptional character. By agreement with the City Corporation the station is situated below the open space in front of the Royal Exchange, the Railway Company constructing, for the public use, a system of subways and stairways connecting the various streets which meet at this point. By this arrangement, pedestrians desiring to cross the roadway will be able to do so without incurring the risk and delay now so notorious. The main or public subway which surrounds the station is 15ft. wide, and will be lined with white tiles and lit by electricity. Under this public subway is placed another in which are arranged all gas and water mains, telegraph lines, &c., which formerly crossed the street in all directions. This will obviate the necessity of disturbing the roadway for repairs of pipes and the like. In the central space is the booking hall or upper station of the railway, which, except that its floor-level will be some 16ft. below the street, and consequently that its roof will carry the City traffic overhead, is similar in its arrangements to the other stations of the line, and from it lifts will carry the passengers to the platform below.

#### THE ARCHITECTURAL ASSOCIATION.

A CROWDED attendance marked the opening meeting of the Architectural Association held at 9, Conduit-street, W., on Friday evening, when the inaugural address was delivered and the prizes for the last session were distributed by the President, Mr. G. H. Fellowes-Pryne, F.R.I.B.A. The adoption of

##### THE REPORT AND BALANCE SHEET

for last session (summarised in our issue of the 9th ult., p. 346) was moved by Mr. HAMPDEN W. PRATT, treasurer and ex-President, who commented on the gratifying position of the association as thus revealed. The present membership, 1,218, was the largest ever recorded in the history of the Association, showing not only a constant addition of new blood, but that a large proportion of those who had passed through the classes kept their names on the roll. During the session the attendances were good, and some excellent papers were read at the general meetings, while in the classes the character of the work was more than maintained, for though the number of students slightly fell off, the work was on the whole in advance of previous years. Some alterations had been made in the curriculum with the endeavour to increase the numbers attending the advanced classes. He expressed the special thanks of the committee to Mr. W. B. G. Lewis, for his supervision of the work carried out in the studio. The accounts showed that, as in the previous year, the Association now paid its way, with a balance on the right side.

Mr. W. H. SETH-SMITH, in seconding the adoption of the report, remarked that the Association classes existed for the teaching of *bona fide* architectural students serving an apprenticeship, and did not pretend to compete with subsidised polytechnics and so-called schools of architecture, to which young builders and others were admitted.

##### WHAT ABOUT NEW PREMISES?

Mr. OWEN FLEMING, in pursuance of notice, asked the president three questions:—Firstly, Whether the committee was yet in a position to make any definite statement as to the probable locality of the proposed new premises? Secondly, Whether any, and if so what, provision was to be made in the new buildings for the adequate practical instruction of students in the scientific handling of materials? And, thirdly, whether it was the intention of the committee to obtain the approval of the general body before committing the Association to any particular scheme?

The PRESIDENT replied that to the first question he was sorry to reply in the negative, while he had taken the opportunity to reply to

questions two and three in his address. He then put to the meeting the adoption of the report and balance sheet, a proposition which was carried unanimously, as was a vote of thanks to the auditors, Messrs. H. P. G. Maule and J. W. Stonhold.

Mr. E. HOWLEY SIM having read a long list of nominations for membership, the PRESIDENT announced that, under the by-laws, Mr. Alfred H. Hart and Herbert A. Satchell, having accepted paid offices as lecturers, had retired from the committee, but were eligible and willing to stand for re-election. The annual conversazione would be held in King's Hall, Holborn, on that day fortnight, Friday the 21st inst.

##### THE DISTRIBUTION OF PRIZES

was then made by the PRESIDENT, in accordance with the list published some time since.

##### THE OPENING ADDRESS

was afterwards delivered by the PRESIDENT, who remarked that having completed our fifty years' life as an Association and entering now upon the first session of a new decade, we are in a measure able to

##### REVIEW THE PAST WITH CONSIDERABLE SATISFACTION,

and, with past experience to guide us, to look forward with every hope of even greater success in the future. The first object of the promoters of the Association was, perhaps necessarily, a somewhat limited one, and it must be a source of no small gratification to Professor Kerr and Mr. Arthur Cates (now our oldest member), and other of the promoters who are still amongst us, to whom we all owe so much, to see the vigorous plant that has grown from the small seed they sowed and nourished with so much care fifty years ago. Whilst we should never lose sight of the debt of gratitude we owe to the first promoters of the Architectural Association, yet they will be the first to acknowledge that the good work they started has been well carried forward by many able workers, to whom we owe an equal debt of gratitude; and more especially to those who were the means of bringing about the great revolution in our mode of work and launching the new scheme of education. Useful as the educational work of the Association had been up till 1891, and successful in many ways as had been the results of the noble and generous voluntary support given in teaching and otherwise—and again, whilst it cannot be denied that the enthusiasm inspired amongst students was as great, if not even greater, under the old voluntary system, more especially in such sections as the old Class of Design—yet undoubtedly with the rise of numerous schools of art, and the demands for systematic education in every branch of art and science, it became absolutely necessary, if we were to maintain our position as an educational body, that our whole system should be worked upon more methodical lines than heretofore; and further, that our educational work should not be dependent solely on voluntary effort. How much this great need was felt by those most interested in our welfare, for many years before its accomplishment became possible, is purely a matter of history. With what care and surprising thoroughness the new scheme was at last launched, and became a living factor for good, under the able direction of our energetic past-presidents, Mr. Stokes and Mr. Baggallay, and no less energetic secretaries, Farrow, Gale, and Goldsmith, we have ample evidence in the original curriculum. This curriculum was at once simple and comprehensive, and the fact that so few alterations to the original scheme have been found necessary speaks wonders for the care and insight of its framers. Such changes as have been made from time to time are simply the outcome of experience in actual working, and that further modifications will have to be made in the near future is more than probable. Good as our start in thorough educational work has been, we do not think that our system is yet perfect. Indeed, there are

##### PALPABLE DEFICIENCIES,

and especially as regards the technical and practical branches of our work. You will agree with me that we should not always look only at the bright side of the picture. There is another side, and it is much better to face it; and as it is a matter that affects the whole body, I trust you will forgive me if I state certain facts concerning the work of the last few sessions.



## ONE OF THE GREATEST DISAPPOINTMENTS

is perhaps in finding how few students, comparatively, work through the four years' course proposed by the original and still recommended by the present curriculum. It is very hard to judge exact results by figures only, as a majority of our students take up various subjects, the studio work, or especial courses of lectures separately. It is distinctly disappointing to find that out of all the students who have joined during the years 1891 to 1894 and 1895 inclusive, only 18 have taken the complete four years' course. Of this number seven students commenced their studies in the session 1891-92; five in session 1892-93; five in session 1893-94; one in session 1894-95. These figures at least indicate that the four years' course is either not generally popular amongst students, or otherwise that the majority of students do not, under our present system of pupillage, find it practicable to carry forward a regular four years' course of A.A. instruction in addition to their other work; and it must not be forgotten that the more industrious and ambitious students, or those with more time at their disposal, are tempted, and I think wisely so, to join the Royal Academy schools, and carry on the R.A. work conjointly with that of the Association. This in itself may to some extent tell against the success of the four years' course originally proposed. What do we learn from the experience of our various divisions of work? When the work was divided into four Divisions, it was Division III. and IV. that were poorly attended; when the work was rearranged in three divisions, it was Division III. that languished, and now that the Curriculum is once more modified, and excellently arranged for the complete work to be included in two divisions, it is in the advanced classes of Division II. that there is still the greatest falling off. Indeed so much was this the case last session that the committee have felt that it was desirable to remove the valuable lectures on General History, and those on Stresses and Strains from Division II. to Division I., and to make Land-Surveying, originally in Division I., one of the extra subjects. This will perhaps tend to make the lectures in Division I. still more popular, and we hope at the same time increase the attendance at the remaining classes in Division II. But I am not confident that it will altogether solve the problem as to why it is that the majority of students do not follow on through the advanced classes. Personally, my view is that, taking into consideration the present system of pupillage and other difficulties that beset the architectural student,

## A FOUR YEARS' COURSE IS TOO LONG,

unless under a regular college system, and that a curriculum drawn up for a three years' complete course would be more popular and successful: not that I think four years under regular systematic work too much—*per se*; but when supplemented by office and other work, it becomes impracticable. In saying this, I am aware that it is possible for a student to cram through the Lectures and other classes in two years, but in doing so, he must miss much of the studio work. This course can not be too strongly deprecated. That it is resorted to by some as a means of cramming up for and passing the R.I.B.A. examination in a limited time is only too true. Again, it is found that many students, after passing through Division I., go to a private tutor, for getting up the advanced subjects, with the same object. It is one of the inevitable evils of this otherwise most useful examination, that students are tempted to consider

## THE PASSING OF THIS EXAMINATION THE GOAL

of their ambition, and to make the historical, theoretical, and scientific side of architecture the main feature of their studies, too often to the detriment of the practical art-and-craft side of their education. Whilst I am most firmly convinced that the reading, the study, and the preparation that are necessary for these examinations are simply invaluable to the student as a means to an end, and that even the examination itself may be, and is, in many cases, an incentive to work, yet one cannot but deplore that the passing of the examination is the end far too often worked for, and not architecture. There are certain peculiarities I have particularly noticed about the man whose only or principal qualification to being an artist is the passing of the R.I.B.A. examination, as opposed to the artist who uses the examination, as it is intended to be used, as an accessory to his art: the former invariably wants to tell

you all about it—he has a wonderful liking to discourse upon his book-learned art to others, and is sublimely critical as to what is and is not correct in style, &c. For fear of being misunderstood, however, let me repeat that I believe the R.I.B.A. examinations, within limits, to be a great lever for good, both as an incentive to study, and as a test of study. If these examinations are not, as they never should be considered, or thought of as, a test of art, they may in a measure be fairly considered of a certain qualification in the very necessary scientific side of our art. But having said this, I am only expressing the views of all who have interested themselves in the educational work of the Architectural Association when I emphatically assert, that in no way whatever do we as an educational body

## ENCOURAGE A SYSTEM OF CRAMMING STUDENTS

for the R.I.B.A., or any other architectural examination; and we most strongly deprecate the idea of our classes being used for that end, to the detriment of the studio work, which must of necessity be the case if students attempt to confine their studies to a two years' course. No; the whole scheme of our educational work is based upon a much firmer foundation than is involved in cramming. It was the aim of the framers of our new scheme, and the great desire of those who have carried on that scheme, to lay a solid foundation of elementary education, and to build up gradually a superstructure that should be as perfect in its parts as we could make it; and in this system was it, do you think, for one moment desired that historical, theoretical, or even scientific study should be the backbone of the work? Surely not!

## THE STUDIO WORK.

and all that is involved in it was intended to be the backbone of all other study, and that the subjects therein taught should throughout be worked conjointly with the lectures, classes, or divisions. It is here that a student will first learn to express his thoughts and ideas with his pencil—it is here that he will learn the beauty, relative proportion, and value of ornament and mouldings—it is here that he will be able to formulate his ideas into actual working formulæ—it is here that he will be able to test the value of what he has learnt in other sections—and last, but not least, it is in the studio that he will learn the fundamental principles of design, and having gained confidence in himself, will have many unrestricted opportunities of showing that individuality in design which I trust it will ever be the object of the Association to encourage. For these reasons the studio work should be considered by our students as the very basis of all other work. Amongst our many really able instructors, it would seem invidious to pick out any one name, when all, in their particular spheres of work, are so thoroughly good; but all who know Mr. Lewis will agree that he is simply *facile princeps* in his position as studio instructor. Whilst speaking of the value of studio work I take the opportunity of calling very special attention to one important section of it—I refer to the

## SCHOOL OF DESIGN.

Our older members will remember how popular was the old Class of Design in years gone by. I have previously referred to the enthusiasm in connection with this class under the old voluntary system. Many men who are now in full blown practice will remember with feelings of gratitude to the Architectural Association, the great help this old Class of Design was to them in their early days. Now, gentlemen, this is the class in our present system that binds us most closely with the past. It is this class that is most closely allied to the voluntary system of teaching. The visitors give their services freely and ungrudgingly for the good of the cause as of old, yet withal

## WE HAVE TO DEPLORE A FALLING-OFF

in this school of design, both in membership and quality of work. It has puzzled the committee a good deal to try and find out the real cause of this general falling-off. It surely cannot be that there is less enthusiasm amongst students for this all-important branch of study. There is now not less ability among our students than at any previous period of the history of the Architectural Association. On the contrary, there is every reason to believe that, with all the advantages we have been trying to heap up for the future happy student of the Architectural Association, that we comparatively old fogies shall in another decade be left far behind, and be looking on with wonder

and astonishment at the freaks and fancies of the 20th-century style—what shall we call it?—the "Conglomerate" style—invented by those geniuses we hatched and nourished with so much care in the folds of the Architectural Association. But joking aside—it is my earnest hope that this school of design may be a great success during the present session, and, in expressing my own wish, I am, of course, only speaking as chairman on behalf of the committee. Feeling that the fee of a guinea might be the real stumbling-block in the way of many who would otherwise join, the committee have most wisely decided to reduce the fee to the nominal sum of 5s. in both the elementary and advanced classes of design. I trust that this inducement alone will be enough to make the class more really representative of the work of the students of the Architectural Association. One can only hope that on the principle that you value most what you pay most for, that students will not value less what they are paying so little for. The very name, and the object of the class, should of course in itself be an ample inducement for any enthusiastic student to join. If, however, further inducement were needed, surely a glance at the list of names of visitors who, although all busy men, are ready to give their time, energies, and experience, freely and voluntarily for the good of the students, should be sufficient. The committee will watch with hopeful interest the result of its endeavour to meet the convenience and requirements of the students in every possible way. We now come to the latter part of our title:

## SCHOOL OF HANDICRAFT.

This question is so mixed up with that of premises that it is hard to speak of them apart. Undoubtedly the want of success in this branch of our work is owing to the want of technical and demonstration workshops in our own building. This being quite impossible at 56, Great Marlborough-street, the committee in past years obtained permission for students to attend various workshops and polytechnics, a list of which was given in the Brown Book. The results are not encouraging, and personally I think the reasons are obvious. During the past session not a single student applied to be allowed to attend the Trades Training Schools, or the Battersea and Chelsea Polytechnics. Twelve students, however, attended the Masonry and Leadwork classes at the Regent-street Polytechnic under the direction of the L.C.C. Technical Education Board. But 12 out of 176 students is indeed a small proportion. I suppose that amongst the average students of the present day, there is no need more conspicuously apparent than

## THE WANT OF THOROUGHLY PRACTICAL KNOWLEDGE

of materials and their proper treatment constructionally and otherwise. Our lectures and instruction on Theoretical Construction are of course very valuable. But practical demonstration in a workshop by an expert mason, carpenter, bricklayer, and plumber, would be of equal, if not of greater value to the young student, and is in any case a very necessary adjunct to theoretical study. The advice given by the late G. E. Street to a father who wished to send his son to him as a pupil was: "Please send your son to the workshops of a good builder for a year before sending him to me," and I feel confident that this was sound advice, and only wish that it could be more generally followed within certain limits in places where other means of practical training are unattainable. We all know what severe and prolonged workshop training is considered necessary for a civil or mechanical engineer. In a modified degree, it is not one bit less necessary that an architect should have a similar training as to the quality, uses, and correct treatment of the materials he has to deal with, in various kinds of building. It is simply deplorable how little really thorough practical knowledge of this kind exists, and, what is worse, how little it is sought for, amongst the great majority of students. This is not an evil by any means confined to the present generation. The haphazard system of learning—to be an architect by means of office and class training, and picking up the practical craft side as best you can, has been quite as much an evil of the past as it is of the present day—with this difference, however, that at the present time the

## FACILITIES FOR PRACTICAL CRAFT TRAINING

are so much greater than they were a few years ago, that there is less excuse for students not profiting by their numerous advantages. I am



not urging that an architect should himself become a perfect craftsman in all trades. With the many qualifications that are considered requisite for an architect, life is far too short for such an ideal; but an architect worthy of the name, should have such a personal practical knowledge of materials and actual workmanship, that he can always utilise the former to the best advantage, and correct the latter, when defective, in all trades; to do this he must gain his experience on the actual building or by practical demonstration in the workshop. It is for this reason that I sincerely hope we shall before long see proper demonstration workshops in direct connection with, if not under the same roof as, the present or future Architectural Association premises. Until such arrangements can be made, I do hope that a larger proportion of

#### THE STUDENTS WILL JOIN SUCH POLYTECHNICS

or other technical classes as they may find most convenient, and that all will take every possible opportunity of visiting various works in progress wherever possible. Principals can in a great measure help forward their pupils in this way, by allowing them continually to visit works they may have in hand, whereby the pupil can study the plans and details and building together. And further, there must be many architects who have sufficient interest in the education of their younger brethren to give to individual Architectural Association students permission to visit their buildings. Personally, by previous arrangement, I should be always pleased to do so. There are

#### TWO OTHER POINTS

bearing upon the work of the last session that I feel bound to touch upon. First, that the instructors do not think the "home-work" is as good as it should be, and the second is the want of support given to the Modelling Class. As regards the former, the Association cannot, of course, attempt to regulate the "home-work" of students, but if they want to obtain the full benefit of the lectures and classes they pay for home-work is an invaluable accessory, and one which, by being neglected, leaves the individual student the main sufferer. And with reference to the latter, what I have said as regards workshop study applies with equal force to the study of modelling. Wholly independent of the intrinsic value of modelling as a means of learning form and proportion, and the value of light and shade under various conditions, and in various positions, it is one of the greatest helps to an architect being able to illustrate his requirements as to ornament or intricate stonework by modelling for the carver or mason, and it is a kind of illustration that both carver and mason appreciate far more than a pencil sketch, and greatly enhances the reputation and respect for an architect among the workmen. In Mr. Pomeroy we have an instructor second to none in the art, and this should tend to render this one of the most popular classes in the Architectural Association. I am afraid so far you have found what I have said very severely practical; but I cannot but feel that if we wish to make the Association work more thoroughly successful than it is, it is well that we should at times look at the severely practical side of things, and see where our defects and weaknesses are, that we may be in a better position to remedy them. To turn now to more general subjects. Undoubtedly the greatest need of the Association at present is

#### THE WANT OF NEW PREMISES.

For years past this need has been unceasingly felt. The prospect of new and more suitable premises has so often been foreshadowed, unhappily without any tangible result, that I cannot wonder that members should feel disappointed, and consequently somewhat apathetic on the subject. But I can assure those who are not immediately behind the scenes that the question is by no means an easy one, and is beset with many difficulties. The Committee, as a body, certainly have not shirked the question. Time after time have different schemes been brought before them, and many hours have been spent in the inspection of possible buildings, and yet on only two occasions have we come anywhere near a solution of our problem, and then only to find our hopes blighted by some unforeseen difficulties. The largeness of our requirements, and the limited means at our disposal, form

#### THE TWO GREAT OBSTACLES

to the attainment of our long-deferred hope. In company with several of my predecessors in the

chair, I had good reasons to hope that I should be able to bring before you this evening a scheme that would meet our requirements, and it is with much regret that I find myself at the last moment unable to do so. But I can say this much, that the Jubilee Premises Committee have under consideration another scheme that we sincerely trust we shall be able to submit for your consideration at no distant date. I will briefly state what I consider our needs are, and what I shall aim at obtaining in any scheme for new premises.

#### AN A.A. CLUB.

In the first place, I should like to see our Architectural Association centre made much more of a true centre, a house, or club, if you like it better, of architectural life; a place where one and all members could drop in at all reasonable hours of the day, and enjoy the privileges of a good common room, where light refreshments could be obtained, in a comfortable reading and writing and smoking room; a place where one would not feel ashamed to ask a friend or client to meet one, and where the parents and guardians of any student might call, without feeling that they were visiting a sort of architectural wholesale warehouse or counting-house; and last, but not least, a place where country members or members of allied societies could call, and feel that they had a homely centre in this great Metropolis, where they would be always welcome and could meet men of like interests to their own. Such a modified club life would be of great service to the younger as well as the older members of the profession. Within proper limits its tendency would undoubtedly be for good all round; it would form a social background to the otherwise serious educational work of the Association, which would reflect warmth of feeling, and create a spirit of *esprit de corps* amongst its members. I could wish that there was some such club life in the Royal Institute of British Architects, that it might be in reality what it should be, the proper social as well as the professional centre in London for all architects. In addition to good offices and library and classroom accommodation, it is, I think, desirable that we should have our own meeting-room if possible, and a large, well-lighted and ventilated studio will be an essential feature; and the next important new requirement should be

#### DEMONSTRATION WORKSHOPS.

an addition which will, I hope, be one of the great features of our future educational work. You will notice that I use the title demonstration workshops; I do so advisedly. Any scheme for extensive workshops in various trades would (even if it were desirable, which I doubt) be entirely beyond our means. Men who wish to attend regular workshops where they can see a large variety of work can always make arrangements with some good builder to do so, and they will no doubt obtain a good insight into practical work. There are, however, many obvious difficulties, and some objections to regular builders' workshop training. To begin with, anyone who wishes this sort of training to be of real service to him must make up his mind that no half-measures will be successful. He must drop any sort of kid-glove studentship, and be ready to work with his hand, and on the same footing as any ordinary mechanic. There are troublesome class difficulties and craft jealousies to be faced—a footing to be paid for, added to which there are only too often influences of a low moral and degrading kind that cannot be healthful to the younger student just starting upon his life's career; and in saying this, I speak from personal experience. Again, hard manual work at the bench or banker may often be injurious to a man's sketching and pencil work. For these reasons the first practical training for architectural students should be in technical schools and demonstration workshops rather than at the actual bench or banker at a builder's works. If after such training a student can take the position of a clerk of works, or a place under a good clerk of works, he will have precisely the kind of practical training that an architect requires. The demonstration workshops in connection with the Architectural Association ought to consist of at least three large rooms: one for carpentry, a second for mason and bricklayer's and tiler's work, and a third for plumbing and general metal work. The furniture would, of course, consist of benches, bankers, lathes, and other necessary tools and appliances on a modified scale—but, further, it

should be furnished with models of wood, stone, and metal construction, and plumbers' work. In some instances, such as roofs, floors, staircases, and groining, the models would necessarily be on a small scale, but in all cases they should show accurately the construction, with joints, tenons, mortises, scarfings, &c., complete. But for such details as doors, window sashes, and casements, and other things of every-day use that will readily suggest themselves, full-size models would be more useful, and so made that they could be taken to pieces and put together again, so as to be copied, bit by bit, to small scale by students.

#### THE PROBABLE COST.

It may be objected that the cost of such models would be very considerable, which, if they had all to be especially made, would certainly be the case. But I would suggest the following method for the commencement of work in this new department:—(1) That the initial expense to the Association would be the necessary fittings, tools, and materials. When these were once obtained, the fees for the workshop course should be more than sufficient to pay the remaining expenses. (2) That the services of experts in each of the various trades should be obtained at a reasonable fee, and that the duties of such experts should consist of descriptive and practical lessons in setting out work on the board from scale drawings, and as to the best application of that setting out to the actual materials, so as to obtain the best results and avoid unnecessary waste; to give actual working demonstrations on the bench or otherwise in preparing, and afterwards putting together, the model to be constructed. (3) To superintend the students' work in carrying out various portions of the same model or other work he may set them to do. (4) That certain members of the Association should be invited to become visitors, and that they should from time to time set a subject for a model, or a problem, and give designs and details, say  $\frac{1}{2}$  in. and  $\frac{1}{4}$  in. scale, to be worked out in proper materials by students to  $\frac{1}{2}$  in. or 2 in. scale—or larger, as the subject might allow. By this means in a few years the Architectural Association would have a most valuable set of models always ready for reference, made by the students themselves, under the supervision of an expert, and without any other than the ordinary running expenses being entailed. When our collection of models was large enough, no doubt the students who made future models would be glad to keep their own handiwork in memory of the happy hours spent in the demonstration workshops of the Architectural Association. The manual labour involved in working out these models and details to small scale is a very different matter to working on large planks and heavy stones in a builder's yard, yet, for all practical purposes, the teaching would be the same, and that without injury to the hands for drawing purposes. There is

#### ONE OTHER CLASS

that I should like to see revived in connection with the Studio, and that is drawing from the antique and from the life. I say revived, because as far back as 1864 a class was started for this end, but from lack of the method such as we now have it fell through. Such a class would be found very useful to many of our members of all ages. I sincerely trust that my picture of what we hope for in our new premises is not merely a fancy one or fated never to take substantial form, but that ere long we shall see it an accomplished fact, and that our long and patient waiting will only make us value the more our new home, wherever it may be.

#### A WORD TO STUDENTS IN ARCHITECTURE.

I take it as a simple axiom that we are one and all students in our beloved art, and this is an axiom that cannot be too often repeated, for I fear that after passing through the first stages of studentship and commencing practice, many are far too apt to agree with the sentiment of such an axiom without carrying forward their studies, and thus building up upon the foundation of their earlier architectural education. No profession or art needs more keeping up and continuous study than architecture, and an architect who ceases to study, not only by bookwork, but by travelling and sketching, becomes sooner or later a more or less repeating machine. His ideas crystallise, and his designs become cold and lifeless. It is for this reason that I hope one and all of our members will claim the honourable name of student in architecture. We are only on different stages of the ladder. To



those who are just commencing their climb let me say, Look well before you start. Consider well what are your qualifications. Can you honestly say that you love art for art's sake, that you are prepared to work hard, and in a great measure to sacrifice your pleasure for your art, that you do not take up architecture merely because it is a respectable profession?—if so, then I think you may go forward with every confidence of future success; but if not, for the sake of your future happiness and welfare, you had far better turn back before it is too late. If you seek an easy-going and lucrative profession only, do not become an architect. The practice of architecture is neither easy nor lucrative: on the contrary, it is one of the hardest-working and most poorly-paid of professions, as a large number of its members have learnt from sad experience. On the other hand, the man who sincerely enters into the true art side of architecture will experience great pleasure in his work, a pleasure that it would be hard to surpass, if, indeed, to equal, in any other profession or calling, and although wealth will be within the grasp of comparatively few architects, yet with a true love for his art as his main guide, with industry, ordinary business capacity, and last, but not least, absolute integrity in all business transactions, he will almost invariably be sufficiently successful to render his professional career a happy one.

#### ARCHITECTS' UNIFORM CHARGES.

In speaking of architecture as a poorly-paid profession, I am reminded of a somewhat amusing episode. A client of mine wrote a certain sanitary surveyor, and auctioneer, &c., whom she had previously employed on some sanitary work, complaining that his charges, which I may say amounted to over 15 per cent. of a total expenditure of some £1,600, were greatly in excess of the charges of architects whom she had employed before on other house work. The answer of the sanitary surveyor and auctioneer, &c., was to the effect that of course his charges were quite a different matter to those of an ordinary architect. He was a specialist! This, at least, indicates that there are some people who think that an architect must be a poor sort of thing to charge so little, and indeed our system of charges does seem somewhat an anomaly—the Scott, Street, or Pearson of his age charging precisely on the same scale as Mr. Tom Brag, architect, auctioneer, and house agent. It is somewhat like a Millais or Leighton charging at the same rate per square foot of canvas as Mr. Daub, who once succeeded in getting one of his pictures marked with a big D, and hung in the Academy. The result is too often that the men who have made a name get more than they can possibly attend to properly, whilst the less-known men get little or nothing to do. From an art point of view, it is an utterly wrong system, but as the public, our patrons, would not be satisfied unless there was an equal schedule of charges, I acknowledge the difficulty of finding a remedy. In conclusion, the President offered a few well-chosen words of congratulation on the prosperous condition, both numerically and financially, of the Association, and defended the amounts and energy expended on the *soirée* and other forms of entertainment, as developing the invaluable social side of the work, a side which was the sheet anchor and *raison d'être* of the Association.

A vote of thanks to the President for his address was passed by acclamation on the motion of Mr. STATHAM, seconded by Mr. BERESFORD PITE, and supported by Messrs. E. T. HALL, COLE A. ADAMS, W. J. N. MILLARD, and W. H. SETH-SMITH.

#### THE LUXFER PRISMS.

ONE of the most remarkable applications of optical science, or the law of refraction of light, to the purposes of building has been introduced by the British Luxfer Prism Syndicate, Limited, of 16, Hill-street, Finsbury. Many of our City and other buildings remain in gloom even in bright days, and the problem of lighting a deep block of offices or factories except through light-wells is one of the most difficult the architect has to consider. The Luxfer prisms have at last solved the difficulty. What are these? They are small plates of crystal glass with prismatic ribs cast on one side, welded together by electricity into plates of great strength. By this medium daylight can be turned anywhere and at any angle. They take the light from the

sky and bend it in any desired direction; but they are not mere reflectors. Formed on exact scientific principles, basements can be made as light as ground floors; the most inaccessible places are lighted. The prismatic plates are placed vertically in the plane of the ordinary windows or above the transom, and they increase the light of the room from five to twenty-five times. Being electro-glazed, they are stronger than plate-glass, and fireproof. The *crux* of how to light the inner end of a long room with only one window to the street is solved in a way that has hitherto been a hopeless task. Taking a room, say, 50ft. long, back from the window the floor space illuminated is only a small part of the depth, about 15ft. at the most, 60 to 80 per cent. being lost, the light rays, in fact, falling on the floor within an oblique plane from the skyline of houses opposite through the top side of the window. Now, by placing the Luxfer prisms in the window opening the light is bent horizontally and thrown to the further end of room, which becomes as light as the window end. By a series of very interesting experiments we can speak with absolute certainty of this result. Passing through a succession of rooms which the Luxfer Syndicate have fitted up with their plates of prisms, several important points were noticed. A long, narrow, gloomy apartment, nearly 100ft. in length, lighted from the street end by ordinary plate-glass was absolutely dark at the further end. When the plates of the Luxfer prisms were folded over the opening the influx of light was extraordinary: the dark end of room became as light as day—we could hardly believe it possible. The effect must be seen to be realised. In another long room a "canopy" of the prisms or a lean-to of the glass was placed outside the window in a dark court receiving its light from the sky. These prisms were arranged so that the light is thrown horizontally to the end of room, and, by having prisms of different angles, either side of the room can be illuminated in a wonderful manner, dispensing with gas and its unhealthy products. We may here say that 120 different prisms of all angles are manufactured, which enable the trained lucifer engineer to "lay-on" the light of the sky in any direction desired—extreme right and left, top or bottom of any room. The application of the Luxfer-prisms to ornamental shaped-glass windows is important. The prismatic glass can be made to any shape or design, and many exceedingly elegant designs are to be seen well adapted to the upper part of shop or office windows above the transom. By the use of the Luxfer prisms arranged as a canopy-light, wells are not necessary for lighting large floors. Architects will no longer grieve about that necessary evil, the light-well, as they can bring the light of the sky into the darkest room on the ground floor, which has an opening into it, and that bugbear, the dark corridor or staircase, if it have only an opening at one end or side, can, by the Luxfer prisms, receive the pure and healthful daylight without resort to gas or electric lighting.

The basement, too, is relieved of its gloom. The old prismatic lenses have only given partial light, the Luxfer pavement lenses or multiprism pavement tile are specially designed for the purpose; the prisms, unlike those in use, do not obscure each other, but throw the light down to impinge on the "lucidux," a carefully prescribed plate of prisms through which the light is refracted to the rear of the basement. The ends of the multiprism pavement lenses are also utilised by other prisms, which receive the side light up and down the street. The real aid is not the pavement prism, but the vertical lucidux. A basement window fitted with ordinary lenses on the pavement level showed a very different result to that fitted by the Luxfer method.

We have yet to speak of another valuable application of the Luxfer prisms that cannot fail to be extensively brought into use—that of increasing the light behind stained-glass windows, and thus rendering them clear and transparent. Many costly windows in town churches are lost because the light of the sky has not access to them. The Luxfer prisms placed behind restore them to their real brilliancy and beauty, and an example of this is to be seen at the factory. The contrast of the same stained-glass window without the prisms is remarkable, and the best illustration of the value of this means of illumination is to be seen in St. Saviour's Collegiate Church, executed by Mr. C. E. Kempe, the well-known stained-glass artist, where the great window of the north transept, lately unveiled by the Duke of Connaught, and which was obscured by a very

high warehouse, has been brought to view in all its brilliancy by the placing of the Luxfer prisms behind it. Canon Thompson, the rector of the church, says the "Luxfer prisms have wrought wonders on the window."

Other important features of this scientific means of lighting can be merely glanced at here; the prisms are fireproof, the glass squares being so firmly welded by the electro-glazing process that if cracked by heat they cannot fall out. The electro-glazing method of uniting the squares smooth on the outer side, and having a moulded prismatic surface inside, is in itself a discovery of the greatest value applicable to all glazing purposes. By an electrical deposit of copper a perfectly rigid and homogeneous plate is formed, the pieces joined by means of flat copper bars  $\frac{1}{2}$ in. in thickness is neater and stronger than lead, and these can be formed to any pattern. The Luxfer prism lenses are made in sections 4in. square; the plates are nearly  $\frac{1}{2}$ in. in thickness.

The advantages of this unique and important invention must be seen to be fully appreciated. Architects who have seen the Luxfer prisms are unanimous in their opinion of their merits. The prisms have been applied to several buildings including the Birkbeck Bank, to Jays, Ltd., and other business premises, and we have no hesitation in saying it is a new building appliance of great value.

#### THE HEARST UNIVERSITY, BERKELEY, CALIFORNIA.

THE international jury elected to make a preliminary choice of designs for the great Californian university have been holding their conferences within the past week or two under the presidency of M. Pascal at Antwerp, and have now selected eleven architects to take part in the final competition. Mr. Norman Shaw, R.A., who represents this country on the jury, assures us that every care was taken to make the proceedings absolutely satisfactory, and he expresses his confidence that the officials had not the smallest suspicion of the authorship of any one of the designs. The jury eliminated the plans by degrees, after repeated examinations, and brought them down to about thirty. Each member of the jury from these then made his own list of eleven, and after a morning spent in individual examination the assessors met to compare notes. A certain number of the designs were found to have been unanimously chosen, and so were soon disposed of. The remainder were gone over again and discussed at length. Sometimes the majority held out, and the plan under consideration had to go. Sometimes our distinguished representative saw the force of others' arguments and approved; but in the main the jury agreed well, though individuals naturally held individual views, and when they were strong, held to them still. The exhibition took place in the Musée, two long galleries being set apart for the display of the drawings, which were well placed and well lit. The distinguishing characteristic of the proceedings was the "enormous courtesy and civility shown to the jury by everyone, from the Burgomaster down to the smallest boy, of whom there were several in knee-breeches and Californian bows in their buttonholes." Mrs. Phoebe Hearst, the lady who is to pay the enormous cost of erecting this vast university, gave a superb banquet at the conclusion of the proceedings when the jury were entertained with the Burgomaster, the Aldermen, and town officials, the Consul being also present. Everything, we understand, was perfectly organised without any friction between the nationalities, and without a hitch of the smallest kind. We published the names of the eleven chosen competitors in our last issue, page 496, from which it is clear that no British architect is included in the list. The designs, indeed, are mainly characteristic of the French school, in the Grand Prix style of draughtsmanship so dear to Continental experts, and so out of accord with the English architectural manner and architectural ideas, which no doubt are not so commonly associated with large municipal schemes—projects which in France, Germany, and Austria cost hundreds of thousands of pounds, while in England the outlay on such undertakings generally bears no like relation. Our Governmental buildings have always been grudgingly provided for, and English architects consequently are not so familiar with public undertakings on a vast scale. The profession in England no doubt may well pride itself



on its Domestic architecture and its church designs, for they at least hold their own for taste and individuality against all comers. Nevertheless, although the universities of Oxford and Cambridge, the works of Inigo Jones and Sir Christopher Wren are unsurpassed elsewhere, the architecture of the 19th century in England, whatever its merits in other respects, cannot be described as distinguished for its monumental proportions and scale. Our public buildings, with very few exceptions, are not unqualified successes chiefly for this reason. Whether few or many English architects contributed designs for the Hearst University or not we cannot tell, but we think most likely not. The particulars issued for the use of architects were so essentially American in conception and promise, that they imparted too great a problematical element to the affair to inspire many of the leading architects in this country to embark upon a competition against the odds necessarily belonging to an international contest of this kind, and where the judges, with one exception, by the very nature of things would have predilections strongly in favour of Continental ideas of architectural fitness. It is, however, a matter of regret unquestionably that an English-speaking university, such as that which Mrs. Phoebe Hearst is to build on so magnificent a scale, so splendid a heritage for future generations in America, should not be thoroughly in accord with the genius of the Anglo-Saxon race. Instead of this, from all accounts, a composition conceived on the models of design associated with the Ecole des Beaux Arts seems likely to be adopted for erection on "the most beautiful site on earth," where "there is to be no sordid or inharmonious feature, with an entire exemption from the influence of discordant surroundings."

#### THE FATAL BUILDING ACCIDENT AT GOVAN.

**A**N inquiry under the Fatal Accidents Inquiry Act was held at Glasgow on the 6th inst. before Sheriff Fyfe into the circumstances regarding the deaths of Andrew Davidson, foreman mason; William Rankine, labourer; Patrick Gallocher, labourer; Thomas Mossman, joiner; and Thomas Edwin Christie, joiner, who lost their lives in the collapse of a concrete roof in a building in Govan-road on the 19th September, as reported in our columns a fortnight since. Mr. William Orr, builder, Moss Cottage, Dumbreck, examined by Mr. Hart, stated that all the deceased workmen were in his employment. The property was five stories in height, and was intended to be used as a model lodging-house, with shops in the Govan-road street floor. Plans were prepared for the building by Mr. W. J. Anderson, architect, and were passed at the Dean of Guild Court. All the floors were of concrete and steel, imbedded in the concrete being a network of steel barbed wire. In regard to the construction of the building, he was in the hands of his two foremen. Witness was not a practical builder himself. He called almost daily to see how the work was progressing. The concrete floors and roof were constructed in four sections. The section of the roof which gave way was about three-fourths completed, and there were still three sections to do. The floor immediately below the section which broke was put in on the 3rd and 4th July, and the other lower floors were put in proportionately earlier. The only explanations for the accident he could think of were that something might have happened to the temporary timber supports on which the soft concrete was placed, or the concrete on the fourth floor, on which the timber supports rested, might have given way. By Mr. Newlands (representing the Home Office): The concrete floor below the section of the roof that fell had been laid about ten weeks before the accident. The usual time given for drying was three or four weeks. The mesh of the barbed wire netting was about two inches. By Mr. Shaw (appearing for the relations of deceased): Witness was the proprietor of the ground, and was erecting this building on his own account. He did not call himself a builder, but he knew a little about building. He had not been trained to the trade. He was interested in concrete as a material in building, and had used it to some extent. The section that gave way was 32ft. long by 11ft. broad, and 6in. thick. He had constructed large buildings in Buchanan-street on a similar system. He did not know any person except himself who had ever used barbed wire. He claimed that as a

novelty of his own. The barbed wire gave more strength than the plain wire. It did not make very much difference in the cost to supply barbed wire in contradistinction to steel supports, but he should think the wire was cheaper. By the Sheriff: The concrete was composed of from three to four bags of concrete to a cubic yard of aggregate. He was quite satisfied that the concrete was properly mixed and in proper proportion. It was mixed under the direction of Davidson, who had experience of concrete. Mr. Charles Pooler Hogg, civil engineer, deposed that he had examined the building in company with Mr. Orr. The opinion he formed was that the accident happened through some giving way of the temporary support of the ceiling of the fourth floor. By Mr. Shaw: He did not attribute the accident to any weakness of the fourth floor. Beyond Mr. Orr he was not aware that anyone in Glasgow used wire netting in concrete construction. Mr. W. J. Anderson, architect of the building, said he believed the accident was caused by the collapse of the wooden supports. Mr. John Stewart, wright and builder, stated that in company with Mr. Muir, builder, he had inspected the scene of the accident. It was their opinion that the concrete first broke immediately under the supports of the roof. The floor had been subjected to great strain by large stones having been laid upon it. After further evidence, the jury, who included in their number a joiner, a mason, and a measurer, retired to consider their verdict. On returning to court, the foreman stated that the jury were of opinion that the casualty was attributable to the defective construction of the concrete, and the insufficient steel beams, and to the want of properly skilled supervision of the work. They expressed regret that no tests were made of the quality of the concrete as taken from the wreck.

#### RECENT DISCOVERIES AT POMPEII.

**T**HE excavations at Pompeii have, says a correspondent of the *Times*, been continued during the past year and have resulted chiefly in the discovery of small houses containing objects of secondary interest and importance. In the neighbourhood of the Gate of Vesuvius, a portion of the city wall belonging to the earliest period of Pompeian building was laid bare, and is apparently more ancient than the portions of the wall previously discovered. It appears to be of Oscan construction, being built of large blocks of rough stone joined without mortar. This section of the excavations being exhausted, the director determined to excavate the small corner near the "Sea Gate," the only unexcavated spot in that part of the city. Experts had long been anxious to see what lay buried there, for there was a portion of a very large red marble pillar, which had long been above ground, and had given rise to sundry conjectures. On removing the soil the site was found to be occupied by the foundations of a small temple which was in course of construction at the time of the destruction of the city in 79 A.D. Though it had scarcely risen above the ground level, the marble architraves, carved with the usual egg and tooth moulding, are lying around it ready to be put up; and the Corinthian capitals, some finished, and others only partly executed, remain in the inclosure, as well as the base of a pillar upon which the mason was at work at the time of the catastrophe which overwhelmed the city. The tool-marks on this base are clearly perceptible. The partly executed capitals show the methods of the Roman artist who was engaged upon them, while those that are complete are very good specimens, considering that they belong to an age of decline.

A small excavation on private ground a few yards outside the walls has revealed one of the finest and most interesting mosaics of antiquity. Surrounded by a garland of flowers, with a theatrical mask thrown in here and there to break the pattern, is a picture representing a group of seven philosophers, one of whom is seated with a papyrus in his hand, and the others are grouped round listening to him. In the background are some ruined pillars, and in the right-hand upper corner is a representation of the Areopagus of Athens, with its rocks and buildings. The mosaic is polychrome and in diminutive cubes of very fine workmanship. It is about 3ft. square, and was intended for the centre of the pavement of a room. It had probably never been used and was a new mosaic, because it was not found on the ground, but leaning against a wall. The

Government has purchased it from Signor D'Acquino, and it will shortly be exhibited to the public in the mosaic department of the Naples Museum.

#### CHIPS.

The Wesleyan Chapel at Hampton, North Devon, was reopened last week, after renovation carried out by Messrs. Hooper and Howard.

A fresco representing Our Lord in Majesty is being painted in the semi-dome above the chancel of Holy Trinity Church, Guildford, by Mr. Percy C. Bacon, of Newman-street, W., and will be unveiled on November 3rd.

The total area irrigated in Guzerat and the Deccan in 1896-97 was 118,009 acres, or nearly 22,000 acres in excess of the previous largest area, which was recorded in 1891-92.

Green patina on zinc roofs which lasts for years is produced in the following manner:—Cleanse the zinc of all dirt, and coat it repeatedly with a diluted solution of copper nitrate. When the whole roof has been thus coppered over, cover it with a likewise diluted solution of carbonate of ammonia. On this coat of copper patina readily forms.

The Lancaster Town Council have resolved to apply for sanction to borrow £20,250, for extending the electric lighting, constructing a new river wall and railing on the ramparts at Skerton, carrying out improvements in Church-street and Horse Shoe Corner.

At a meeting of the district committee of the Middle Ward of Lanarkshire, held at Glasgow on Friday, it was agreed to construct additional sewers and purification works in the Blantyre special drainage district at a cost of £5,500.

The gas committee of the Glasgow Corporation has at present under consideration the question of extending the gasworks of the city. Mr. W. Foulis, the engineer, recommends the purchase of ground, extending to about 110 acres, between the Monkland Canal and the Caledonian Railway branch line, for the erection of works capable of manufacturing 40,000,000c.ft. per day, thus enabling the corporation to close the Dalmarnock Works, which at present produce only 6,000,000c.ft. per day.

A new church is being built at St. Stephen's, Portsea. It is Perpendicular in style, and, owing to the form of the site, almost square on plan. Mr. Reginald Crowley, A.R.I.B.A., is the hon. architect, and the builder is Mr. T. P. Hall.

The St. Helen's Corporation electric-lighting and traction committee have appointed Mr. J. S. Highfield, the resident electrical engineer, to be electrical engineer to the corporation in the place of the late Dr. John Hopkinson, F.R.S., who was recently killed while mountaineering.

Since the amalgamation of the urban districts of Bingley, Bingley Outter, and Wilsden, the question of providing a scheme for the sewerage of the three districts has been under consideration, and Mr. E. Armistead, C.E., of Bingley, was instructed to prepare a report thereon, and to show the best means of providing such a scheme which would include the whole of the Bingley Urban District Council's district. The report has now been prepared, and states that the cost of the combined system, with works for sewage purification at Dowley Gap, is £23,400.

The Perth Water Commissioners propose to promote a bill in the coming Parliamentary session for powers to build a new reservoir on Kinnoull Hill, at a cost of £8,000, and to supply Scone and other outlying districts.

At Bingley, last week, Colonel W. Langton Coke, M.I.C.E., one of the inspectors of the Local Government Board, held an inquiry into two applications by the urban district council for borrowing powers—viz., £1,900 for the extension of the public offices, and £1,800 for improvements in Park-road, Bingley.

In connection with the York-street unhealthy area improvement scheme, the sanitary committee of the Leeds Corporation have provisionally arranged for the purchase of properties there, involving an expenditure of, in the aggregate, over £12,000. Continuing, also, the improvements in North-street, it is proposed to buy a shop and premises on the east side of that thoroughfare, on the basis of an exchange of land in addition to a payment of £2,000.

New branch offices have just been built at Bristol for the Edinburgh Life Assurance Co. They occupy the corner of Baldwin- and Marsh-streets, and are faced with red bricks with dressings of Pennant and Bath stone. The building is Georgian in style, is four stories in height, the street angle being emphasised by a hemispherical copper dome. All the fittings and joinery are of oak except the main staircase, which is of oak. Mr. James Hart, Corn-street, Bristol, is the architect, and Mr. A. J. Beavan, Dean-street, in the same city, the builder.



## BOOKS RECEIVED.

*Building Construction* (Advanced Course), by CHARLES F. MITCHELL, Lecturer on Building Construction to the Regent-street Polytechnic, M.S.A., &c., assisted by GEORGE A. MITCHELL (London: B. T. Batsford).—This is a revised and enlarged edition of a very useful manual on building construction with which our readers are no doubt familiar. The authors have added to several chapters, including those on materials, brickwork, masonry, half-timbered construction. We see many additional illustrations have been introduced, such as those on half-timbering, a section of hollow wall showing how the sheet-lead is used over window and door-frames extra, and other illustrations of brickwork and masonry. The book is up to date in fire-resisting construction, sanitary matters, hot-water supply, &c., and the chapter on graphic statics is useful. We can highly recommend Mr. Mitchell's little book in its revised form to all students and those who are preparing for their examinations. *Building Construction and Drawing*, by CHARLES F. MITCHELL, &c. (London: Batsford).—The fourth edition of the above author's work on drawing for students for the examinations in building construction in the Elementary, Advanced, and Honours stages, is a valuable work. It contains a large number of excellent illustrations, figured and revised to agree with the latest practice. Several lecturers on the building trades are acknowledged as having revised the book and made useful additions.—*Specification: for the Architect, Surveyor, Engineer, when Specifying* (London: Published by the Proprietor of the Builders' Journal and Architectural Record, Effingham House, Arundel-street), is a revised quarterly dealing with specifications. The facts, notes, and precedents for clauses in the various trades in this part are useful, though in some trades incomplete. Each of the trades has been corrected by professional experts. Illustrations are numerous.—*Carpentry and Joinery*, by FREDERICK C. WEBBER, chief lecturer to the Building Trades Department of the Merchant Venturers' Technical College, Bristol (London: Methuen and Co., Essex-street, W.C.).—This is a little volume well illustrated, giving the substance of the instruction given to students attending the evening-classes in carpentry and joinery in the above institution. The first chapter is devoted to geometry and projection, and the mechanics of carpentry is also treated graphically. The usual subjects are dealt with, and examples given of sashes and sash frames, lantern-lights, skylights, roofs, moulded work, staircasing and hand-railing, shoring, &c. The definitions and diagrams are clear and well drawn. The appendices comprise the syllabus from the programme of the City and Guilds of London Institute.

A contract, amounting to about £30,000, for additions to the Royal Marine Depot at Walmer has been entered into, and the work will be commenced at once.

The Local Government Board has given sanction to the proposal of Croydon to borrow £23,262 for purpose of extending the electric lighting to Norwood.

A special committee of the Leicester Corporation have entered into a provisional agreement to purchase the Leicester tramway undertaking, hitherto in the hands of a company. The price to be paid by the corporation is £129,500.

The St. George's-in-the-East Vestry have decided to invite tenders for the enlargement of the vestry-hall. The cost of the work is estimated at £7,000. The seating accommodation will be increased from 300 to 500.

New offices are being erected for the local school board in Albion-street, Hull. The building is being completed by Mr. Southern, of that city, the original contractor having withdrawn owing to labour troubles.

The Roman Catholic church of SS. Mary and Michael, Commercial-road, E., has undergone considerable alteration in connection with the enlargement of the sanctuary from the design, and under the direction of, Mr. F. A. Walters, F.S.A., of Westminster. The work comprises a lofty carved reredos, wrought-iron screens, enriched by decoration, in the four easternmost arches between the sanctuary and side chapels, and a pavement of encaustic tiles over the whole of the chancel. A feature of the alterations has been the removal of the flight of steps from the middle to the entrance of the chancel, and the removal of the altar-rails from the middle of the sanctuary to the lowest step in front.

## Building Intelligence.

ABERDEEN.—Union Club buildings, at the north end of Union-terrace, were opened by the Marquis of Lorne on Tuesday. Fronting the Viaduct, the new club, which was designed by Mr. A. H. L. Mackinnon, architect, is three stories in height, the ground floor of the front being occupied by three shops, while the floors above are devoted exclusively to the uses of the club. The central portion of the elevation rises to a height of 64ft. and terminates in a circular window, flanked by pilasters and surmounted by an obelisk. A projecting cornice, with balusters above, is carried along the rest of the elevation. The length of the hall in which public meetings will be held is about 75ft., with a breadth of 42ft. At the south end is a small gallery, which will accommodate about eighty persons. On the same floor there is a kitchen and buffet, from which there is a lift to the refreshment-room above. The first floor contains smoking, reading, and refreshment-rooms, all looking to the front; while on the second floor are committee and recreation rooms, with caretaker's apartments. The billiard-room has been fitted with six tables. Throughout the building is to be heated with steam pipes as well as by open fireplaces, and the electric light will be fitted up. The total cost of the club is between £9,000 and £10,000, exclusive of furnishings.

CANTERBURY.—Colonel Newton Dickenson, High Seneschal of the cathedral, contributes to the *Diocesan Gazette* the following notes on the work of restoration which has been going on since February in last year:—"The stonework of the cloisters has been very carefully gone over, and wherever a structural weakness existed it has been repaired under the directions of Sir Arthur Blomfield; a great deal of pointing has also been done on the parapet and coping. The roof, it will be remembered, had previously been releaded and retimbered, and the condition of the cloisters generally is now all that could be desired. It may be a relief to some if I add that the ancient appearance remains entirely unchanged. The roof of the Norman passage, leading from the library to the cathedral, has been releaded and timbered, and is now in perfect condition. The same may be said of the roof of St. Andrew's Chapel, which turned out to be in a very bad state, and could, in fact, hardly have lasted many more years without collapsing. Chimes have been attached to the clock in the south-west tower, and now mark the quarters of the hour. The complete air for the four quarters is a Gregorian chant. The remote corner of the cathedral outside the north choir aisle, at the east of the chapter-house, has been much neglected in the past; some of the shafts of the pillars in the windows were missing, and much pointing was required. The restoration of this part is now in hand. About seventy years ago, in the time of Dean Percy, a stone screen with glass panels was placed behind the Communion-table; this screen still remains, but the effect has been entirely changed, as the stonework has been painted and gilded, and the centre panels have been filled with paintings representing angels holding the instruments of the Passion. The work has been carried out by Mr. Hemming, of Margaret-street, London, under the direction of Sir Arthur Blomfield. Archbishop Chicheley died in 1443. He was the founder of All Souls' College, Oxford, and the care of his tomb has always been undertaken by the college. Mr. C. E. Kempe, by order of the Fellows, has now completed the redecoration."

EAST GRINSTEAD.—On Rosary Sunday the Roman Catholic Church of Our Lady and St. Peter, built by Sir Edward and Lady Blount, was blessed and opened. The church is Norman in style, the plan consisting of a nave, apsidal chancel, two small transepts, each with a chapel attached, and a processional aisle together with a baptistery. There are also priests' and boys' sacristies at the east end. The total length internally is 105ft., and the greatest width 51ft. A massive tower, 29ft. square, stands over part of the nave near to the west end. Externally, the church is finished with roughcast, the quoins, doorways, windows, &c., being of stone. The roofs are covered with Westmoreland green slates. The internal height, from floor to apex of the barrel vault of the roof, is 33ft. The chancel is separated from the nave by low stone walls with marble coping, forming Communion rail. Inside these the high altar is approached

by three steps, and is surmounted by a lofty stone baldacchino. The altar itself is inlaid with marble, and supported by marble columns. The altars in the two side chapels, dedicated to Our Lady and St. Peter respectively, are of similar character. All three altars, together with pulpit, font, &c., are of simple and severe character, to accord with the style of the church. Accommodation is provided for about 400 persons, including a gallery at the west end. Mr. F. A. Walters, F.S.A., of Westminster, is the architect, and the contractors are Messrs. James Longley and Company, of Crawley.

EDINBURGH.—Premises are about to be erected for the Commercial Bank on the east side of North Bridge-street, with frontages to both that street and High-street. The buildings will be five stories high, and about 100ft. from the pavement to the ridge of the roof. The bank office is placed at the end next North Bridge-street, and has an entrance at the corner of the two streets. The banking room is 30ft. square, and 18ft. high, and will be lined entirely with coloured tiles. The windows of the fourth floor rise through the roof like old Scottish dormers. At the three angles of the building which are visible from the street are placed circular corbelled turrets with ogee-shaped roofs. The lower portion of the building will be of polished granite, and the rest of hewn freestone. The architects of the building, which will cost about £15,000, are Messrs. Sydney Mitchell and Wilson, of Edinburgh.

EXETER.—An annexe, or secondary hall, added to Barnfield Hall, Exeter, the meeting-place of the Literary Society of that city, was opened on Friday. It agrees in character with the main block of buildings; but red brick dressings have been substituted for the terracotta and white brick employed in connection with the large hall. The accommodation now added comprises a small hall, 45ft. by 22ft., with an apsidal end, having an open panelled room, lounge space or entrance hall, cloak-room, &c., 18ft. by 18ft., and at the rear a kitchen, fitted with a gas-stove for use on the occasion of dinners, &c. The electric light has been installed throughout. Accommodation is provided for 150 persons. The work has been carried out by Messrs. Stephens and Son, Fore-street, Exeter, from the designs, and under the supervision of Mr. E. G. Warren, Commercial Chambers, of the same city.

HEATON, NEWCASTLE-ON-TYNE.—The Victoria Branch Library in Heaton Park, Newcastle, which has been erected at the expense of Alderman W. H. Stephenson, and was formally opened by Earl Grey on the 6th inst., is built on similar lines to the Stephenson Branch Library in the Park at Elswick, presented to the city by the same donor. The accommodation of the ground floor consists of a reading and news-room, smoking-room, and ladies' reading-room. On the upper floor are the lending-library, a room 70ft. by 36ft., committee-room, and janitor's-room. The walls of the ground-floor story are of rubble stone, neck faced, and dressed stone to the quoins, windows, and doors; the upper part is all of red bricks and stone-mullioned windows. The roof is covered with Madeley Wood brindled tiles. The contractors have been Messrs. J. and W. Lowry; Mr. G. J. Baguley, lead glazing; Messrs. Doulton and Co., sanitary fittings; Messrs. Ashwell and Nesbit, heating apparatus; and Mr. Robert Beall, carving and marble work. The works have been carried out from the designs and under the superintendence of Mr. John W. Dyson, M.S.A., architect, Newcastle-on-Tyne.

LIVERPOOL.—The work of extending the North Haymarket is progressing satisfactorily, and the new building will be completed at the end of the year. The additional buildings will be devoted to the wholesale vegetable trade. Already the North Haymarket, which has been erected at a cost of £87,866, has an area of 20,050 square yards, and the extension adds further 2,100 square yards, while it will give the buildings a total frontage in Cazneau-street of 500ft. The site for the new portion has been obtained by the demolition of a quantity of house property and the closing of a small street, and the cost of the undertaking, inclusive of purchase of property, will be about £20,000.—The Thompson-Yates Laboratories of Physiology and Pathology, at Liverpool University College, were opened on Saturday. These laboratories are the gift of the Rev. S. A. Thompson-Yates, and have cost, with their equipment, £28,000. The block containing the new laboratories harmonises in appearance with



the main college buildings, and its provision is another step towards the completion of the contemplated quadrangle. There are four stories, including the basement, and three mezzanines adjoining the main staircase, but not extending into the wings. On the ground floor, opening from a hall in quadrant form, is the pathological department. One wing is occupied by the classroom for practical morbid histology. This is 56ft. by 26ft., and is fitted to accommodate about 60 students. It opens directly into the pathological museum. In the other wing is the room for bacteriology, 53ft. by 19ft. The tops of all the benches are of opaline, so as to obviate all risk of the retention of infective materials. Adjoining this is a suite, including a constant temperature room, and rooms for pathological chemistry, and for photography. On the first floor is the large theatre, which will be used in winter for physiology, and in summer for pathology. On the same landing is a large classroom for drum work. There is also a room for physiological chemistry, a chemical balance inclosed in a dustproof chamber, a preparation, a research, and an electrical room. On the second floor the large wing is occupied by the practical histology room, 60ft. by 40ft., which is fitted to accommodate 80 students. This room has an open-timbered roof. The basement contains a cold storage room, kept at a constant low temperature by the ammonia process, a laboratory for carrying on the work of the Clinical Investigation Society, and rooms for other kinds of experimental work. A students' common room is provided, and also a room for electric meters. The facilities for photography and for lantern demonstrations provided in all the departments are notable features of the new laboratories. The building will be heated throughout with hot air, the apparatus for which has been erected in the basement of the north wing. The architect is Mr. Alfred Waterhouse, R.A., who designed the Royal Infirmary and the other buildings of University College. Messrs. W. Tompkinson and Sons, of Liverpool, were the contractors; and Mr. J. T. Dampier acted as clerk of works.

**LEIGH, LANCs.**—The chairman of the Leigh Joint Hospital Board opened, on the 6th inst., the new fever wards which the board have erected at the Leigh Sanatorium, at Astley. The total cost of the land, which contains sixteen acres, of the old hall, the four new buildings for dealing with typhoid and scarlet fever cases, the walling of the grounds, and the furnishing amounts to about £18,000. The hospital is about three miles from Leigh and Atherton, and one and a half miles from Tyldesley. The site of that hospital was purchased, together with the old Astley Hall, by the Leigh Local Board in 1893, for £3,000. The old hall has been used for the treatment of typhoid and scarlet fever cases, and the board has now erected on the gardens four isolated blocks capable of accommodating from 50 to 60 patients, a disinfecting-house, and a new laundry. They have still to erect a new kitchen, and make structural alterations in the administrative block. The architects are Messrs. Banks, Fairclough, and Stephen.

**MACCLESFIELD**—The foundation-stone of the restored parish church of St. Michael, Macclesfield, was laid on Friday by the Duke of Westminster. The "old church" was founded by the Queen of Edward I., in 1278. The oldest portions of the church are the tower and the Legh and Savage chapels. The tower is about to be refaced with new stone. The two chapels are both eventually to be restored, the former to be furnished as a baptistery, and the latter to be formed into a morning chapel. The remainder of the church is to be practically rebuilt, the cost of the work (which is to be carried out under the direction of Sir Arthur Blomfield, A.R.A.) being estimated at something like £17,000.

**NEWCASTLE-ON-TYNE**—The renovation of the town hall, which has been in progress during the past four months, has now been completed. The work of renovation has now been carried out, the colour scheme being uniformly light. The slightly-arched ceiling, which was fashioned many years ago by Alderman Ralph Dodds, of Newcastle, has been treated in colour. The walls of the hall are also coloured, the prevailing colours being white, and cream, and buff. The woodwork is painted brown, and varnished, and all the seats have been re-painted. The organ has been treated in white and cream, pale blue, and pink. An installation of the electric light has replaced the previous system of gas. For the

better ventilation of the hall, gratings have been placed in the ceiling, and the air is warmed by hot-water coils, placed under the windows. The work has been carried out by Mr. G. G. Laidler, of Northumberland-street, Newcastle, from his own designs, and those of the city engineer, Mr. W. G. Laws, and his assistant, Mr. Liddell.

**TRURO.**—The Cathedral Building Committee met at Truro on Saturday, the bishop of the diocese presiding. Mr. Wix, treasurer, reported that after paying nearly £2,000 for preparing the foundations, £27,500 remained available for building the nave. About £1,800 was collected by the ladies' association, and £200 had been received from the London committee of the Archbishop Benson Memorial Fund. The architect, Mr. Frank L. Pearson, was instructed to have specifications for the nave prepared, as well as sketches of that portion of the interior east and west and one of the proposed west front, exclusive of the towers. It is suggested that that should be the limit of the present undertaking, tenders for which will probably be invited in January.

**TUNBRIDGE.**—The new municipal baths, erected in Monson-road, at a cost of £10,000, were formally opened on Wednesday week. The interior walls of the swimming-tank are of brick, with glazed tiles for the lower portion, and a gallery surrounds the bath, under which the dressing boxes abut on to the platform which incloses the water surface, and which has a mosaic pavement. The dressing boxes are of pitch-pine on the half-door system, and warmed with steam radiators. The sides of the bath are of white glazed tiles, and the bottom of mosaic pavement, in which the borough arms may be traced. The roof has a 55ft. span, and is 70ft. from the water surface to the apex of the glass lantern, the bath is 105ft. long, and 55ft. wide, the actual water surface is 90ft. by 30ft., with a depth varying from 6ft. 6in. to 3ft. 6in., which can be increased 6in. for polo matches, while a spray is introduced for cleaning the surface of the water. The gallery will hold 400 spectators, and the walls are for a height of 8ft. lined with glazed bricks, and the remaining portion with red bricks. At one end of the bath an alcove contains a shower-bath, and there is the usual lavatory accommodation. Behind the bath is the boiler-house, with a couple of Cornish boilers, a steam laundry for bath-linen, and a drying-oven for towels. A subway encircles the bath, in which the various pipes can be easily reached in case of need. Over the boiler-house is a tall chimney shaft. The building was designed, and its erection superintended by Mr. W. Mellor, the borough surveyor. Messrs. Longley and Co. were the contractors for the building; Messrs. T. Bradford and Co., of Salford, for the engineering; Messrs. Diespeker, for the mosaic paving. The electric light is utilised all over the building.

**WALTON, LIVERPOOL.**—The memorial stones of a new Primitive Methodist church and schools to be erected in Church-road, Walton, were laid on the 6th inst. The chapel when erected will measure internally 55ft. by 39ft., will have no galleries, and will seat 340 people. The school, which will be of two stories, will comprise, on the ground floor, a lecture room accommodating 100 persons, six classrooms, each accommodating 20, also a minister's vestry; on the upper floor will be an assembly hall, 56ft. by 28ft., accommodating 300 scholars, also ante-rooms, lavatories, &c. The kitchen will be in the basement. The design will be Gothic, simply treated, being faced with Liverpool grey bricks and Runcorn stone dressings, the bands and arches being of stock bricks. The interior woodwork will be done in selected pitch pine, stained and varnished. The cost will be about £2,500. The work is being carried out by Messrs. J. and G. Chappell, of Walton, and the architect is Mr. Fred W. Dixon, of Trevelyan Buildings, Manchester, Mr. R. Hardman acting as clerk of the works.

The Marquis of Ripon visited Todmorden on Tuesday in connection with the opening of the Technical Institute, the Roomfield School of Science, the Fielden School of Art, and the Pupil Teachers' Centre.

At the town-hall, Tunbridge Wells, Mr. E. A. Sandford Fawcett, C.E., held an inquiry last week on behalf of the Local Government Board into the application of the Corporation for sanction to borrow the sum of £15,000 for electric lighting purposes. Mr. H. Boot, the electrical engineer, explained the proposals.

## COMPETITIONS.

**HULL.**—A central library is to be built at the cost of £8,000, and there is to be an open competition. Mr. Sydney R. J. Smith, F.R.I.B.A., will act as professional referee, we understand.

**SMETHWICK.**—At Monday's meeting of the Technical Education Board for this town, the plans of the new technical schools were submitted and discussed at considerable length. Four plans were presented, two premiums of £50 and £25 being offered by the board, and one of the conditions of the competition was that the total cost of the building should be about £5,500. It was decided to submit, for the approval of the urban district council, the set of plans marked "Experience," providing the cost of erection was in accordance with the provision stipulated, and in the event of this condition not being complied with, it was decided to recommend the council to accept the plans marked "Science and Art."

**TAUNTON TOWN HALL.**—At the meeting on Friday of the Market Trustees, it was agreed "That such plans and estimates for the building of the proposed town-hall be forwarded to the Charity Commissioners, and that when their sanction has been obtained, as well as a satisfactory guarantee that the necessary money can be raised, Messrs. Sansom and Cottam be instructed to take out the builders' quantities and advertise for tenders for carrying out the work in accordance with the plans and specifications required by them."

**WOLVERHAMPTON.**—At the meeting on Friday of the Wolverhampton Board of Guardians, a report was submitted by the assessor and the New Workhouse Committee, with regard to the selection of plans by the assessor for the new workhouse. A member objected to the reports being read, and said he considered that they should be laid before the General Purposes Committee before they were made public, in order that the details might be fully discussed. He moved a resolution to this effect, which, after some discussion, was agreed to. In that report the assessor states that he considers the best plans sent in are those of Messrs. Marshall and Turner, of Nottingham, who estimate the total cost at £129,673. The next three best plans submitted are those of Mr. M. Johnson, Wolverhampton, and Messrs. Magnall and Littlewoods, Manchester (joint plans), £119,740; Messrs. Magnall and Littlewoods and Mr. M. Johnson (joint plans), £126,000; and Mr. W. Doubleday, Birmingham, £100,000. The authors of the three last-named sets of plans will each be awarded £100, as stipulated in the advertisement. The other two plans sent in were by Mr. R. E. W. Berrington, Wolverhampton, with estimated cost of £90,000, and Mr. F. T. Beck, Wolverhampton, £126,000.

## CHIPS.

A gift has lately been made to the chapel of the Royal South Hants Infirmary by the medical men of Southampton. It takes the form of an oak pulpit in Perpendicular style, to match the building, and has been carved by Mr. H. Boniface, of Gibbs'-road, Southampton.

The Baroness Hirsch has placed Tudor House, Hampstead Heath, which she has purchased at a cost of £16,000, in the hands of trustees, to be maintained as a convalescent home for Jewish consumptives.

At the last meeting of the Liverpool Corporation the Insanitary Property and Artisans' Dwellings Committee submitted a resolution, which was agreed to, placing on record their appreciation of the excellent manner in which Mr. W. Goldstraw, the building surveyor, had carried out the erection and completion of the labourers' dwellings in Gildart's-gardens, Purcell-place, and Kearney-place.

The urban district council of Northwich decided at the last meeting to instruct Mr. Henry Bancroft, C.E., of Manchester, to take various levels with a view of more practically dealing with the sewerage and sewage disposal of Northwich ward.

The urban district council of Erdington, near Birmingham, decided at their last meeting to increase the salary of their surveyor by £100 per annum.

A Local Government Board inquiry will be held to-day (Friday) at the public offices, Egremont, respecting an application by the Wallasey Urban District Council, to borrow £40,000 for gasworks purposes, £1,790 for purposes of street improvements, and £1,198 for fire-brigade purposes. The inquiry will be held by Mr. W. O. E. Meade-King, M.I.C.E.



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## ILLUSTRATIONS.

ST. OLAVE'S UNION NEW OFFICES, RELIEF STATION, AND DISPENSARY.—"OWEN JONES" TRAVELLING STUDENT-SHIP: DESIGN FOR FAIENCE DECORATION.—ST. LUKE'S CHURCH, WEST HAMPSHEAD.—NEW WING, LOCKE PARK, DERBY.—HOUSES AT WALTON-ON-THAMES.—WHITBY ABBEY, YORKSHIRE.

## Our Illustrations.

ST. OLAVE'S UNION NEW OFFICES, RELIEF STATION, AND DISPENSARY.

THE building of which we give illustrations to-day is now in course of erection in Tooley-street for the Guardians of the St. Olave's Union, and has been designed by the architects to the board, Messrs. Newman and Newman, of 31, Tooley-street, London Bridge. As will be seen from the plan, the Union Offices forming the front portion of the building and entered from Tooley-street, although communicating, is shut off from the relief station and dispensary at the back. Upon the ground-floor is provided the registrar's private and general office, also offices for the general relieving officer and collector, with porter's box, and the necessary waiting-rooms, &c. Approached by the main central staircase is the first-floor, upon which is provided the clerks', general, and private offices, and strong-room, committee-room, waiting-rooms, and offices, and at the back the board room, 50ft. by 30ft., with alcove, for reporters, gentlemen's and ladies' retiring-rooms, and back staircase. The second floor in roof will be fitted up as store for books, stationery, &c., and the basement also as stores and strong-rooms. Passing through the doors at side of main stairs, or by the main entrance in Shad Thames, the relief station is entered in the centre, and under the board room is the large general waiting-room, with two relief committee-rooms, and on each side the necessary number of rooms for medical officers and relieving officers. Upon the right hand is the dispensary and vaccination station, with the requisite consulting rooms, and over the dispensary the rooms for the caretaker. The greatest care has been paid by the architects to the general arrangement of the interior, with a view to convenience and official administration, and the decoration and fittings are of a plain, although substantial description. The exterior of the building is faced with red brick, with red Dunfries stone dressings, and the roofs are covered with green Westmoreland slates. Mr. J. Bullers, of George-row, Bermondsey, is the contractor, Mr. Hatten foreman, and Mr. Hillier the clerk of works.

## FAIENCE DECORATION FROM STAMBUL.

THESE drawings of mural tilework form part of the series of studies in colour made by Mr. A. E. Henderson, as "Owen Jones" Travelling Student last year. We have not been favoured with any special particulars about these individual details, which are characteristic enough, and well-chosen examples of Oriental ceramic decoration. Mr. Henderson has drawn his subjects with becoming freedom, and although we cannot, of course, reproduce their colour, his sketches faithfully record the forms and relative values in the compositions represented.



ST. OLAVE'S UNION NEW OFFICES, BOROUGH.

## ST. LUKE'S, WEST HAMPSHEAD.

THIS church is being erected in Kiddespoore-avenue. As the ground falls considerably towards the east, a large basement is formed beneath the chancel and part of the nave, to be used for parish purposes. The materials used are red brick and Bath stone. The contractors are Messrs. Albert Estcourt and Son, of Gloucester. The accommodation is for about 800. Mr. Basil Champneys is the architect.

## NEW WEST WING, LOCKE PARK.

THIS represents the design for ballroom on the ground-floor, with bachelors' rooms over, and rooms for visitors' servants beyond. This was all eventually shifted over to the east side, and the design underwent considerable modification in the process. The whole of the work was executed by Messrs. W. H. and J. Slater, of Derby. A very warm-tinted stone from the park was used for the whole of the external work, and the roofs were covered with green Westmoreland slates.

A. E. STREET.

## HOUSES AT WALTON-ON-THAMES.

AN attempt has been made to give these houses, which are to be built on a site close to the river, a distinctive character by placing the upper floor entirely in the roof. The materials are stock brick, rough-casted, for the ground floor, with green Tilberthwaite slates for the roof covering, and all woodwork white painted. The deep lead aprons to the dormer fronts over the entrance doors are to be relieved with *repoussé* decoration. Red chimney-pots on the stacks will give a touch of bright colour to the whole. The drawing was exhibited in this year's Royal Academy by Mr. Cyril E. Power, the architect.

## WHITBY ABBEY.\*

WHITBY ABBEY occupies a position upon the summit of what is known as the East Cliff, and it is owing to this exposed situation that a great deal of what must have been very beautiful detail is now hopelessly lost. There is sufficient left, however, to give some idea of its former magni-

\* The choir arceding of Whitby Abbey was illustrated from measured drawings by Mr. Archibald H. Winterburn in the BUILDING NEWS for April 15, 1898.

cence. The greater part of the choir and transepts still stands, with one or two bays of the vaulting on the north side. The nave, with the exception of a piece of the north wall and the west end, has disappeared. What remains of the choir is in the Early English style. The north transept and part of the north wall of the nave are decorated, and the west end is of the Perpendicular period. The central tower fell in the year 1833, and the piles of broken masonry and debris, now overgrown with lichens and wild flowers, render the ruins delightfully picturesque. At the time of my visit some small restorations were being made with the object of arresting further decay, and securing those parts considered dangerous. The subject of the illustration shows the lofty and well-proportioned east end of the choir.

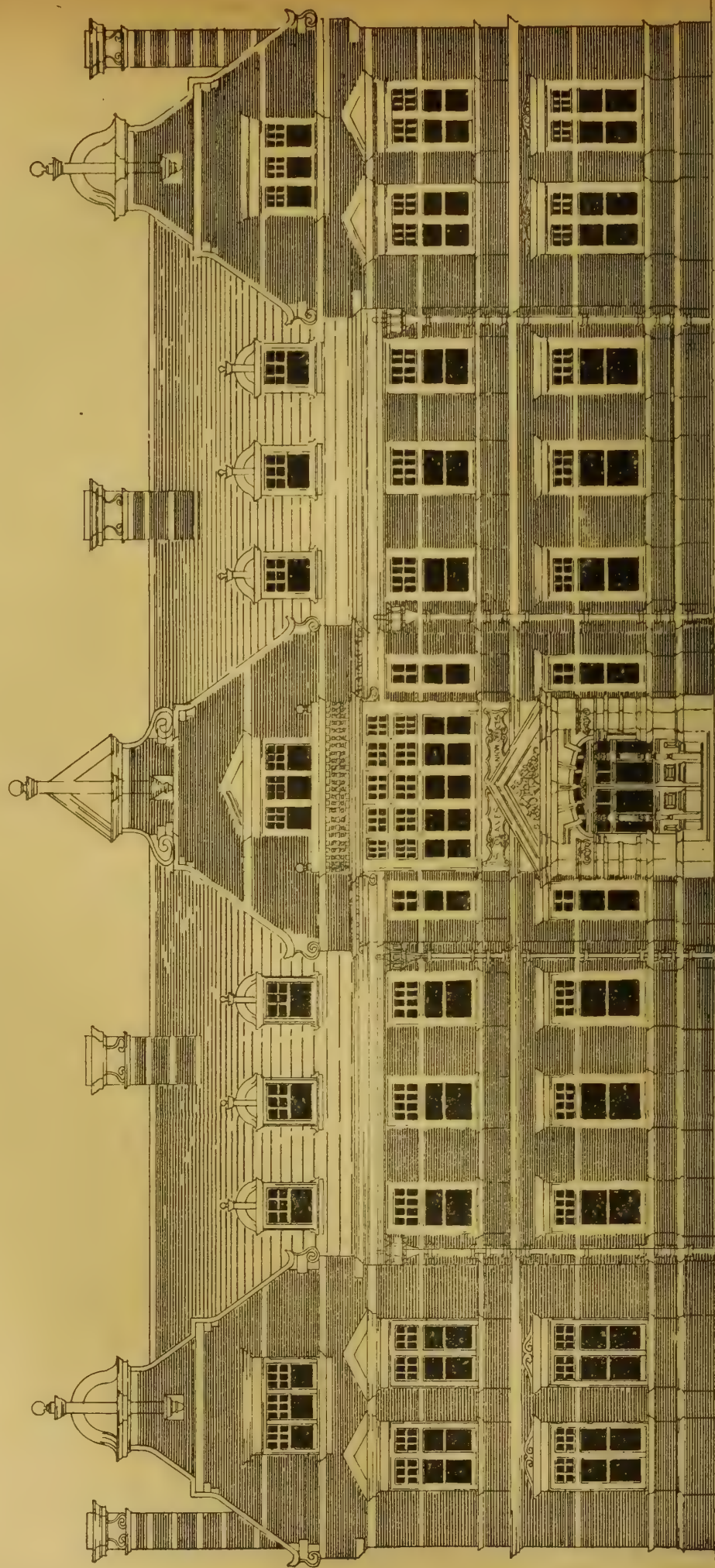
LAURENCE HOBSON.

A central fire-brigade station is about to be built in Ward-road and Courthouse-square, Dundee, from plans by Mr. Mackison, the brigade engineer. The building will be five stories in height, with a tower, capped by a domical roof at the angle of the streets. The estimated cost is £6,150.

At Fauls Church, Salop, memorials to the late Viscount and Viscountess Hill were dedicated on Saturday. Fauls Church, which is situated close to Hawkstone Park, for a long time the residence of the Hill family, was erected in 1854 to mark Lord Hill's coming of age. An organ chamber has been built on the south side, and the chancel has been enlarged. New brass lectern and choir-stalls have been provided, and the organ has been enlarged and renovated.

Two new mural paintings in the ambulatory of the Royal Exchange were unveiled on Monday by the Lord Mayor. The subject of the first is William the Conqueror granting a charter to the citizens of London. It has been painted by Mr. Seymour Lucas, R.A. The second represents the offer of the crown to Richard III. at Baynard's Castle. The artist is Mr. Sigismund Goetze. Three panels already adorn the walls of the building—Lord Leighton's picture of Phœnician trading with the ancient Britons, Mr. Macbeth's "Opening of the Royal Exchange by Queen Victoria in 1844," and Mr. Solomon J. Solomon's depicting the progress of Charles I. to the Guildhall to demand the arrest of the five members.





FRONT ELEVATION





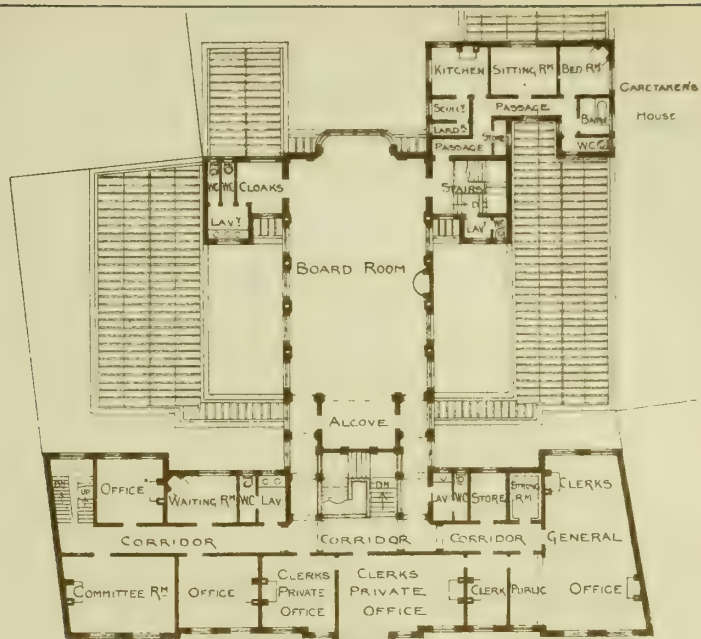


ST. OLAVE'S UNION. NEW OFFICES, RELIEF STATION, AND DISPENSARY.

NEWMAN & NEWMAN, ARCHITECTS.







FIRST FLOOR PLAN



















OWEN JONES TRAVELLING STUDENTSHIP.

FAIENCE DECORATION FROM STAMBUL.

DRAWN BY A. E. HENDERSON.













WHITBY ABBEY, YORKS.  
EAST END OF CHOIR.

"PHOTO TINT" BY JAMES AKERMAN 6, QUEEN SQUARE LONDON W.C.

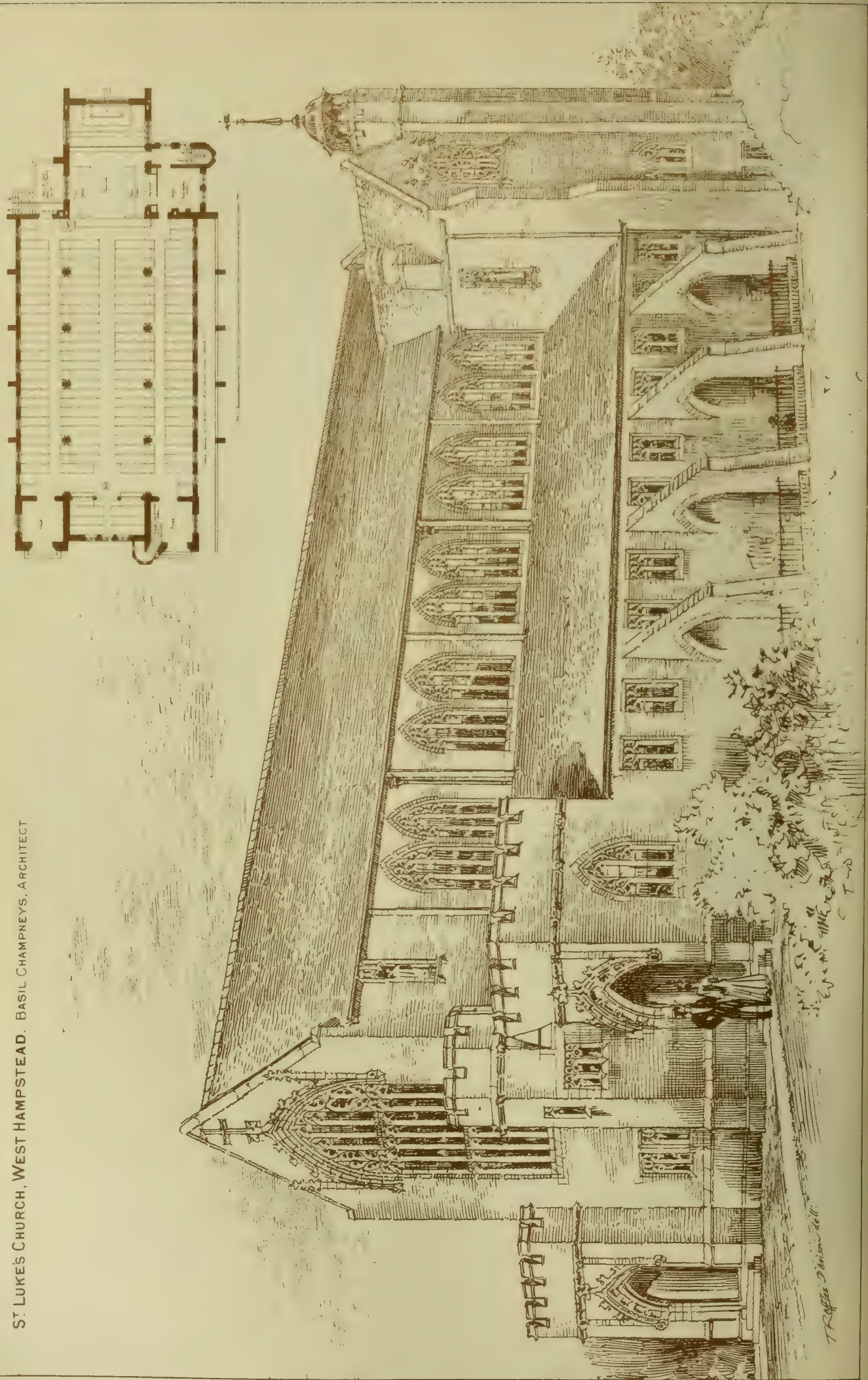






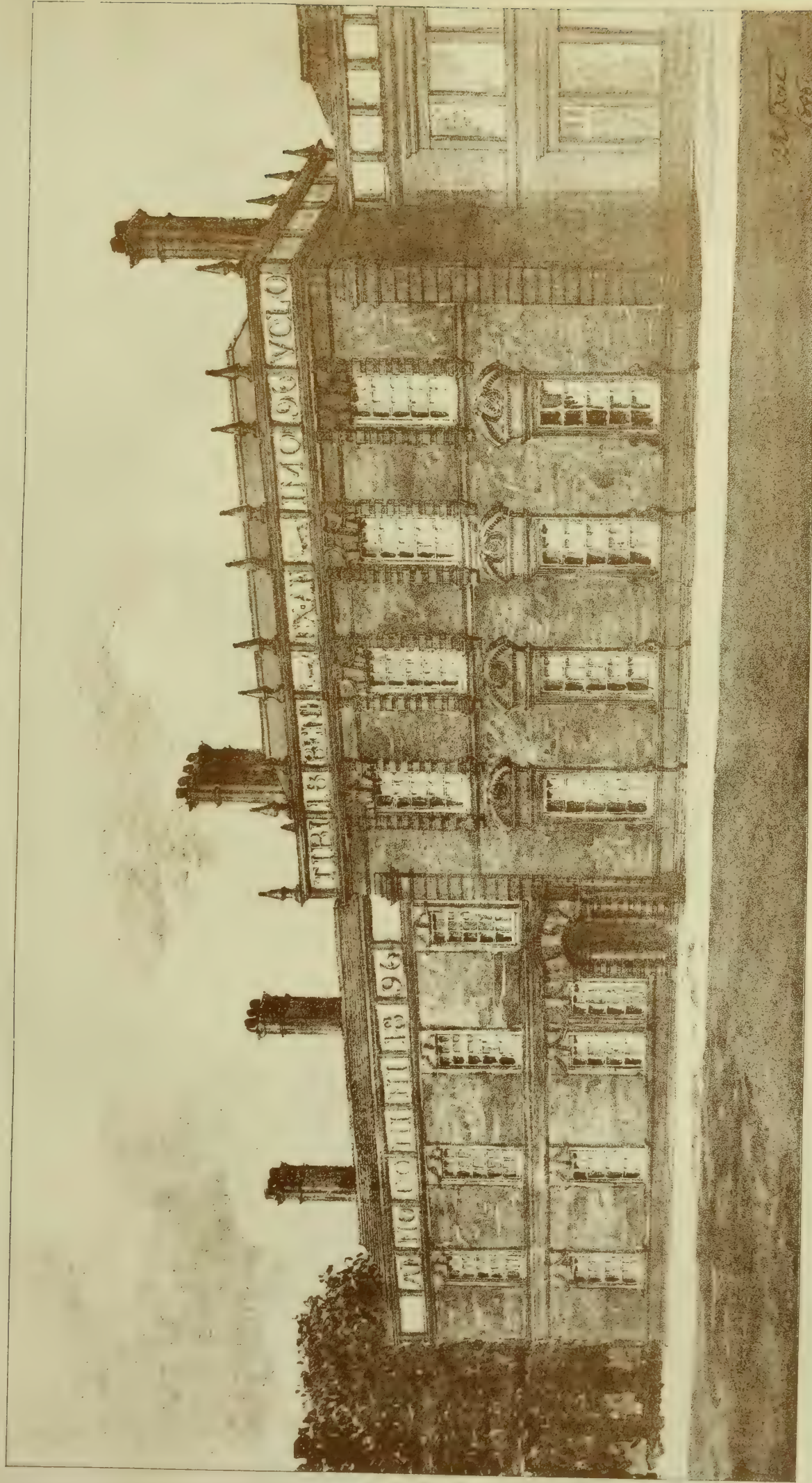
THE BUILDING NEWS. OCT. 14, 1898.

ST. LUKE'S CHURCH, WEST HAMPTSTEAD. BASIL CHAMPNEYS, ARCHITECT





THE BUILDING NEWS, OCT. 14, 1898.



NEW WING, LOCKE PARK, DERBY.  
ARTHUR EDMUND STREET, M.A. ARCHITECT

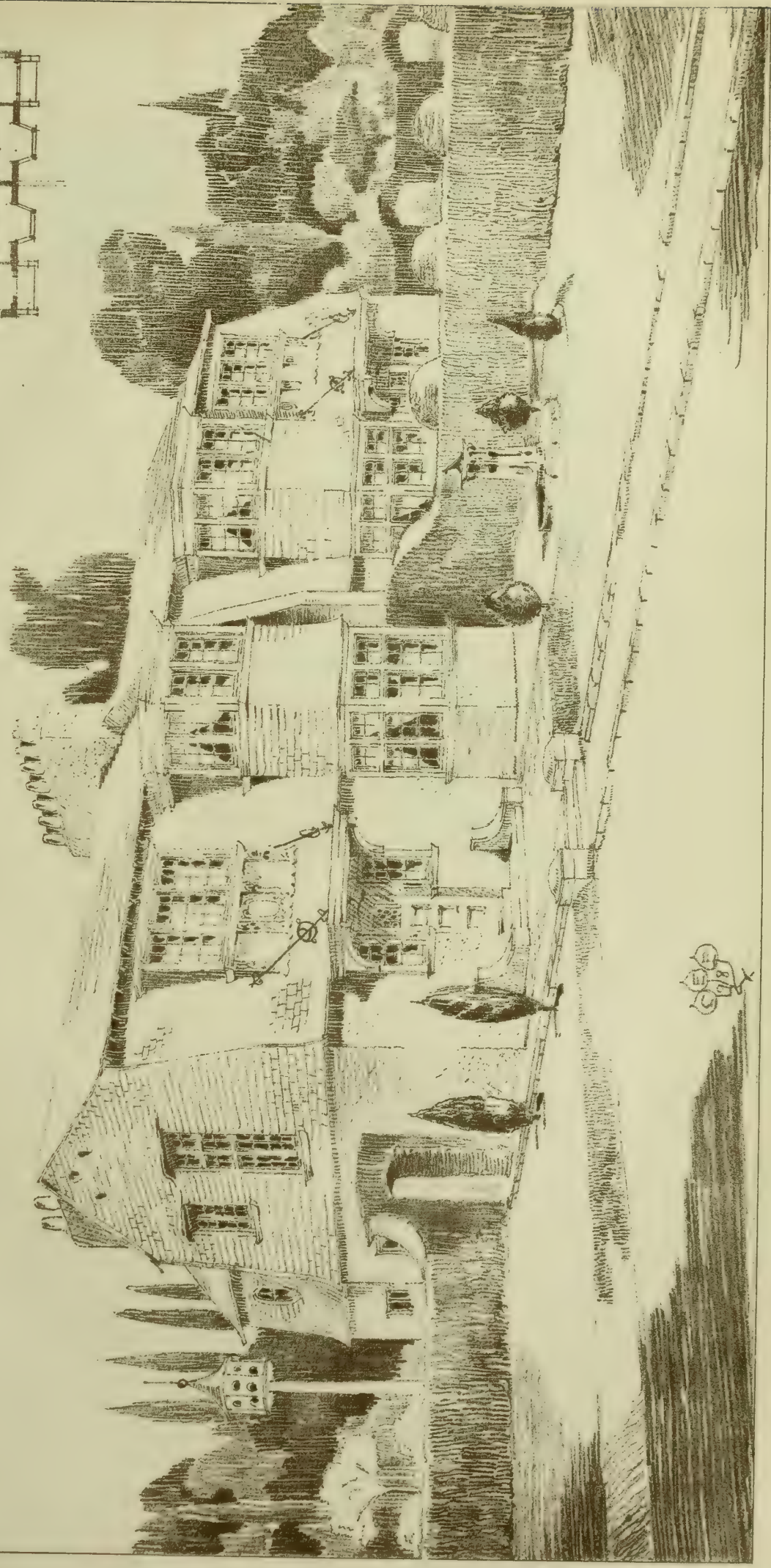
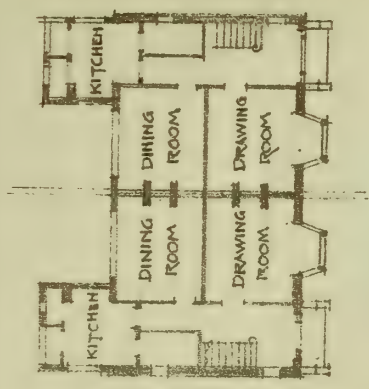






HOUSES . AT . WALTON - ON - THAMES : CYRIL E. POWER, ARCHITECT .

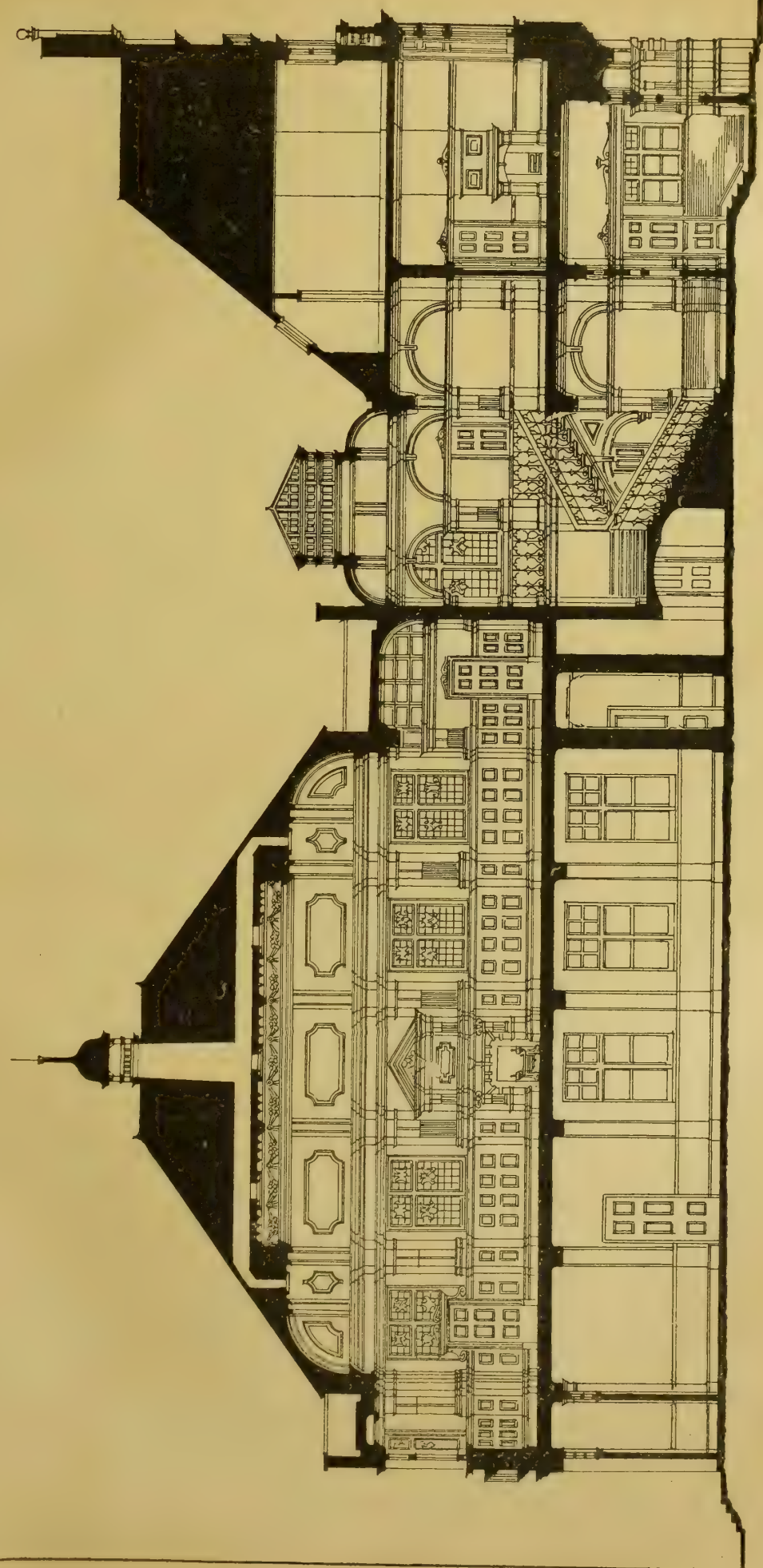
GROUNDS  
FLOOR  
PLAN.











LONGITUDINAL SECTION THRO' BOARD ROOM

ST. OLAVE'S UNION NEW OFFICES AND RELIEF STATION, BOROUGH,



## PROFESSIONAL AND TRADE SOCIETIES.

**GLASGOW ARCHITECTURAL ASSOCIATION.**—The usual monthly meeting of this Association was held in the rooms, 187, Pitt-street, on Tuesday last, the subject for discussion being "Scottish Church Planning." Mr. Blain, in describing the development of the Presbyterian Church, traced the alteration in plan which the introduction of choir and organ had entailed. He pointed out that the service of the church had of late years undergone great modification. Nowadays the service might be considered in many cases suited more to the emotional than to the intellectual side of our nature. To plan a church for such a service the chancel might be more fully developed; its sacred character could be heightened by a careful disposition of the light, by proper placing of the choir, and by the use of sacred symbols and emblems. A feature should be made of the Communion table rather than of the pulpit. Features might be made of pews, galleries, font, &c., while broad passages were needed for processional purposes.

**PRESTON MASTER BUILDERS' ASSOCIATION.**—The ninth annual meeting of this association was held at the Castle Hotel on Thursday evening in last week, Mr. C. Walker in the chair. The secretary, Mr. John Tomlinson, presented the committee's report, which congratulates its members on the continued success of the association, there being a net gain of ten members, the number on the books now being 111. Relations with the operatives, which were somewhat disturbed at the date of the last report, had now assumed a more cordial aspect. The Lancashire and Cheshire Federation had been greatly strengthened, and now consisted of 29 local associations, with an aggregate membership of 1,400. A revised apprenticeship indenture had been adopted after very careful consideration, it having been settled by solicitors in consultation with counsel. The new forms were now ready. As the new Workmen's Compensation Act would increase the cost of building operations at least 1 per cent., the committee recommended that all architects be asked to include a clause in quantities providing a sum for insurance of risk incurred under this Act. The report was adopted. The financial statement showed a considerable balance in hand. Mr. Chas. Walker was again elected president; Messrs. T. H. Kellett and J. Cartmell, vice-presidents; Mr. R. Crossdale, hon. treasurer; and Messrs. W. Caterall and A. Tullis, hon. auditors. Messrs. W. Tullis, T. Croft, J. Cartmell, W. Caterall, R. Crossdale, T. Bradshaw, T. Park were elected on the trade committees of the Lancashire and Cheshire Building Trades Employers' Federation, and Messrs. Walker, Kellett, and Crooke, jun., retain office on the executive board of that body until May 30 next. After the meeting the fifth annual dinner of the association took place, about 40 members and friends being present. Mr. Charles Walker occupied the chair, and Mr. T. H. Kellett the vice-chair.

**SHEFFIELD SOCIETY OF ARCHITECTS AND SURVEYORS.**—The annual dinner of this society was held at the Wharcliffe Hotel on Saturday evening to inaugurate the new session. The President, Mr. R. W. Fowler, occupied the chair. The President proposed the toast of "The Lord Mayor and Corporation," which was acknowledged by Col. Bingham, who has been a member of the city council for 24 years. Mr. Sayer also replied on behalf of the permanent staff. He mentioned the increased departmental work which attended the growth of the city, and said that the Derwent water scheme would occasion the biggest fight before a Parliamentary committee since the well-known Wakefield Water Bill of 1874. Dr. Sorby submitted "The city and trade of Sheffield." Mr. Douthwaite replied. The vice-President gave the toast of "The Royal Institute of British Architects," and spoke of the alliance between architecture and the prosperity of the city. Mr. C. J. Innocent, as the senior member present of the Institute, replied, and said he thought the Institute might make itself more useful to the members, and it would be improved by being brought up to date. When the Institute agreed to affiliate provincial societies Sheffield was the first branch to join. Mr. Hadfield gave "The Visitors," Mr. W. T. Tasker acknowledging the toast. Mr. Sayer, in submitting "The Sheffield Society of Architects and Surveyors," described it as an eminently useful body, and the President, in response, said the society had prospered. The

membership was 115—the largest number on record. Mr. Innocent had retired from the position of secretary, but they were glad still to have the benefit of his experience. Mr. Fenton had proved a hard working and energetic successor. The final toast was "The President," proposed by Mr. Moss.

## CHIPS.

Hope Park U.P. Church, Edinburgh, was reopened on Sunday, after internal decoration, designed and executed by Messrs. McFarlane and Wallace, of that city.

At the last meeting of the executive committee of the Hampstead Heath Extension Scheme, it was reported that £40,000 had been received or promised towards the £41,000 required, so that if the Paddington Vestry and the Middlesex County Council contribute £500 each, their task will have been accomplished, and Golder's Hill will have been saved for the people of London for all time.

A new Roman Catholic Church was dedicated at Ballynafeigh on Sunday by the Right Rev. Dr. Henry, bishop of the diocese. The church has been erected at a cost of £8,000.

New adult schools in Farn-street, Hockley, Birmingham, were formally opened on Saturday. The buildings are faced with red brick, and have terracotta designs. The main hall is 63ft. by 40ft., and is seated for 450 persons. Four classrooms are also provided, each capable of accommodating 50 persons. Behind the whole is another large room, to be used as a club, 46ft. by 20ft. The buildings have been erected by Mr. T. Elvins, of Handsworth.

Dr. Parker and Sir George Williams will lay the foundation-stones of the Whitefield Tabernacle, Tottenham Court-road, on Friday, the 21st inst.

The Lord Mayor of Birmingham opened, on Friday, the Queen's Park at Hasborne, the seventeenth open space under the control of the corporation of that city, the total area of the parks and recreation-grounds being 350 acres. The Hasborne Park is 10½ acres in extent, and is pasture-land dotted with trees, abutting on Court Oak Wood, in the centre of a district which is rapidly being built over. The freehold cost £2,300, and £2,500 has been expended on laying out the ground and building a keeper's lodge.

Mr. R. H. Bicknell, of the Local Government Board, held an inquiry at the Idle District Council offices on Friday, with respect to that authority's application to borrow £700 for the purpose of sewerage and sewage disposal, and for consent to certain deviations from the scheme sanctioned by the Local Government Board in 1894. There was no opposition to the application.

The Leicester Town Council had a long discussion on Monday night on a proposal to purchase the tramways by the Corporation for £156,000. The tramways are worked by horse-power, and strong objections were raised to purchasing plant and lines which would have to be replaced by electric traction in the near future. On a vote being taken the proposed purchase was rejected by 27 votes to 17.

Mr. Harry Hems lectured last (Thursday) evening before the members of the Exeter Literary Society at Barnfield Hall, in his adopted city, on "My Recent Trip to South Africa and Back." The address was illustrated by specially-prepared lantern slides.

A new hotel, to be known as the Wherry, is being built at Oulton Broad, near Lowestoft, from plans by Mr. Sidney Revett, M.S.A., of South Quay, Great Yarmouth.

It is proposed to establish an archaeological society for East Herts, and with this view a meeting is to be held on Monday next in the council chamber of the town-hall, Hertford, the mayor of the town presiding.

A reredos has been erected in the parish church of Cogan, near Cardiff, by the Marquis of Bute, in memory of his late agent, Mr. Corbett, at whose suggestion the restoration of the church was carried out. The reredos represents the "Transfiguration," and is said to be quite unique in character. The church itself is not more than 50ft. in length, and dates back from Norman, if not still earlier times. The whole building has now been restored, entirely at Lord Bute's expense.

Memorial-stones of a Baptist chapel were laid in Alfred-road, Fordham, Devonport, on Wednesday. The plans were prepared by Messrs. Wiblin and De Boinville, of Plymouth, and the builder is Mr. W. Partridge, also of Plymouth, whose contract was £2,552 5s. The building is Perpendicular in style, and will be built of red brick, relieved by Polyphant and Doulton stone dressings. The main front will have a gable with a wide five-light tracery window, and will be flanked on either side with turrets. At present it is not proposed to erect the galleries, on the ground of expense.

## STAINED GLASS.

**GRAY'S INN CHAPEL.**—A window to the memory of Archbishop Laud was unveiled in Gray's Inn Chapel on Sunday by the Bishop of London. The chapel was completely renovated about eight years ago. The large stained-glass eastern window—a survival of the old edifice—represents the Ascension of Our Lord. Two additional panels have been inserted in this window, at each side of the representation of the Ascension—one a memorial to Thomas à Becket, which was put up two years ago, and the other in commemoration of Archbishop Laud. Both panels are the gift of Mr. H. C. Richards, M.P., and were designed by Mr. G. W. Ostrehan. The figure of Thomas à Becket is arranged in embroidered cope. His right hand grasps his Archiepiscopal staff, and in his left he holds a naked sword across his breast. Above there is a view of Canterbury Cathedral, and below is depicted the little chapel of the cathedral in which he was assassinated on December 29, 1170. In the companion panel to Laud, which was unveiled on Sunday, the archbishop is seen in full canonicals—in gorgeous cope and mitre—the staff in his left hand, and his right displaying an open copy of the Book of Common Prayer. Above the figure of Laud is a view of Lambeth Palace, and below the archbishop is seen on the scaffold on Tower Hill, where he was beheaded on January 10, 1645, in the 72nd year of his age.

The town council of Edinburgh discussed on Tuesday a scheme for the erection of working-class houses on one of the slum areas of the city, at a cost of £17,000. Action was delayed for a fortnight.

The Lord Bishop of the Diocese consecrated on Tuesday a new chancel, chapels, font, windows, and enlarged organ, which have recently been added to Cainscross parish church, near Stroud, Gloucestershire, at a cost of £4,000.

Sir W. Harcourt, M.P., will open on Wednesday, the 26th inst., the new central block of the University College of Wales, at Aberystwith, which has been erected at a cost of £15,000.

By a fire in Muirhouse Sawmills, East Pollock-shields, the property of Messrs. John Watt, Torrance, and Co., on Tuesday morning, damage was done to stock and plant to the extent of £3,000.

In the case of Herbert Goodwin, of Longton, builder and contractor, the order of discharge from bankruptcy has been suspended for two years, ending Sept. 5, 1900.

A special committee of the Portsmouth Town Council had under consideration on Wednesday the steps to be taken consequent upon an Act having been passed last session to enable the corporation to acquire the local tramways. It was decided to recommend the council to give early notice to the tramways company with the view of taking over the lines as early as practicable. Estimates have been obtained of the cost of providing electrical traction.

The first stage of the Parliament-street improvement is now nearly complete, and the demolition of the remaining buildings which block the view of Westminster Abbey from Whitehall will soon be proceeded with, and the sale of the old building materials arising from this demolition is announced for the 28th of the present month. The Mitre and Dove public-house, at the corner of King-street was finally closed on Tuesday, and all the remaining houses except the Parliament-street Post Office are now unoccupied and covered with the notices of the sale. It is intended that the whole site shall be cleared by the end of the year.

The fifth annual convention of the National Association of Master House Painters of England and Wales was opened on Tuesday at the City Hall, Eberle-street, Liverpool, where the lord mayor welcomed the members to Liverpool, and the president (Mr. A. G. White) delivered his presidential address. The business at the afternoon sitting consisted of the reading of reports of the hon. secretary (Mr. W. S. Sutherland), treasurer, and special committees. The president and Mrs. White gave a reception at the Exhibition Hall in the evening. A number of papers were read and discussed at the meeting on Wednesday, and yesterday was devoted to excursions.

In preaching on Tuesday night at the reopening after renovation of the church of St. Barnabas, King-square, the Archdeacon of London remarked that he was bound to say that in the case of many of the numerous churches built in the last 60 years, many of the architects seemed to have cared little about material, convenience, climatic considerations, acoustics, or ventilation. Churches built only 40 years ago needed stonework and windows replaced. Dark village churches had been built which would be pleasant in the country, but surrounded by high walls and chimneys were the reverse of attractive. Money had in some cases been lavished on external ornaments, which rapidly crumbled in London smoke.



## Correspondence.

## GATESHEAD COTTAGE HOMES.

To the Editor of the BUILDING NEWS.

SIR,—I notice in your last issue a paragraph stating that the above work for the Gateshead Board of Guardians has been commenced, and that a Mr. Newcombe, of Newcastle, is the architect.

If I remember rightly, there was an open competition for this work, but "Newcombe" was not the name of the successful competitor. Can anyone explain the matter? Has there been some more "hole-in-a-corner" work here? Is this a repetition of the Durham County Council Buildings fiasco, where a London firm won the competition, but a local firm carried out the work?

How long will the profession generally, and the Royal Institute of British Architects in particular, allow this sort of thing to continue? The matter is in the hands of the profession, and by the combined action of a united body it can be stopped, though not by individual effort.

But, Mr. Editor, the matter is much worse than appears on the face of it, for in both the above-named cases the work has been taken out of the hands of those who were legitimately entitled to it by members of the Royal Institute itself—a body which is supposed to protect our rights and interests, and to see that its members act honourably, and professes to claim, by enforcing certain by-laws, that its members are, like Caesar's wife, above suspicion. Do the Council of the Institute openly countenance such a state of affairs, or do they wink at it? How can we hope for anything better when members of the Institute assist (and for their own personal benefit) in depriving brother architects of the fruits of their labours? I feel absolutely ashamed of the Institute, of which I have been a member for many years past.—I am, &c., A.R.I.B.A.

## WARNING TO ARCHITECTS.

SIR,—I have been informed that a gentleman has been visiting architects with a view to collecting subscriptions for a new publication, entitled "The Practical Decorator," which he states is being produced under the auspices of the Architectural Association. I know nothing of the publication referred to, and the statement is false.—I am, &c., E. HOWLEY SIM.

(Hon. Sec. Architectural Association)

56, Great Marlborough-street, London, W.  
October 12.

Lord Reay, chairman of the London School Board, formally opened on Friday night a new board school in Rhyl-street, Malden-road, Kentish Town. The school has accommodation for 1,119 pupils.

Through the Duke of Rutland the devisees of the late Sir Joseph Whitworth, on Friday, presented to the public of Matlock for ever the Whitworth Institute and park and the Whitworth Hospital at Barley Dale. The gifts cost considerably over £100,000, and they are endowed in perpetuity with a considerable income.

Mr. Richardson Evans, the hon. secretary of the "National Society for Checking the Abuses of Public Advertising," of 1, Camp View, Wimbledon, informs us that at an early date a memorial, signed exclusively by London architects, will be presented to the Council praying for municipal control over all forms of spectacular advertising. Already some 350 signatures have been appended, and others are invited.

New engineering works are about to be established at Ipswich for Messrs. Beavell and Co., Limited, the subscription capital being £27,000. The chairman of the company is Mr. A. F. Hills, of the Thames Ironworks. A site of three acres near the Ipswich Railway Station has been secured, and building operations have been commenced. The architect is Mr. J. Shewell Corder, of Ipswich, and the builder Mr. E. Cattermole, of the same town.

A Local Government Board inquiry into the application of the town council of Newport, Mon., for sanction to borrow £7,500 for the extension of the Allt-yr-yn Infectious Diseases Hospital was made by Mr. H. Timbrell Bulstrode, M.D., on Thursday in last week, at the town-hall, Newport. The town clerk explained that the first loan was made in 1894 for £1,200, and on the completion of the erection in 1896 a further £2,000 was borrowed to complete the furnishing, &c. The plans for the present extension, which will increase the accommodation from 32 to 54 beds, were prepared by Mr. Haines, the borough engineer.

## Intercommunication.

## QUESTIONS.

[12072].—**Exchange of Land.**—A. and B. are owners of two fields. A's land is freehold and B's leasehold (999 years). The boundary line between the two fields is very irregular, and A. would like to straighten it. He is informed that, if he can obtain the consent of B's landlord, he can effect an equal exchange through the medium of the Board of Agriculture, without the expense of conveyance or the necessity of proving the title should he sell his land. Can anyone inform me if the Board of Agriculture are invested with any such powers?—**AGRICOLA.**

[12073].—**Lantern Slides.**—Can anyone tell me where I can procure lantern slides dealing with timber and timber trees?—**QUEBECUS.**

[12074].—**Lights.**—A large building is in course of erection about 8ft. from the boundary wall of my premises. The windows of this building will, when completed, overlook my garden. Please say under these circumstances what is my position and course to adopt?—**ANXIOUS.**

[12075].—**Surveying.**—Is there any elementary work treating on the subject of surveying for buildings, taking levels, angles, apart from land surveying? I should be glad with the names of any books of this kind, and the price.—**ARCHITECT'S ASSISTANT.**

[12076].—**Projecting Cornices.**—Is it allowable to return the front cornice of my house along the side? Its level will be above the roof of my neighbour. Can he demand that the projecting courses shall be removed? I have proper guttering fixed, so that there is no dripping from my roof. An answer will oblige.—**W. T. O.**

[12077].—**Cast Iron.**—What is a good quality of iron for cast-iron columns, and for small castings, gratings, &c.? Any practical advice will be gladly received by—**A. L. B.**

[12078].—**Sound-Proof Partitioning.**—Will any of your readers inform me if stoothed partitioning can be made sound-proof? If so, by what means?—**J. B.**

## REPLIES.

[12050].—**Adjoining Wall.**—It seems a curious piece of work to use and pay for a party-wall on one side, and to build up a 4½ section without paying for, or tying to, the wall on the other side. I do not think a 4½ wall can be used without being tied to your wall. You could consult the building laws of your district.—**L. E.**

[12050].—**Adjoining Wall.**—If "D.'s" wall is a party-wall and stands between the two plots, the builders have a right to make use of the wall. It is not necessary to build a 9 in. wall if the wall already built is thick enough.—**G. H.**

[12051].—**Imitation Timberwork.**—Avoid all imitation of timber-work; cement-work somewhat resembling timbering (I presume "Kent" means) is often used to divide the wall-surface into panels. The composition of the cement-work may be three of sand to one of cement.—**A. T.**

[12057].—**Boundary Walls.**—Hunt's "Law of Boundaries" is a good legal textbook. I do not know whether it is out of print. The rights of light and air are given in various textbooks, such as Professor Banister Fletcher's work on the subject (Batsford), Emden's "Law of Building."—**G. H.**

[12060].—**Lych-Gates.**—Several good examples have been illustrated in the BUILDING NEWS. A very interesting example is to be seen at Saltwood Church, near Saltwood Castle, Kent. The timbers (usually of oak) are framed by mortise and tenon, and pinned.—**G. H. G.**

[12065].—**Safe Load on Floor.**—If "E. A. H." will send a rough plan of the floor, with positions of posts and girders marked, I will try and answer his question; otherwise I do not quite comprehend the position or length of girders.—**L. E.**

[12068].—**Mildew Stains.**—It is a delicate job to take out mildew stains without destroying the colours in chromos. I should either leave them alone or put them into the hands of an expert.—**L. E.**

[12067].—**Mortise Locks.**—You will be shown a good selection of mortise locks at any large builders' ironmonger's shop. There are any amount of good locks on the market.—**L. E.**

[12067].—**Mortise Locks.**—Several good mortise locks are in the market. Try such firms as Hobbs and Co., Cheapside; Hills and Co., Queen Victoria-street. The prices vary from 5s. to 7s. for two brass bolts, two levers for 6 in. locks. "K." had better visit a large firm and select the kind he wishes.—**ARCHITECT.**

[12068].—**Church Seats.**—There are instructions issued by the Incorporated Church Building Society, offices in Whitehall, I believe.—**L. H.**

[12069].—**Revolving Doors.**—Does "G. H." mean swing doors? If so, I should say that for all places where a great number of people entered, and it was desirable to keep the door closed, that swing doors are much better than the ordinary kind. These swing doors are fixed with an automatic spring hinge of some kind at the bottom, and merely a pivot at the top. The extra cost is to a large extent due to the spring hinges, of which particulars may be had from any manufacturer, and also extra time used in hanging them.—**L. E.**

[12069].—**Revolving Doors.**—An American company, the "Van Kennel," makes revolving doors, which are being used in many large buildings in New York. The company, I believe, supplies descriptions of their door, which is always closed. It can be applied to any building, offices, as well as churches, theatres, &c.—**G. H.**

[12071].—**Oak.**—Oak can be blackened either by fumigating with ammonia, or using a solution of the ammonia. Of course, if a dead black is required a stain can be used.—**L. E.**

[12071].—**Oak.**—If the correspondent who inquires how

to "blacken" oak, means how to tone it down to the delicious brown colour the old wood assumes, he cannot do better than subject it to the fumes of liquid ammonia. On the other hand, if he literally wants what he asks for, he must follow the example of many Irish makers of so-called bog-oak ornaments. The mass of these are first carved in sycamore, and then ebullient down. There are numerous recipes for ebullient. Blackened oak, however, is spoilt oak!—**HARRY HEMS.**

## CHIPS.

New board schools at Gorsty Hill, near Rowley, were opened last week. Mr. Prichard was the architect, and Messrs. Lloyd and Lloyd were the builders. A higher grade school, accommodating 700 children, is to be built for the same board from Mr. Pritchard's plans at Wright's-lane; the contract has been taken at £7,145 by Messrs. Cockin and Sons, of Old Hill.

Mr. W. O. E. Meade-King, one of the inspectors of the Local Government Board, held an inquiry at Llandudno, on Monday, relative to application from the urban district council for loans amounting to £4,701 for the provision of public slaughter-houses, and £632 for a market and fire station. Mr. Stephenson, surveyor to the urban council, explained the proposals.

A new Wesleyan chapel is being erected at Rushton, and special consideration has been given to the ventilation, which will be carried out on the Boyle system.

The Lord Chief Justice of England will open the St. George's-in-the-East Public Library on Saturday, the 29th inst. The library, which is situate in Cable-street, Shadwell, has been built at the cost of Mr. J. Passmore Edwards, from plans by Mr. Maurice B. Adams, F.R.I.B.A., and was illustrated in the BUILDING NEWS for Sept. 24, 1897. Messrs. W. Johnson and Co., of Wandsworth, are the builders.

The parish institute at Portsea, which has been built in the Fratton-road at a cost of £7,000, from plans by Sir Arthur W. Blomfield, A.R.A., was formally opened by Mr. Goschen on Tuesday.

The parish church of Constantine, West Cornwall, was reopened last week, after restoration from plans by Mr. E. Sedding, of Plymouth.

At Tuesday's meeting of the London County Council it was agreed, on the motion of Mr. Beachcroft, "That, as the present system which obtains in London with regard to the supervision of buildings and the responsibility for their proper construction, both from a structural and sanitary point of view, is unsatisfactory, it be an instruction to the Building Act Committee to report fully on the subject."

The partnership heretofore subsisting between C. Ellsmore and C. D. Rutter, surveyors and architects, New Inn, W.C., under the style of Ellsmore and Rutter, has been dissolved; as has also been the partnership hitherto in existence between G. L. Watkins and G. F. Davies, architects and surveyors, of Aberdeen.

Mr. Sidney A. J. Smith, F.R.I.B.A., has been appointed by the council of the city of Hull, assessor for a New Central Library, which is to be erected in that city. He is engaged (with the committee) drawing up conditions for an open competition for designs for the new building, which will shortly be advertised.

The foundation-stone of the new Science and Art Schools in connection with the Addey and Stanhope Foundation, Deptford, was laid in the New Cross-road on Saturday afternoon by Mr. T. W. Marchant, chairman of the Governors. The outlay will be £14,000.

The Right Hon. the Speaker of the House of Commons (Mr. W. C. Gully) visited Carlisle on Friday on his return from Scotland, and unveiled the monument which has been erected in that city in a shrubbery at the south end of Eden Bridge in memory of the late Mr. J. R. Creighton, who was Mayor of Carlisle 1880-1 and 1888-9, and who died on September 6, 1896. Mr. Creighton was the brother of the Bishop of London.

The first ordinary general meeting of the session 1898-99 of the Surveyors' Institution will be held at the above premises on Monday, November 14, when the president, Mr. Robert Vigers, will deliver an opening address.

The cabinet-makers' workshops in Newman-yard, Oxford-street, W., were almost destroyed by fire on Friday night. The building was of two floors, about 60ft. by 50ft. in dimensions.

The parish church at Bulmer, East Riding, whose history reaches far back into the Saxon period, and a portion of which has recently undergone a considerable renewal, was reopened on Friday by the Bishop of Beverley. The south and east walls of the chancel have been rebuilt, and a stained-glass window put in the east end. A new reredos and altar-table have been erected, and the choir-stalls, &c., are also new.



## LEGAL INTELLIGENCE.

**ARBITRATION AWARD AT RHYL.**—The award of Mr. Baldwin Latham, C.E., in the arbitration in the matter of the claim brought by Mr. Jacob Biggs, contractor, Birmingham, against the Rhy Urban District Council, was received on Saturday. The hearing of the arbitration extended over four days. Mr. Biggs was the contractor for the new sewerage works at Rhy, and by the terms of the contract, Mr. Baldwin Latham, the engineer, was appointed sole arbitrator in the event of any dispute arising between the parties. Mr. Biggs preferred a claim of £3,415 2s. 10d. against the council, which was disputed, and the council made a counter claim of £3,450. In the course of his award, the arbitrator stated that he had taken the opinion of Mr. Cripps, Q.C., M.P., on the legal points involved, and having considered that opinion and the evidence given, he disallowed the claim of £93 6s. 11d., extra weight of pipes. Of the claim of £65 19s. 7d. in connection with damage to gas-mains, he awarded £35 19s. 7d. He disallowed the whole of the claim of £1,024 for timber left in trenches. Of the claim of £2,150 for delays, he awarded Mr. Biggs £1,257. He disallowed the whole of the claim of £42 10s. for damage to property in Simon-street. The next two items in the claim, £26 4s. and £12 9s. 10d., he allowed, making a total award in favour of Mr. Biggs of £1,331 13s. 5d., as against £3,415 2s. 10d. claimed. On the counter-claim he awarded to the council the sum of £89 17s. 10d. for extra superintendence due to delay on the part of Mr. Biggs, £9 8s. 10d. for loss of gas and damage to gas-mains, and £16 14s. 10d. for expenses in connection with the restoration of defective sewerage works, making a total award of £107 9s. 8d. in favour of the council. He further awarded to Mr. Biggs the sum of £100 for costs. The arbitrator's costs, amounting to £22 9s. 6d., was ordered to be paid equally by Mr. Biggs and the council.

**NORTH BRIDGE-STREET ARBITRATION, EDINBURGH.**—An arbitration has been held at the Clarendon Hotel each day since Wednesday in last week as to a claim by the Equitable Loan Company of Scotland against the Edinburgh Corporation for £27,500 in respect of compensation for the compulsory taking of the Company's premises in Milne-square, and the consequent disturbance of their business. The arbitrators are:—Mr. J. Smith Clark, S.S.C., for the claimants; and Mr. John Blair, W.S., for the Corporation, with Mr. David Dundas, Q.C., as oversman, and Mr. John Shaw, S.S.C., as clerk to the reference. For the claimants the witnesses were Mr. T. P. Marwick, architect; Mr. Peter Laurence, surveyor; Mr. John Hepper, valuator; Mr. John Kennedy, builder, Edinburgh; Mr. J. Laird, of M'Tier and Co., contractors, Glasgow; Mr. John Macrae, of Taylor and Son, Princes-street, Edinburgh; Mr. William Royce, of Dowell's, auctioneer, Edinburgh; Mr. George Smellie, surveyor, Glasgow; and Mr. Thomas Binnie, valuator, Glasgow.

**A CHURCH CONDEMNED AS A DANGEROUS STRUCTURE.**—Mr. Godfrey, on behalf of the London County Council, appeared on Wednesday at Marlborough-street Police-court, to support a summons against the owner of St. Mary's Church, Charing Cross-road, to compel him to "take down the remaining portions of walls on the west and south sides as far as cracked, loose, decayed, or otherwise defective, and other work adjoining the same where found defective." No defendant appeared, and service of summons was proved by Matthews, one of the assistant warrant officers. Mr. C. Forster Hayward, district surveyor to St. Anne's, Soho, said that he found the church to be in a very dangerous condition. Some of the walls were very weak, and the danger was increasing daily. The matter was urgent, and the work ought to be put in hand at once. Mr. Plowden: It is trembling? The Witness: Yes. The magistrate made an order for the necessary work to be put in hand within 48 hours.

**ARBITRATION AWARD IN SHEFFIELD.**—At the meeting of the city council held on Wednesday the town clerk reported that Mr. A. Smith Denton, the sole arbitrator between Mr. R. W. Watson and the corporation, as to the purchase money and compensation to be paid to Mr. Watson by the corporation in respect of certain freehold premises numbered 22, Angel-street, and 5, King-street, which were required for the widening of Angel-street under the powers of the Sheffield Corporation (Streets and Tramways) Act, 1897, had made his award, whereby he had settled and determined that the purchase money and compensation as aforesaid was the sum of £9,734 6s. 9d.

**CLAIM AGAINST THE NORTH BRITISH RAILWAY COMPANY.**—Proof was led on Monday, Tuesday, and Wednesday in the Clarendon Hotel, Edinburgh, in an arbitration between the North British Railway Company and Mr. William Melville Sym, C.A., judicial factor on the trust estate of the late Mrs. Cockburn. Mr. Sym claims £4,500 as the value of property at 42, Duke-street, Leith, taken compulsorily by the company. Mr. Peter Lawrence is

arbitrator for the claimant, and Mr. James Inglis Davidson is arbitrator for the railway company, and Mr. David Dundas, Q.C., is oversman. The following witnesses have been examined this week for the claimant:—Mr. George Craig, architect, Leith; Mr. James Morrison, of Mr. Dowell's, Edinburgh; Mr. W. N. Thomson, architect, Leith; Mr. H. J. Blanc, architect, Edinburgh; and Mr. Peter L. Henderson, architect, Edinburgh; and Mr. Thomas P. Marwick, architect, Edinburgh; and Mr. William Finlayson, builder, Edinburgh. The proceedings have been adjourned till the 22nd inst., when the case for the railway company will be opened.

## CHIPS.

In consequence of the death of Mr. H. J. Wheatley, the secretaryship of the Builders' Clerks' Benevolent Institution has fallen vacant. The salary offered is £50 per annum. Applications should be addressed to H. W. P., 10, Cubitt-street, W.C.

The tramway committee of Glasgow Corporation formally opened yesterday (Thursday) the Springburn electric-car route. The official inspection on behalf of the Board of Trade took place on Tuesday.

At the last general meeting of the Institute of Painters in Oil Colours, Piccadilly, it was decided to alter the title to "The Society of Oil Painters." The exhibition will open on Saturday, the 29th inst.

The death is announced of Major C. M. Lester, of the West Yorkshire Regiment, and for the past six years Professor of Military Topography at the Royal Military College, Sandhurst.

The properties offered at the Auction Mart last week was generally of an inferior description, and the realisation was consequently moderate in amount, the aggregate registered at the Estate Exchange being only £32,590, a falling off of little short of £20,000 from the returns recorded for the corresponding week of last year.

The first of a series of University extension lectures upon "Gothic Architecture" was delivered by Mr. Bond, M.A., F.S.A., at the grand assembly-rooms, Peterborough, on Friday.

The London County Council received, on Tuesday, a report from the improvement committee recommending that a contribution of £16,000, a third of the estimated cost, be made to the City Corporation towards the proposed widening of Lothbury between Old Jewry and Prince's-street to 50ft. The consideration of the recommendation was adjourned till the next meeting.

Major Alfred Heales, F.S.A., Hon. A.R.I.B.A., formerly of Doctor's Commons, London, died on Saturday at his residence, Leeson, Chislehurst, aged 71 years. Major Heales was one of the founders of St. Paul's Ecclesiological Society, and for many years served as its treasurer.

The foundation-stone of the new church of St. George, Nailsworth, near Stroud, was laid by Sir Michael Hicks-Beach, M.P., on Friday. The church is to occupy the site of one erected in 1794, which has been found both inconvenient and inadequate. It is to accommodate about 700 people, and the cost, when completed, is estimated at from £9,000 to £10,000, towards which £3,850 has been raised. Mr. M. H. Medland, of Gloucester, is the architect.

The new laundry, Kirkstall-road, Leeds, is being ventilated by means of Shorland's patent exhaust roof ventilators, the same being supplied by Messrs. E. H. Shorland and Brother, of Manchester.

St. Margaret's parish church, Saxlingham, Norfolk, which has been restored at the cost of Sir Alfred Jodrell, Bart., was reopened on Thursday in last week. The church has been restored both inside and out. There is a new roof, the walls have been re-stuccoed, new lead has been placed on the outside, the stonework of the windows has been replaced, and foundation drainage has been supplied. An altar table of cedar and olive has been erected. The work was done entirely by men on the Bayfield estate, under the superintendence of Mr. G. Warne, foreman of Mr. R. Ward.

On Friday at the Dunrobin estate office, at Golspie, the preliminary steps connected with the starting of two companies for the construction of light railways in the county of Sutherland were taken. The first scheme is for a line between Forinsard, on the Highland Railway, and the village of Melvich, in the north of the county. Towards the cost a grant of £20,000 has been made by the Light Railway Commissioners, while the Duke of Sutherland has offered to take up £10,000 and the County Council £2,500 of the share capital. The Highland Railway Company will construct and work the line. The other scheme is to lay a light railway between the Mound, on the Highland Railway, and Dornoch. This scheme has also the support of the Duke of Sutherland and the County Council, and the Highland Railway Company have likewise agreed to construct and work this line.

## WATER SUPPLY AND SANITARY MATTERS.

**BELFAST.**—The public health committee of the corporation have received a large deputation of house agents, who attended with the object of securing the assistance and co-operation of the committee in bringing about improvements in the present state of affairs connected with the occupation of the smallest class of houses, the condition of which has contributed to the spread of disease. The deputation stated that they might be taken as representing the owners of three-fourths of the entire property of the city, and they considered that the overcrowding of workers' houses and the dirty habits of the occupants was largely the cause of the constant prevalence of sickness and the high death-rate. A description was given of the untidy, uncleanly abodes of certain classes, and of the way in which miscellaneous articles of wearing apparel and *bric-à-brac*, bottles, &c., are being constantly found in drains and pipes, having been put there by the tenants. The chairman informed the deputation that the committee would be glad to co-operate with them as far as it was possible to secure greater cleanliness in houses which had been referred to.

**BIRCHINGTON SEWERAGE.**—The sewerage question at Birchington, owing to the pressure put on the rural district council by the Local Government Board, has at last been settled. Messrs. Bailey Denton, Son, and Lawford's scheme has been adopted by the local authority, and they have been instructed to prepare the necessary plans for the holding of a Local Government Board inquiry. The estimated outlay is about £15,000, and the sewage effluent, after passage through roughing and coke-breeze filters, will be discharged on the ebb into the sea below the level of low-water spring-tide.

**WALLASEY.**—The urban district council have instructed Mr. G. F. Deacon, C.E., of Liverpool, to make surveys in connection with the scheme for giving the residents in the Wallasey area a more satisfactory supply of water. Next session the council will seek Parliamentary powers to spend nearly half a million of money in impounding the water of a Flintshire river and forming a lake similar to (but of course smaller than) Lake Vyrnwy.

The Ayr Electricity Lighting Works have been in operation for two years, and extensions on a large scale have recently been made, and are partly in use. The original installation cost £25,000. The additional plant, which has been laid down at a further cost of £15,000, nearly trebles the means of production. The length of cable laid down already extends to eight miles, and the corporation, who have already lit several miles of streets with arc lamps, have now entered into a contract to light the harbour and dock.

The Secretary of State for Foreign Affairs has received a despatch from her Majesty's consul at Warsaw, stating that the municipality of the town of Warsaw have decided to construct market-halls at a cost not exceeding 1,092,390 roubles (about £100,000). Tenders for the construction should be addressed to the president of the town of Warsaw.

The peal of bells in Woodbury Church, a village seven miles south-east of Exeter, has been raised from six to eight, as a memorial to the late Rev. J. Loveband Fulford, M.A., vicar, 1842-98, one of the founders of the Exeter Architectural Society, and father of the Rev. R. Medley Fulford, formerly a F.R.I.B.A. practising at Exeter. The bells were rehung by Mr. Harry Stokes, of Woodbury, and a brass tablet commemorating the late vicar has been fixed in the chancel, the work of Messrs. Harry Hems and Sons, of Exeter.

In his annual address on the work of the London School Board, Lord Reay, the chairman, mentioned that he had given instructions to the architectural staff that in the planning of new schools more classrooms than were previously required should be provided.

The Dauncey Memorial Wesleyan Chapel and Sunday-schools in Bradley-street, Wootton-under-Edge, were formally opened last week. The buildings are faced with Shortwood bricks, with Bath freestone dressings, and accommodation is provided in the chapel for 200 worshippers.

The urban district council of March were informed, at their last meeting, that Mr. J. W. Rowe, of Peterborough, whose tender was accepted at the previous meeting for erecting the proposed market buildings, refused to find the required sureties, and that Messrs. E. Girling and Co., who sent in the next lowest tender, declined the contract. It was unanimously resolved that the council carry out the work themselves, and a committee of management was selected for that purpose.

Twenty-seven plans of new dwelling-houses were sanctioned by the plans committee of the town council of Aberdeen. The estimated value of the property is £26,000.



## Our Office Table.

THE water-colour collections at the South Kensington Museum have been enriched by the addition of a fine example of the work of the late Alfred Pizzey Newton, presented by the widow and the children of the artist. Newton was chiefly known for his Highland subjects, but he also painted some foreign scenes during visits made abroad. It was probably while on one of these journeys that he painted the picture which has just become the property of the nation. It represents the Arch of Titus at Rome by moonlight, and is signed and dated 1862. The view is taken looking towards the Forum, and some French soldiers are leading a prisoner under the arch. The picture has been hung in the water-colour room, immediately at the top of the staircase, in the north-west corner of the north court.

IN connection with the Clare Market rehousing scheme now in progress and with the proposed new street from Holborn to the Strand, in respect of which application is to be made to Parliament next Session, the Housing of the Working-classes and the Improvements Committees of the London County Council have had under consideration the question of obtaining sites for rehousing purposes in the immediate locality of the two schemes. Learning that land in the neighbourhood of Drury-lane was vacant they entered into negotiations with the owner, the Duke of Bedford, with the result that he expressed his willingness to sell two sites in Drury-lane and also a larger site fronting Herbrand-street, near Woburn-place. In their joint report to the Council upon the matter the committees strongly advise the acquisition of these three sites, which, if acquired, will be sufficient for the erection of buildings to accommodate 1,000 persons. By the formation of the new street about 3,030 persons will be displaced. The price asked for the three sites is £118,740, and, in the opinion of the committee, this is reasonable. The County Council will consider the recommendation on Tuesday next.

MR. OSBERT CHADWICK on Wednesday delivered the Chadwick Trust lecture at University College, Gower-street. The Chadwick Trust was founded by the trustees in accordance with the terms of the will of Sir Edwin Chadwick, the father of the lecturer, for the purpose of advancing the study of municipal hygiene. Mr. Chadwick traced the career of his late father, and recounted the history of the Commission appointed by Lord John Russell in 1847, to inquire into the health of the Metropolis. Sir Edwin Chadwick was a member of this Commission, which resulted in the supersession of the seven separate Commissions which then controlled the Metropolitan sewers under an Act of Henry VIII. These were temporarily replaced by a small body of between twenty and thirty, which ultimately developed into the Metropolitan Board of Works. Sir Edwin Chadwick died in 1890. The Chadwick Trustees have devoted a sum of £700 per annum to the endowment of a Chair of Municipal Engineering and a Lectureship of Municipal Hygiene, further expending £1,000 on the purchase of instruments and appliances for the amplification of existing laboratories of engineering and hygiene. The lectures are invariably supplemented by courses of practical work. In the branch of municipal engineering the course comprises lectures on waterworks, sewerage works, and the like, the students being expected to prepare simple engineering works of a municipal character, and to draw up estimates of the cost. A Scholarship of £100 is offered to the most successful student undergoing the course.

THE Founders' Company's Exhibition, the first organised by that company, will open at Ironmongers' Hall on Wednesday, the 26th inst. The competitions are open to founders, designers, craftsmen, and apprentices engaged in the foundry business within the City and the area of the Metropolitan Police. The Exhibition Committee include Mr. W. E. Chambers (the master), Mr. M. B. Herbert (the upper warden), Mr. Deputy Bertram (the under warden), Professor Aitchison, R.A., Mr. A. Gilbert, R.A., Mr. G. J. Frampton, A.R.A., Mr. J. Willis Dixon (of Sheffield), and Mr. R. H. Young (the head of the firm of Young and Co., the Eccleston Ironworks, Pimlico). Prizes will be given for the best castings in groups, panels, bell founding, and other kinds of cast metal work. All exhibits

must be delivered at Ironmongers' Hall by Tuesday, the 25th inst. There will be on view several specimens of foundry-work not intended for competition, and among these will be some interesting objects from Sheffield and other large centres.

UNDER the auspices of the Northern Art Workers' Guild, Mr. Lewis F. Day lectured on Monday evening at the City Art Gallery, Manchester, Mr. W. Burton, Master of the Guild, in the chair. Mr. Day's subject was "The Making of a Stained-Glass Window," and his interesting lecture was copiously illustrated with lantern slides, showing stained-glass processes, and numerous examples of the finest early work in the art. Besides exhibiting the various modes of painting and glazing and the effects produced, the slides also showed in an effective manner the beautiful results possible to obtain in making glass. Incidentally, the lecturer remarked that it was nonsense to talk of the lost secrets of glass making. There was now, he made bold to say, no mystery about the composition of old glass. Aided by modern science, we were able to-day to make glass equal to any ever made, and we could also do certain things which the mediæval glass-maker could not do. What the old makers got by accident the modern got of set purpose. This was well displayed in Mr. Day's slides, showing the effect of streaks and bubbles in glass made by modern manufacturers. In conclusion, Mr. Day observed that stained glass was nothing if not decorative, and the root of all decorative design was the material out of which, he might say, it was to grow. The artist could only get out of his material what was in it, and that he could only get by "humouring" the material. The secret of success in designing for stained glass was to know all about the processes and materials.

FOR some two years or more the main track of the London and North-Western Railway line has been in process of macadamisation, and now some hundreds of miles of the track between the rails are laid with broken stones to the depth of about 1 ft. The primary object is the prevention of dust, which was not only a source of annoyance to passengers, but very destructive to the locomotive engines. The "metal" for this macadam consists of blast-furnace "slag," obtained principally from Northamptonshire, but also in fair quantity from South Staffordshire, and there is every prospect that both districts will in time see the removal of those unsightly hillocks which have so long disfigured the landscape. Almost countless thousands of tons of what has been looked upon as waste refuse is now invested with a defined commercial value, the realisation of which will clear some hundreds of acres of hitherto waste land.

WITH the view of expediting a decision by the Town Council of Edinburgh on the question of the site to be selected for the Usher Town Hall, Lord Provost Mitchell Thomson decided to call in the services of Mr. Alfred Waterhouse, R.A., LL.D., who adjudicated upon the competitive plans for the proposed new municipal buildings during the Lord Provostship of Sir Thomas Clark, and who more recently awarded the premiums upon the North Bridge-street competitive plans. Mr. Waterhouse was in Edinburgh on Friday and Saturday, and, in company with the Lord Provost, Mr. Hunter, town clerk, and Mr. Morham, city superintendent, he made a round of the five sites which were recently the subject of special report by Messrs. Hunter and Morham.

DURING the past week some important discoveries have been made at Ribchester by a party from Oxford who have been engaged in explorations for a month past. At a considerable depth they came upon the remains of the ancient Roman military camp, the whole outline of which has, practically speaking, been determined. The latest discovery consists of what is supposed to be one of the passages through which the boats of the Romans used to pass to the camp. At the south of the camp a large postern gate has been unearthed. The northern gate was discovered about ten years ago by a Houghton clergyman. Other relics discovered include some rare pottery, one piece representing a Roman soldier in full armour, and a variety of coins.

A LECTURE on "The Natural Colour of Water" was read before the Fifth International Congress of Hydropathy at Liège at the close of last week by M. Walthers Spring, Professor of Chemistry at Liège University. The author showed experimentally that the true colour of a

pure water is blue as in the Lake of Geneva, and that this colour is the colour proper for the water, and is not due to a mere reflection from the surface nor from suspended particles in the water; that, when pure, water has a very slight cloudiness due to the presence of finely divided, nearly white, or colourless particles in suspension, even if these are absolutely colourless, as in the case of very finely-divided rock crystal, a yellow tint is given to the water, which, together with the natural blue proper to the water itself, produces a green colour, as in the cases of the Lakes of Neuchâtel and of Constance. It had been noted by various observers that the water of certain lakes, ordinarily green, becomes occasionally absolutely colourless, and this, he showed, was due to the washing into the lake of a fine mud of a reddish tint, due to oxide of iron, which neutralises the green colour of the water, rendering it for the time being perfectly colourless.

A PROCESS for imparting the lustre of metal to ordinary wood, without injuring its natural qualities, is described in the Paris *Annales Forestières*. The wood is laid, according to its weight, for three or four days in a caustic alkaline solution, such as, for instance, of calcined soda, at a temperature of 75° to 90° Celsius. Then it is at once placed in a bath of calcium hydrosulphite, to which, after 24 to 36 hours, a saturated solution of sulphur in caustic potash is added. In this mixture the wood is left for 48 hours at 35° to 50° Celsius. When the wood thus prepared, after having been dried at a moderate temperature, is polished by means of a smoothing iron, the surface assumes a metallic lustre. The effect of this metallic gloss is more pleasing if the wood is rubbed with a piece of lead, zinc, or tin. If it is subsequently polished with a burnisher of glass or porcelain, the wood gains the brilliancy of a metallic mirror. Withal, the wood remains very firm and durable.

A MUNICIPAL ART DEPARTMENT, to pass criticism on works of art given to the City of Boston, or purchased by it, and on the design of municipal buildings, bridges, gates, fences, and similar structures, has been established by the Massachusetts Legislature. It is to be under the control of five art commissioners, one appointed by the mayor each year for a five-year term; no salaries are paid to any of the commissioners, nor to the secretary of the board. Each commissioner is, to some extent, a representative of either the Museum of Fine Arts, Boston Public Library, Massachusetts Institute of Technology, Boston Art Club, or Boston Society of Architects, since he is appointed by the mayor from a list of three nominees by one of these organisations.

### MEETINGS FOR THE ENSUING WEEK.

WEDNESDAY.—The Edinburgh Architectural Society. "Wrought Iron," by Percy E. Nobbs, M.A. 8 p.m.

THURSDAY.—Carpenters' Hall Free Lectures. "Site, Foundations, and Sanitary Requirements," No. 2, by Professor T. Roger Smith, F.R.I.B.A. 8 p.m.

FRIDAY.—Architectural Association. Annual Conversation at King's Hall, Holborn.

The Beckenham Corporation have accepted for their town-hall the gift of a bust of the late Mr. John Laird, the well-known shipbuilder, executed by Mr. Thomas Brock, R.A.

The Sites Committee have visited a number of proposed sites for the Tennyson statue at Lincoln, and have agreed to recommend that it either be erected in front of the Church of St. Benedict (near the High Bridge), or on the space between the road fronting the south entrance to the Cathedral and Vicar's Court. The final decision is left to a general meeting.

Archdeacon Robeson recently unveiled the east window at St. Paul's Church, Westminster, which has been erected by Sir Edward Hill, K.C.B., M.P., in memory of his father, the late Mr. Charles Hill. The window, which is the work of Messrs. John Hall and Sons, is a tracery one of five openings, and it has been carried out in the Perpendicular style. The three centre openings represent the Crucifixion of our Lord, and on either side are scenes from the life of the patron saint of the church, St. Paul. The episodes represented are Saul smitten by light at his conversion; St. Paul before Agrippa; St. Paul forbidding the sailors to leave the ship (27th, 31st Acts); and St. Paul shaking off the viper. Towards the top of the window are portraits of Bishop Ellicott and Bishop Forrest Browne.



## LIST OF COMPETITIONS OPEN.

Ardrossan—Fever Hospital .....	No Premium .....	John Adams, Clerk to Committee, Borough Buildings, Ardrossan ..	Oct. 15
Shrewsbury—School .....	20gns. .....	Borough Surveyor, The Square, Shrewsbury ..	29
Sheffield—Board School .....	£50, £30, and £20. ....	J. Moss, School Board Offices, Sheffield .....	Nov. 15
Aberavon—Market Extension (£5,000 limit) .....	£50, £30, and £20. ....	The Borough Surveyor, Aberavon .....	Dec. 1
Chertsey—Sewerage Schemes .....	£30, £20, and £10. ....	Arthur W. Smith, Surveyor U.D.C., Eastworth-road, Chertsey ..	23
Stockholm—New Stations, &c. ....	£100 .....	Secretary, Royal Administration Swedish State Railways .....	31
Harrogate—New Royal Pump Room (£8,000 limit) .....	Corporation .....	Samuel Stead, Boro' Surveyor, Municipal Offices, Harrogate..(1899)	Jan. 2
Harrogate—Alterations to Old Pump Room .....		Samuel Stead, Boro' Surveyor, Municipal Offices, Harrogate..(1899)	2
Maidstone—Electricity Supply Works and Refuse Destructor .....		Herbert Monckton, Town Clerk, Maidstone.....	—
(Assessor) .....		Edwin Laverock, Town Clerk, Town Hall, Hull .....	—
Hull—Central Free Library (Sidney R. J. Smith, F.R.I.B.A., Assessor) .....			

## LIST OF TENDERS OPEN.

## BUILDINGS.

Tunbridge Wells—Fifty-three Four-roomed Cottages and Five Blocks of Tenements .....	Corporation .....	W. C. Cripps, Town Clerk, Town Hall, Tunbridge Wells .....	Oct. 15
Port Talbot—Drill Hall .....	G. J. E. Gardner .....	Frank B. Smith, Architect, Port Talbot .....	15
Northallerton—House .....	Robert Wright .....	Clark and Moscrop, Architects, Darlington .....	15
Consett—House, Aynsley-terrace .....	Joint Burial Board .....	J. Doherty, Architect, 24, Sherburn-terrace, Consett .....	15
Fulwood—George Woodfin Convalescent Home .....		Hemsoil and Paterson, Architects, 18, Norfolk-row, Sheffield .....	15
Lyme Regis—Five Cottage Almshouses .....		Walter J. Fletcher, F.R.I.B.A., Wimborne .....	15
North Sunderland—Converting Cottages into Two-Story Dwelling Houses .....		James Ewing, Sea Houses, Chathill .....	15
Rangor—Additions to Electric Lighting Station .....	Corporation .....	F. H. Medhurst, M.I.C.E., Westminster Chmbs, 13, Victoria-st, S.W. ....	15
Hatton of Cruden—Hotel .....	Heritors of the Parish of Slamannan .....	John Cantley, Asballow, Cruden .....	15
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Trillick—Alterations, Methodist Chapel .....	Zion Chapel Trustees .....	Rev. J. Bradshaw, The Manse, Irvine town .....	15
Southborough—Victoria Hall and Buildings, London-road .....	W. Riding Standing Jr. Committee .....	William Harmer, Surveyor, 137, London-road, Southborough.....	15
Wombwell—Sunday-School, Classrooms, &c., Wesleyan Reform Chapel .....	Governors of County School for Girls .....	John Robinson, Architect, Wombwell .....	17
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Darwen—Wesleyan Church, Bolton-road .....	J. Spedding .....	John B. Thornley, Architect, 45, Market-street, Darwen .....	17
Ruthin—Additions to School House, Brynhyfryd .....	Corporation .....	James Hughes, Architect, Denbigh .....	17
Outlane—Alterations to Property .....	School Board .....	J. Berry, Architect, 9, Queen-street, Huddersfield .....	17
Leith—Additions to Lorne-street School .....	School Board .....	A. and R. McCulloch, Architects, 3, Bernard-street, Leith .....	17
North Finchley—Parish Room and Institute, Great North-road .....	Corporation .....	Ernest A. E. Woodrow, A.R.I.B.A., 67-69, Chancery-lane, W.C. ....	17
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Heckmondwike—House and Shed at Sewage Farm .....	School Board .....	James Savile, Surveyor, Oldfield-lane, Heckmondwike .....	17
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Edinburgh—Excavations, Concrete Works, &c. ....	Guardians .....	W. Herring, Engineer, New-street, Edinburgh .....	17
Swansea—Ward Block at the Borough Hospital .....	Select Vestry .....	The Borough Surveyor, 13, Somerset-place, Swansea .....	17
Horsham—Workhouse Infirmary .....	Sir Francis Burdett, Bart .....	C. H. Burstow, Architect, 6, West-street, Horsham .....	17
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Newbury—Farm Buildings at Weston Farm .....	Guardians .....	James H. Money, Architect, The Broadway, Newbury .....	18
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Elland—New Infants' School .....	Trustees .....	Herbert W. Booth, Architect, Hopwood Hall, Halifax .....	18
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# THE BUILDING NEWS

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## THE OVERTAUGHT STUDENT.

WITH the return of the architectural tourist and the resumption of the work of the office and the classroom, it is natural to turn to the opening addresses and papers read at the various institutions and colleges. These become every year a little wearisome and threadbare; those who have to give them find it very difficult to treat the subjects with any freshness, simply because they have, in delivering them year after year, to repeat very much what they have said before, and to go over the same ground for the sake of the new students. Educational literature is, in fact, becoming redundant: books and treatises on elementary science and building, reprinted lectures and articles almost threaten to overwhelm and stifle the student with facts, opinions, and theories that have no application to building, or with a kind of loose knowledge that has been bandied about by compilers and lecturers. Through this "learned lumber" students wade with difficulty, not finding what they want, and not a few extricate themselves from its labyrinths more bewildered than enlightened. After all, the architect's education, like every other education worthy of the name, will depend on what he is able to appropriate for himself, and not upon any school course, however good it may be. As the Bishop of London said the other day in his address on "Teaching":—"The process of learning is an individual process. The teacher is really engaged in the process of introduction to that august matron called 'Knowledge.' At present the pupil and knowledge are often ill-assorted guests." Is not this precisely the reason the class-room teaching has failed? The qualities necessary are curiosity and observation, and it is the duty of a good teacher to develop these qualities towards proper ends. The present system of teaching fails because it is supposed that all students are the same, and require the same pabulum. Pupils are not all cast in the same mould. One is fond of drawing—another likes to solve questions of arithmetic or geometry—one is more idealistic—another mechanical and practical in his tastes. Each of these ought to be taught in his particular way, to develop the faculties he possesses, or the result is failure. Even those naturally fond of drawing have different faculties: they learn it in several ways—some are imitative and make good copyists; others are inventive and imaginative, and require to be taught drawing with reference to design, or the means of expressing their ideas. The President of the Architectural Association (Mr. G. H. Fellowes-Pryne, F.R.I.B.A.), in his address the other day, spoke of the few students who go through the four years' course prescribed by the Association. No doubt the fact is that the majority of students find their pupilage absorb a great deal of their time, and that it is impracticable for them to devote four years to the course of the A.A. in addition to their own work. The pupil in a busy office, who has to be hard at work from, say, 9 or 10 in the morning till 6 and sometimes later in the evening, has no time or inclination to attend an evening course of lectures. A four years' course is too long, and a shorter one ought to be arranged. Cramming, however, is to be avoided, as it is an unhealthy mode of acquiring knowledge. Lecturers and presidents are apt to overlook these difficulties of the situation, and, after

all, we may ask whether our gifted predecessors, who knew of no such things as "crams" for examination, were any worse off as architects. But, conceding that an examination is more necessary now than formerly, we ought to be sure that what is taught the pupil will have the effect of drawing him out in his special forte, and encouraging him to examine for himself those other branches of his subject that are more or less related. For example, the pupil fond of drawing will be taken to task to no effect if he is set to work out mathematical problems, or is expected to attend a class two or more days a week on the strength of materials. But if his drawing aptitude is first developed in proper directions, and he is slowly led on to consider lines and angles in a new light as representing forces and their directions, his drawing powers may be made the means of instructing him in the science of graphic statics. Another way of encouraging the teaching of architecture is to bring the pupil early into contact with the actual building operations and materials. The student has now several opportunities open to him: there are the workshops of the University College and King's College, the Carpenters' Hall classes, the studio of the Association, in which he may learn to express his ideas, test his theoretical knowledge, and learn the fundamental principles of design. But has he made so much use of them as expected by those who instituted them? We believe not, and the reason is because they have been conducted too much on the ordinary school basis, as a means of cramming technical knowledge into the students' heads for the R.I.B.A. or other examination, which is regarded as the main end in view. It must not be forgotten it is the voluntariness of effort that is the main thing in all useful study. Directly the idea of compulsion, or forcing, or cramming takes possession of the pupil's mind, he at once likes to shirk the task, or to snatch the desired prize, and then to slip back, by a sort of natural reaction, into indifference. It is the want of gaining confidence in himself that makes the ordinary pupil, under the present system, so indifferent to study. Restore his confidence, make him feel he is a free agent, and he will resume his studies with real pleasure. The older members of the Association under the voluntary system took great interest, as Mr. Pryne says, in the class of Design. Many owe their success to the great aid it imparted; but it was because it was voluntary that so many took an interest in it. The same gentleman's idea that a kind of club-life would be a great help, forming a kind of "social background" to the educational work of the Association, is one worth considering by professional societies.

Last week we gave another important address on "Students' Difficulties," by Professor T. Roger Smith, F.R.I.B.A., at University College. The difficulties of the student are sketched out, and if we go through the list of them, the hindrances to the pupil's progress are by no means overdrawn. The definite goal marked out for the pupil is often illusory. One important hindrance is this: the pupil's studies are mapped out with precision for some object in view, but without any consideration of what the youth is capable of—a system we have already shown to be mistaken. Professor Smith's remarks on drawing are worth attention, and we may add, this branch is one often neglected by the mere educationist, who would be better employed if he could develop and control, rather than suppress, the gift. If drawing is considered in the right light it ought to be made a means of learning other things. As the professor said, the art cannot be learned without it; planning, structural science, ornament, the very commonplaces of architecture, forms, dimensions, features can only be committed to memory or mastered by

drawing them. This value is often forgotten; the gift of the pencil is too often considered to be an accomplishment of a superfluous kind.

The value of office routine is not less important. This, too, has been rather underrated by the modern educationist, who has advocated the classroom and technical school as substitutes;—two helps very useful in their way, but which will never adequately take the place of the routine of an office where actual work is carried through. It is no fault of the system of pupilage to say that many young men leave offices ignorant of many things. The fault is their own. Opportunities are afforded them of learning many things which they cannot acquire elsewhere. The office routine is a valuable discipline. If the advice of Professor Smith is followed, "Try to understand what you are doing," the pupil will not have spent his office time in vain, and when he is at last launched into business will know how valuable the training is. No doubt in large offices there is the temptation to subdivide the work, and to give to the pupil that particular kind of work he is best fitted for, but in provincial offices this seldom occurs. The remarks made on tracing drawings, often very wearisome, are worth reading, and, speaking of examinations, Professor Smith aptly remarks: "I fear that all examinations are apt to become goals rather than finger-posts." Large builders affirm that youths who have been apprenticed to the trade make better workmen than those who have not had that advantage. The classroom and technical school will never supersede either the office or the shop. The former are valuable supplementary aids; but they are too frequently employed in perfecting the youth in a few feats of intellectual agility, which will enable him to pass the exam. even at the cost of solid proficiency.

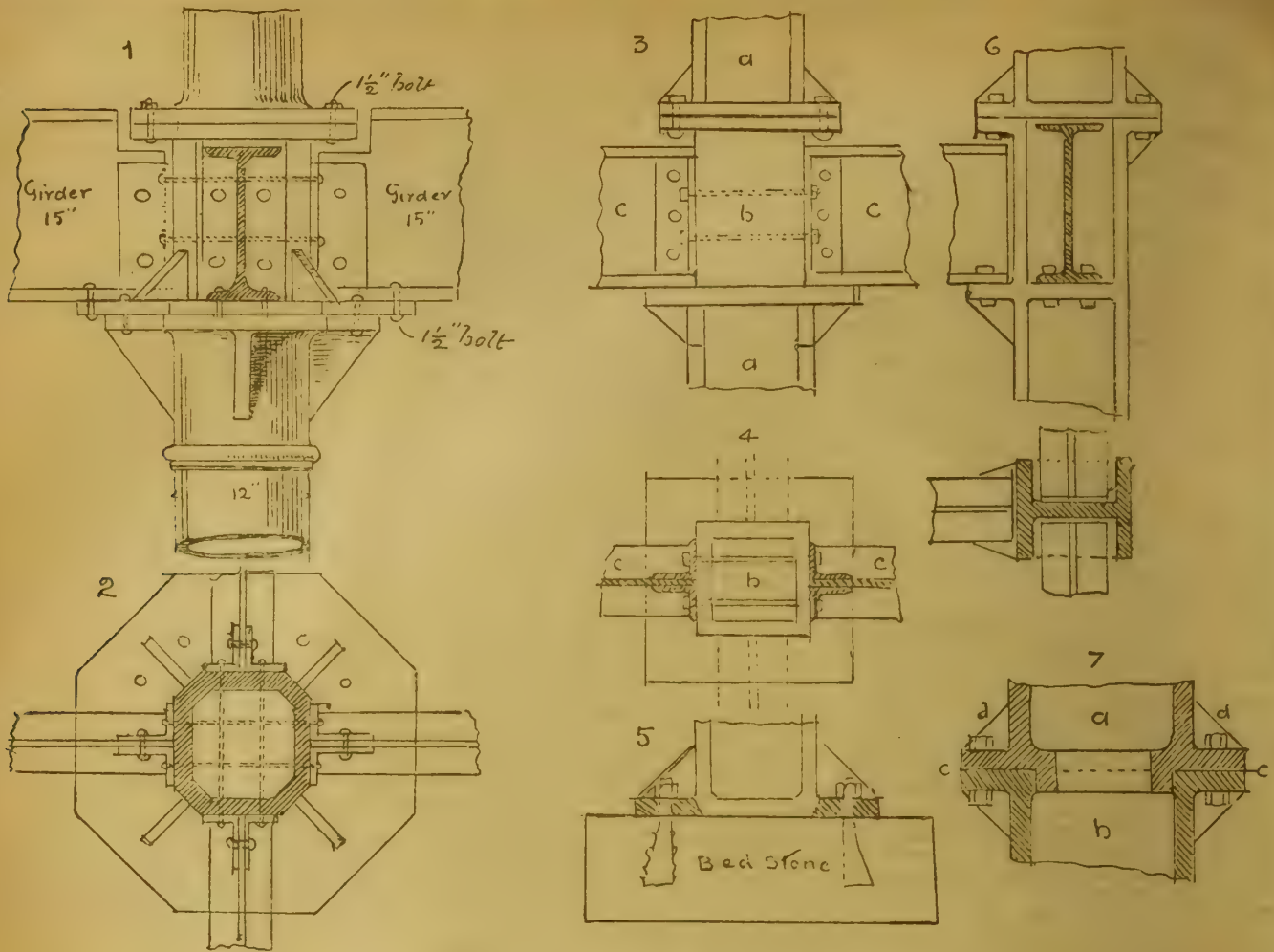
## MODEL SPECIFICATIONS.—XXXV.

FOUNDER AND SMITH.

WE now give a few clauses for the founder's work. Very often this work is left by the architect to the contracting engineer, who makes the necessary details and draws up his own specification; but it is not a satisfactory plan, if good materials and workmanship are required. Constructional ironwork is a very important part of this trade, and now we shall only refer to items and structures of an ordinary kind, chiefly to cast-iron work. As to quality of iron, there is much difference of opinion. One authority says that the cast iron is to be of such quality as to show a grey fracture, and not to break with a less tensile stress than 7 tons per square inch, and that a bar 3ft. 6in. long, 2in. deep, and 1in. wide, resting on supports 3ft. apart, should not break with a less central load than 21cwt.—a fairly good test of strength.

When columns or stanchions are used to carry two or more floors in succession, it is necessary they should be directly over one another and have a continuous vertical bearing. To do this, "stiltings" or brackets must be introduced between the lower and upper columns or stanchions to receive the girder ends (see diagrams 1, 2, 3, 6, &c.) The girders do not rest on the stiling, but simply enter it at the sides, the weight being carried by the stanchion. By looking at the sketches it will be seen that the rolled girders rest upon the upper plate of stanchion, which is strengthened by the brackets cast on. The ends of the girders are bolted through the stiling by ½in. bolts by means of angle-irons or cleats shown in elevation 3 and on plan 4. Two other girders may be supported on the two opposite sides of stanchion, as shown by dotted lines on plan 4. The through-bolts in this case must be arranged for each pair to clear. In the





specification specify these cleats and bolts, and refer to details. The parts of stanchions or columns, as where the plates are bolted together, should be planed level or faced, so as to form an even bearing; spigot-and-faucet joints (see section 7) are necessary to prevent lateral slipping. Sometimes lugs are cast in the stiltting. To these lugs the webs of the girders are bolted; but the girders rest on the column, and must not be carried by the lugs in any way. Very frequently "pockets" or bracketed recesses are cast on the stanchion or column, as shown in our sketch 6, where three girders rest on the same support. The elevation and plan show how these pockets are formed to receive the girders, the web of stanchion being continuous as a vertical support. Section 5 shows the base of a stanchion. In this case the stanchion is secured to bed stone by holding-down bolts with nuts. The bolts are tapered, and the holes filled in with cement or melted sulphur; or the bolts are "rag bolts." These are roughed or jagged, so as to give a better hold on the cement filling.

Rain-water pipes are made in great variety of sections—round, rectangular, polygonal, &c. For a 4in. round pipe the weight is about 18lb. per yard; for a 5in., 23lb. per yard. The pipes are fixed to brick walls with lugs or ears cast on the pipe, or are fixed 1 1/2in. clear of wall by wrought-iron nails. The joints should be caulked with red-lead and tow. Sometimes the pipe is tarred inside. In specifying state if oak or teak plugs are to be used as a fixing to brickwork. State if the eaves-gutter is to be jointed in red-lead, if bolted at the joints, if secured to fascia or to rafters' feet, if with brackets or clips. Or, instead, quote manufacturer's name or number in catalogue;—the latter is generally done.

4. *Quality of Iron.*—The cast-iron to be from the best tough grey pigs, free from air-holes, scoriae,

flaws, and defects of every kind, and to be painted one coat in oil before leaving the foundry. Or—

The metal for the castings shall be of such a mixture of irons best adapted for the purpose, and shall be such that a bar 1in. square and 4 1/2ft. between the supports shall bear, without fracture, not less than 550lb. in the centre. The castings must be of the pattern and dimensions shown in the drawings, and to be cast smooth with sharp arrises, free from air-blows, twists, and flaws of every description. The edges of all bearing-plates and joints to be planed perfectly true to an even surface.

All columns shall be cast vertically in dry sand, and for the purpose of gauging the thickness of metal, small holes shall be drilled where directed. The thickness of metal to be uniform in every part.

5. *Dimension and Weight.*—The ironwork to be of the exact dimensions and form shown in the drawings. Any divergence in the work to have the authority of the architect, and any excess of weight beyond 3 per cent. caused by such divergence will not be paid for. The whole of the ironwork to be put together before leaving the maker's yard, and each piece to be numbered, so that they may be properly put together in fixing.

6. *Cast-Iron Columns.*—The cast-iron columns to be of the dimensions, form, and sectional area shown in drawing, 1 1/2in. thick (see sketch 3), with stiltting of octagonal shape cast or bolted to plate of upper column. The four rolled girders resting on each column to be of the sizes shown, and their ends to be bolted through the stiltting with 1/2in. wrought-iron bolts, nuts, heads, and washers, as shown in section. All the holes to be accurately drilled. The upper and lower plates of columns to be of the sizes figured, accurately planed, and eased out of the shaft, and to be bolted together with 1/2in. wrought-iron bolts, nuts, heads, &c. The bottom plate, or base-plate, to be bedded in neat cement, or on 8lb. (or 10lb.) lead seating in a bedstone of tooled York stone (or Scotgate Ash stone), 3ft. square, secured to same with four 1 1/2in. holding-down bolts, heads, nuts, and washers.

7. *Stanchions.*—The stanchions marked on plan to be of the form and dimensions shown in details (see drawings 3 or 6), with square stiltting to support two (or four girders). The ends of girders to have

cleats secured by 1/2in. bolts, heads and nuts, passed through stiltting, and the top and bottom plates of stanchions to be stiffened by featherings or lugs cast on, and the faces in contact to be planed to a level and even surface, and bolted together as shown. The base-plate, 2 1/2in. thick, to be accurately planed, and be bolted with 1 1/2in. bolts or rag bolts to a stone base of hard York stone, 2ft. 6in. square and 1ft. 6in. thick. [If there are no detail drawings every part of the stanchion should be described, as the section H shape, the thickness of standard of flanges or stiffeners, 2in. (or 2 1/2in.); the thickness of base-plate and cap-plate; the stiltting; the mode of fixing by bolts, &c.; the angle brackets or fillets, metal raised round bolt holes; the position of the stiffeners of stanchion, say every 2ft. 6in. or 3ft. apart, &c.]

8. *Seatings, &c.*—All girders to have seatings of the best hair felt in two or more layers, and seatings of 8lb. lead to be put to the cast-iron bed-plates of all columns and stanchions on masonry of their full size.

The whole of the cast and wrought ironwork to have one coat of best red-lead before fixing, and four other coats of approved colour when completed; the wrought ironwork to be well oiled before the parts are put together.

All rivet holes are to be carefully drilled, the rivets to be of the diameter and pitch shown on drawings.

9. *Rolled Joists.*—Supply and fix in positions marked on plan, and of the sizes and weights hereunder, rolled iron joists of the best manufacture, with a camber of 1in. in 30ft.; or the rolled steel joists to be supplied by Measures Bros., Ltd., 6in. by 5in. or 10in. by 5in., 2ft. apart, having 9in. bearings on walls with felt (or 4lb. lead) seating. The ends of joists to be free at end to allow for expansion, and to rest on 12in. by 3in. hard York stone templates. (Refer to plans or table of lengths of bearing and sizes, if the joists vary in length in different rooms, distance apart, &c.) Or—

10. *Rolled Joists to Wooden Floor.*—The floor of saloon or hall to be constructed with two (or more) 10in. by 5in. (or 15in. by 6in.) rolled steel joists, 8ft. apart, resting on tooled York stone templates 2ft. by 9in. and 3in. thick. Bolt on each side of rolled joists resting on bottom flange two fillets, 3in. by 2in., with 1/2in. bolts, nuts, heads, and washers, 3ft. apart, for bridging joists 9in. by 3in.



11. *Rolled Iron Joists to Carry Front.*—The wall over shop-front to be carried on two 15in. by 5in. (or 18½in. by 7in.) rolled iron joists, with 9in. bearings, riveted up by top and bottom plates. Seatings of 8lb. lead or felt to be placed on bearings; the whole area of bearing on tooled York stone templates 14in. (or 18in.) square and 4in. thick. The girders to weigh 51lb. per foot (a girder of the above section for an 18ft. span would carry a safe distributed load of about 12 tons). (The architect should send for the illustrated sheets of any good firm, as those of Homan and Rodgers, Measures Bros., Lindsay, Neal and Co., &c.—in which several combinations of rolled joists by riveted plates, placed either above one another or side by side, and the weight and safe load for each, are given.)

12. *Cast Iron Shoes.*—Provide and fix all necessary cast iron shoes (see detail) for ends of joists and principals. The shoes to be 9in. or 1½in. long, and of ½in. metal.

13. *Rain-Water Pipes.*—Provide cast-iron water-pipes of the diameter shown (or 3in., 4in., or 5in. diameter). The pipes to be straight and clean castings of superior manufacture (or of 20lb. weight per 6ft. length). They are to be fixed clear of walls with bands, and ears and heads to pattern, and to have all necessary bends, swan-necks, set-offs complete. Or—

The rain-water pipes to be 4in. by 3in. to pattern, with collars and loose ears, fixed with wrought-iron nails to oak (or teak) plugs in brick-work, with all bends, swan-necks, plinth bends complete, to discharge over surface gullies; or to be No. — in Young and Marten's catalogue.

14. *Eaves Gutters.*—The eaves to have 4in. by 3in. (or 5in. by 4in.) heavy R.W. gutters, to design (or No. — in catalogue), jointed with red-lead cement, and fixed to the fascias with stout screws. Supply all necessary stopped ends, angles, outlets, &c., complete; painted three times in oil (or oxide of iron paint). Or—

Provide and fix to eaves 4in. by 3in. (or 6in.) by 4in. ogee (or moulded) cast-iron gutters, pattern No. 38 of Macfarlane's manufacture, with all stopped ends, outlets, angles, nozzles, &c.; they are to have lapped and bolted joints; the R.W. pipes to have spigot-and-socket joints in red-lead. Paint the gutters and pipes with two coats of oxide of iron paint before fixing.

(Eaves gutters are made in 6ft., 4ft., and 3ft. lengths. For ogee guttering (4in. wide) the weight would be about 7lb. per yard; for 5in. guttering, 10lb. per yard). Or—

Fix to eaves 4in. round (or ogee) guttering, bolted together with clips, with wrought-iron brackets screwed to feet of rafters, with all angles, outlets, stopped ends, &c. Put galvanised iron (or copper) wire roses over outlets.

15. *Pavement Lights.*—The areas (or basements) shown on plan (or coloured blue) to be fitted with Hayward Brothers and Eckstein's (the St. Pancras Iron Co., or other approved) "semi-prism" pavement lights, with semi-convex lens fixed alternately in iron frames bedded in cement, the inner side of frame to be let into wall, and the outer side let into a York curb. (State No. or description of the particular pavement or lenses required from illustrated catalogue. Sometimes a p.c. sum is allowed, or the makers contract to provide and fix.)

16. *Basement Lights.*—The basement (or cellar) to be lighted by Hayward Brothers and Eckstein's No. 3 lens 3in. hexagonal, or No. 10 lens 12in. by 12in. pattern, pavement light, fitted to iron frame, let into stone curbs in cement complete, and left to the satisfaction of the architect. Or the basement to be filled with the Luxfer Prism Syndicate, Finsbury, and with the "Lucidux" plate of window prisms prescribed by the Syndicate, and fixed under their direction.

*Stall-Board.*—The stall-board under shop window to be fitted with St. Pancras Ironworks, N.W., patent prismatic stall-board lights (pattern No. —), properly fixed to framing by screws. Or the stall-board to have Hayward's ornamental stall-board lights, glazed with rolled glass 24in. or semi-prism lenses 22½; (or to be filled with "Besto" glass by the "Besto" Glass Co.) The same to be approved by the architect.

represented in Fig. 1, in which CD is a single beam supported at its centre by the pier A B. When the lengths of the two arms are equal to one another, as they frequently are, they balance each other, and if the beam were simply resting



FIG. 1.

upon the support, instead of being virtually *encastré*, it would still be in a condition of perfect equilibrium. There is just one other, and a very important, provision that must be insured before the whole beam can be equilibrated, and that is that the weights of the two arms must be equal. This relation between them is essential, even more so than the proportion between their respective lengths. Should it not exist, the span whose design is lighter than the other must be made longer, weighted at its free end and bolted down to the support, or anchored to suitable mooring



FIG. 2.

plates imbedded *en bloc* in masses of concrete or masonry. If the beam in Fig. 1 be supposed to be able to rotate on the centre of the support, as if on a pivot, it becomes in principle a swing bridge, a structure frequently incorrectly termed a draw-bridge. The swing-bridge when open, that is swinging, belongs strictly to the cantilever type, and must fulfil the general conditions already specified for the equilibration of double cantilevers. When, however, the bridge is closed, and the free extremities of the arms are resting upon the supports, the principle called into play is then that of the ordinary horizontal girder, and the same methods of investigating the stresses and

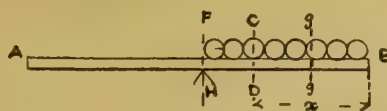


FIG. 3.

calculating the dimensions and sectional areas of the different members apply equally to both examples.

One form of a swing-bridge is represented in Fig. 2 when it is closed, and in a position to carry the live as well as the dead load. In addition to the assumption that when the bridge is closed each arm acts as an independent horizontal girder, resting upon two supports, another condition prevails which is probably nearer the truth than the former. It is that the entire bridge can be regarded as a girder continuous over two spans. From whatever point of view the question may be looked at, it is evident that a swing-bridge has to act in a dual capacity.

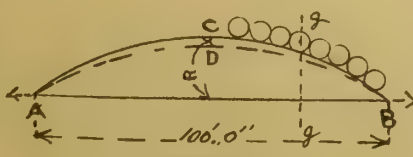


FIG. 4.

When open, each arm has to do duty as a cantilever; when closed, both have to obey the rules laid down for the design of both continuous and discontinuous spans. It results from the necessity of discharging these diverse, though not conflicting, duties that there are no less than four different standpoints from which the swing-bridge may be regarded.

Similarly to all bridges, those of the swing pattern have to carry both a live and a dead load, but with this difference—that when open and

acting as a cantilever bridge the swing structure is not exposed to any live or rolling load. Since Fig. 2 represents a swing-bridge closed, then Fig. 1 will show it open and in its other extreme position.

Assuming, therefore, that the swing span is open, or just commencing to swing, then obviously there will not be any live load upon the cantilever arm, and, moreover, all the dead load will be ultimately transferred to the single support at the centre. Again, if the bridge be closed, and each cantilever arm is considered as a girder carried upon two supports, it is evident that the single span must be always subjected to a dead load, and, except when there is nothing on the bridge, to the live load as well. Both these conditions must be taken into account when determining the stresses upon the various parts of the bridge. Lastly, the girder may be regarded as consisting of a couple of continuous spans acted upon by a dead load only, and also under the influence of a combined dead and live load. Practically, these two last cases may be resolved into one, and each span considered to be, when closed, under the action of both a dead and a live load. It would be wasting time and labour to enter into subtle suppositions and purely theoretical deductions respecting these three cases. What is really required in all these structural problems is the calculation of the maximum stress upon all the different members, and not elaborate investigations, which, when worked out, have no value in practice, and, more often than otherwise, no actual existence.

Commencing with the first case, let Fig. 3 represent a swing-bridge swinging freely on its pivot and entirely unsupported at each of its free extremities. The other cantilever arm will be in a similar position, and is for the present supposed to be of the same length, weight, and loading, which, in this instance, is composed of the dead load only. It is unnecessary when these conditions are complied with to consider more than one of the cantilever arms of the bridge. It may be as well to offer some little explanation of this statement, as it frequently perplexes a beginner. He very naturally observes: "If the weight upon one of the arms produces a certain stress over the central support, and the other arm, which is similar in all respects, does the same, there are two equal stresses, and surely their sum is the correct total stress to allow for." An illustration will perhaps be best to explain this apparent paradox. In Fig. 4, let A C B be an arched rib, held in equilibrium under a uniform load by the horizontal tie-rod A B. Under the action of the load the arched rib will undergo a certain amount of deflection, however small, and will tend to assume the position shown by the dotted lines A D B, and to develop, in consequence, horizontal thrusts in the direction of the arrows at A and B, which are equal to one another. But it must be borne in mind that one of these thrusts acts as a *point d'appui* or fixed point to the other, so that the stress or tension upon the tie-rod unless there is a corresponding resistance. Let us imagine that A B is a loose rope horizontally supported, and fastened only at one end, B. If, as before, a thrust be exerted at the point B, it is manifest that there will be no stress on the rope A B, because there is no resistance except the weight of the rope itself and the slight amount of friction induced by the motion imparted to it by the thrust, both of which factors may be disregarded.

It is not difficult to arrive at the actual stress or tension upon the tie-rod A B under the ordinary conditions of the arched rib being uniformly loaded, and in this case the same rule will apply as in the example of the cantilever arm—that is, it is only necessary to take into account the half of the total span. Let  $w$  equal the uniform load per horizontal foot run,  $L$  = the span,  $R$  the rise, and  $A$  the net sectional area of steel or other metal. Put also  $M$  for the bending moment or moment of stress,  $H$  for the horizontal thrust, and  $S$  for the actual stress itself. Considering the right-hand half of the arched rib, the uniform load upon it will be given by the equation—

$$\text{Uniform load} = \frac{w \times L}{2} \dots\dots\dots (1)$$

But this uniform load may be regarded as acting at its centre of gravity in the line  $g g$ , and its leverage with respect to the horizontal thrust at the crown of the rib at  $c$  is equal to one-fourth of the span. Multiplying these quantities together,

## THE CANTILEVER BRIDGE: ITS DESIGN AND CONSTRUCTION.—III.

A CANTILEVER beam has already been defined to be a beam fixed securely at one end and free and unsupported at the other. Cantilevers may be either single or double. If, instead of having but one free end, the beam be continued across or through the support, it will be a double cantilever and have two arms, as



we have the moment of the horizontal thrust or stress at the crown given by the formula—

$$M = \frac{w \times L \times L}{8} \dots\dots\dots(2)$$

It is clear that the horizontal thrust at the crown must be resisted by one of corresponding magnitude at the abutments, or motion would take place. Consequently we have the general relation, putting  $T$  for the tension upon the tie-rod—

$$H = S = T$$

But—

$$H = \frac{M}{R} \dots\dots\dots(3)$$

so that the actual calculated value of the tension on the tie-rod is—

$$T = \frac{w \times L^2}{8 \times R} \dots\dots\dots(4)$$

In order to find the net sectional area or the quantity of metal required for the tie-rod, some unit of stress must be adopted—that is, the number of tons of stress that is to be put upon 1sq.in. of metal. Let this be made equal to  $a$ , and then the net sectional area in square inches will be obtained from the equation—

$$A = \frac{w \times L^2}{8 \times R \times a} \dots\dots\dots(5)$$

We have now quite sufficient data to calculate a practical example. Let the span of the arched rib equal 100ft., the rise 10ft. (which is the ordinary proportion of rise for arched ribs), and the load uniformly distributed at the rate of one ton per horizontal foot of the span; then putting  $a$  the unit stress for steel allowed by the Board of Trade at 6.5 tons, we have—

$$A = \frac{25}{1.3} = 20\text{sq.in.} \dots\dots\dots(6)$$

It may be remarked here, as a piece of information probably not generally circulated, that, under certain conditions, the Board of Trade reserves to itself the right of permitting a greater unit stress to be placed upon steel for bridge and roof work. For mild steel, which is principally used for purposes of construction, the limit, in the case of some parts of the great Forth Bridge, was raised to 7 and  $7\frac{1}{2}$  tons. This concession would probably not be made in every instance, and must not be considered in the light of a precedent, nor, in fact, would it be safe to do so. The same net sectional area of metal will be required at the crown of the arched rib as for the tie-rod, since we always have  $H = T$ , the relation between them being simply one of action and reaction. It is the property of an arched rib that the value of  $H$  is constant when the load is uniformly distributed.

Another, and perhaps more simple, and conclusive, way of looking at this general question of a force is to take the case of a couple of men pulling at each end of a free rope acting at each end as a tie. Suppose each man to exert a pull equal to 250lb.; the stress upon the rope will not equal 500lb. For, let one of the men be removed, and a stout stake driven into the ground about midway in the length of the rope, sufficiently strong to resist the pull of the 250lb. exerted by the remaining man. Then, evidently, the stress upon the rope is only the pull due to the force of one of the men, which equals 250lb., and the pull of the other man supplies the necessary resistance, as the stake did, but without adding to the single stress brought upon the rope.

Returning now to Fig. 3, in which the first case is represented, and employing the same notation, we know, from our previous articles, that if  $M$  be the bending moment at the point  $CD$ —

$$M = \frac{w x^2}{2} \dots\dots\dots(7)$$

The maximum value of  $M$  will take place at the pivot or centre of support at  $FH$ , and substituting for  $x$  its value equal to  $L$ , we have—

$$M = \frac{w L^2}{2} \dots\dots\dots(8)$$

The shearing stress at the same central point over the pivot will be also a maximum, and will be equal to  $wL$ . As it is intended to compare this case with the others, a numerical value had better be allotted to the symbols. Let  $L = 42\text{ft.}$ ,  $w = 500\text{lb.}$ , which is the fourth part of the American ton, and infinitely to be preferred to our own awkward and unmanageable equivalent of 2,240lb.

Then—

$$M = \frac{0.25 \times 42^2}{2} = 220 \text{ tons} \dots\dots\dots(9)$$

and the maximum shearing stress will, putting  $S_1$  to represent it, be given by the equation—

$$S_1 = w \times L = 10.5 \text{ tons} \dots\dots\dots(10)$$

The next case to be investigated is that in which the bridge is closed and each span is supposed to act as an independent horizontal girder, supported at both ends. It will be unnecessary to prove the truth of the algebraical expression for the bending moments upon the bridge under different conditions, as they may be accepted as both accurate and well-established and recognised. Moreover, as the calculations are undertaken for the purpose of instituting a comparison between the cantilever, the independent span, and the principle of a girder continuous over two spans, it will suffice to consider the dead load only in all the three cases. The action of a live load, as well as of a dead, obtains in only two of the cases, and since the live load is either a multiple of, or bears some proportion to, the dead, it is a simple matter to multiply or increase in the proper ratio the result of the calculation with respect to the effect of the dead load, add the two together, and thus find the total bending moments and shearing stresses.

There is a marked difference to be observed in the amount, as well as in the position, of the maximum bending moments and shearing stresses in the cantilever and the single-span independent girder. The maximum bending moment in the single span is given by the well-known formula—

$$M = \frac{w \times L^2}{8} \dots\dots\dots(11)$$

As the values of all the symbols are common to all the cases under comparison, we have—

$$M = \frac{0.25 \times L^2}{8} = 55 \text{ tons} \dots\dots\dots(12)$$

Thus it will be observed that the maximum bending moment of a cantilever and a single-span horizontal girder under precisely similar conditions of span and loading are as 4 to 1, which manifestly leaves a large balance in favour of the independent girder. The point where the maximum moment occurs in the cantilever is over the central pier, but this point is shifted in the girder to the centre of the span. For the maximum shearing stress on the girder, it takes place similarly to that on the cantilever over the supports, and can be found from—

$$S_1 = \frac{w \times L}{2} = 5.25 \text{ tons} \dots\dots\dots(13)$$

which is just half that which occurs on the cantilever.

Passing on to the third case, or that of a girder continuous over a couple of spans, the value of  $M$  is—

$$M = \frac{w \times L^2}{8} \dots\dots\dots(14)$$

and its numerical value will consequently be—

$$M = \frac{0.25 \times L^2}{8} = 55 \text{ tons} \dots\dots\dots(15)$$

This maximum bending moment is located over the central support, and it should be noticed that it is equal to the same moment at the centre of the single span girder in Equation (11). It is at the same point in the continuous girder that the maximum shearing stress occurs—that is, over the central supports, and its equation is—

$$S_1 = \frac{5 \times w \times L}{4} = 13.125 \text{ tons} \dots\dots\dots(16)$$

It has been already stated that the cantilever as exemplified in the swing-bridge and the continuous girder are really one in principle, and the truth of this assertion is evident on comparing them. In both instances the points where the maximum bending moment and the maximum shearing stress take place are identical, although their absolute values are very different. T. C.

#### THE ART OF WILLIAM MORRIS.

THE opening lecture of the session in connection with the Art Department of the Yorkshire College, Leeds, was delivered on Friday evening by Mr. Frank Suddards, the art master, the subject being, "The Art of William Morris." Mr. W. H. Thorp, F.R.I.B.A., Leeds, presided. Having traced Morris's early history, Mr. Suddards went on to say that in 1852 he matriculated at Exeter College, Oxford;

the late Sir Edward Burne-Jones matriculated at the same college and on the same day. Then it was that the lifelong friendship which had been so fruitful in artistic results was commenced. Morris intended at the outset of his career to devote himself to architecture, but he soon threw up his articles and joined Burne-Jones in London. In 1861, having in the mean time made the acquaintance of many of the leaders in the world of art and literature, he put forth a definite and tangible effort to supply artistic surroundings to our every-day life. In the early days much time was devoted to stained glass, in the designing of which Burne-Jones co-operated. The latter supplied the figures, and Morris the accessories, in the way of ornamental design, and also the arrangement of colour to be adopted. Another important branch he took up was the printing of wall papers, and it was largely through him that that industry was now in such a flourishing condition. Many examples of Morris's designs were thrown on the screen, and also examples of his cretonnes and woven tapestries. These were supplemented by examples of the actual fabrics lent by Morris and Co. Mr. Suddards drew attention to the characteristic points of the design, special reference being made to the beauty of workmanship in many of the woven fabrics. Having spoken of Morris's designs for carpets, and especially of those for entirely hand-made carpets, a branch of work he was particularly interested in, Mr. Suddards went on to refer to the arras tapestries the firm had produced. Sir Edward Burne-Jones co-operated with Morris in the designing of these materials. Several examples were shown, including the "Star of Bethlehem" tapestry and other smaller and less important works. The work of the Kelmscott Press was illustrated by examples thrown on the screen, and by books printed at the press, these latter having been lent by the Science and Art Department. In conclusion, Mr. Suddards said the influence of Morris on the decorative arts of to-day could not be overstated. He certainly did more, much more, than any man of this century to effect the change for good which had come about in the applied arts of this country during the last fifty years. His influence had been enormous; it had spread in every direction, till now almost every branch of industry and every class of life had felt the benefit. Both at home and abroad he was recognised as the most striking figure of modern times as a decorator and as a reformer in the application of art to industry. There were many skilled workers nowadays who could turn out designs in no way inferior to those produced by Morris in his best days; but there were few who did not acknowledge with gratitude the debt they owed to his example and his teachings. His life's work had been an example to hosts of others, and his name would go down to posterity, not as that of a poet only, or a social reformer, but mainly as that of the man who, above all others, had succeeded in bringing art into the service of everyday life.

#### UNPROTECTED COLUMNS.

A SERIES of deductions of much interest to architects, made by the Committee on "Fire-Proofing" Tests, New York, has been published by the British Fire Prevention Committee, of Waterloo-place, Pall Mall,\* relating to the collapse of unprotected ironwork at recent fires. On the committee we find several well-known names of architects, Mr. Edwin O. Sachs, being the chairman. We have often spoken of the need of a committee of experts to undertake experiments, and to publish reliable results on building materials. This committee proposes to fill such a position "to direct attention to the urgent need for increased protection of life and property from fire by the adoption of preventive measures; to publish from time to time records and translations of experiments, and to undertake independent investigations, and lists of materials, methods, and appliances." The value of such a work must be appreciated by all architects, engineers, and others interested in the protection of life and property. Independent research in this direction is small, and except the investigations made on the Continent and in the United States, few are of any permanent value. The systematic tests made at Brooklyn on unprotected iron columns form the subject of the publication before us, and

\* Fire Tests with Unprotected Columns. A Report by the Committee on "Fire-Proofing" Tests, New York.







able in the great rush to the Board's hospitals. Temporary accommodation was provided, but as the public were clamouring for additional hospital accommodation and the managers had the Shooter's Hill site available, he pointed out to the board that by acting promptly it might be possible to get a hospital ready by the autumn of 1894. The board decided to erect the hospital, and Mr. T. W. Aldwinckle was appointed architect. When the plans were submitted to the managers the estimated cost was £220,000, but eventually the estimate was reduced to £194,810, and the plans were adopted. Mr. Brown, ex-chairman of the Brook Hospital Committee, was then called. Questioned as to the £5,000 estimate for making sure the foundations, and the ultimate expenditure of £19,000 upon that work, he said the necessity for improving the foundations was not seen until large areas of ground had been opened. The expenditure on drainage was much larger than had been anticipated, and certain things were ordered without the knowledge of the committee. Mr. Thomas W. Aldwinckle, the architect, gave evidence with reference to the foundations, &c., and said he considered that in all he did he was justified by the general orders of the committee. The hospital was excellently finished, and no money had been wasted. Mr. E. White, chairman of the special committee of inquiry, also gave evidence, and said that Mr. Aldwinckle was in no way answerable for the site. The trouble with the foundations was largely due to the requirements of the Local Government Board. The inquiry was adjourned. Mr. Aldwinckle, the architect, was further questioned on Tuesday with regard to the details. He said that when he reported that the cost of making the foundations secure would be not less than £5,000 he had not the least idea that the ultimate cost would be £19,000, although he was aware, as the work proceeded, that they were spending a good deal more than £5,000, and that it was absolutely necessary to spend more. He questioned whether he received any benefit from the increased expenditure, taking it all round. The inspector said he did not suggest that the witness did the extra work for the sake of what he would get out of it, but at the same time he did reap an advantage, and he could not understand why, for his own protection, he did not report the matter. Mr. E. White, the chairman of the special committee of investigation, said that Mr. Aldwinckle was undoubtedly in error in under-estimating the cost, because when he said the cost would not be less than £5,000 there was £10,000 worth of work to be done. The inspector, after examining the various items, said it appeared to him that upon foundations £5,000 was spent with the knowledge of the managers, and £14,144 without authority. Mr. Aldwinckle said they were working under great pressure, and his reason for not reporting was his desire to save time. He considered that he had the implied authority of the managers to do everything that was necessary in connection with the foundations. It was on the ground of time also that he did not bring to the knowledge of the managers the alteration in the levels. It was correct to say that £959 was spent on this work with the knowledge of the managers, and £2,372 by him without authority. Mr. White, replying to the inspector, said that had they built on the plateau instead of on the sloping ground, as the Local Government Board required, a great deal of the expense would have been spared; but that did not affect the architect, because he knew they were going to build on the sloping ground. With regard to sundry other items, Mr. Aldwinckle said he really did not know whether he ought to have reported them; but, at all events, he did not. He had placed an order for stones with a firm of his own selection, but they were obtained at a reduced price. Mr. White said they cost £663 more than Mr. Aldwinckle originally advised the committee. The painting, which was not included in the original contract, cost £1,000; but Mr. Aldwinckle said the work was so obviously necessary that he did not report it. Mr. Monson, one of the managers, drew the inspector's attention to the plans, which he said had not been prepared in accordance with instructions for a hospital on Shooter's Hill, but on the flat, and he characterised the whole of the circumstances in connection with Brook Hospital as disgraceful. Mr. Aldwinckle denied the accuracy of the statements, and Mr. Duncombe Mann, the clerk to the board, contended that the plans, which spoke for themselves, showed that Mr. Monson's "reckless allegations" had not been

proved. The inquiry was further adjourned. The examination of Mr. Aldwinckle was continued on Wednesday, the closing day of the inquiry. He produced a further list of "extras," including one item of £363 for fire insurance. This he said was an item in excess because the work was stopped on account of the severity of the weather, and two instalments of insurance had to be paid instead of one. The inspector said he could not understand how it was that the sum was paid to the contractors without the board knowing what it was for. Mr. Mann, clerk to the board, said that the managers were bound to pay the amounts certified by the architect. The inspector replied that it was the duty of the board to inquire of the architect what the sums were for. No one could justify a public body placing the expenditure of public money in the hands of one individual. There was a duty resting with the board to see what the certificates were granted for. Mr. Mann said that would imply suspicion of the architect. The inspector replied that all public bodies should have suspicion: they should not accept anybody's statement without proof. Mr. Monson, one of the managers, said the inspector had raised one of the most important questions in connection with the proceedings of the board. Neither on the Finance nor on the Works Committee could he get any details of the accounts. Mr. Brown, who was chairman of the Brook Hospital Committee at the time of the construction of the building, stated that certain small items were authorised by himself, in company with other members of the committee, when going over the building, and he was ready to accept full responsibility for everything he did. Mr. E. White, chairman of the special committee of investigation, said the whole of the extras, with trifling exceptions, would have been included in the specifications if the board had not built the hospital so hurriedly. The board should be protected by a clause in the contracts to the effect that no extras would be paid for unless countersigned by the clerk. The architect should not have the power of spending the money of the ratepayers without the sanction of those who represented them. In this case the architect very nearly had *carte blanche*. With regard to the £19,000 expenditure upon the foundations, it had to be remembered that enormous quantities of concrete were used, and some of the blocks were 30ft. by 20ft. The hospital as completed was, however, a first-class one. Mr. Brown also addressed the inspector, alluding especially to the difficulties of the site, and to the fact that the whole scheme for the hospital was prepared in three weeks. He added that the ultimate amount paid was in excess of the various contracts by about £50,000. He thought it fair to the architect to say that very few things which he ordered could be called unnecessary. The inquiry was concluded, and the inspector said he would make his report to the Local Government Board.

## THE ARCHITECTURAL ASSOCIATION.

### DISCUSSION SECTION.

THE first meeting of the session was held at 56, Great Marlborough-street, on the 14th inst., Mr. H. J. Leaning, chairman of the section, in the chair.

In opening the business of the session, the CHAIRMAN remarked upon the continued increasing success of the section, and upon the interesting set of papers which were to be read during the session.

Mr. C. E. MALLOWS then read a paper entitled "Church Restoration." The term "restoration" was a misnomer, for no architect, however great and well versed in the old work, could restore it, or follow the individuality of the original artist. The misnamed practice had been the cause of the destruction of a great number of our old and most cherished art treasures, and of all the historical associations which were attached to them. It was frequently unavoidable, even when the restorer was acting with the best intentions for the preservation of all that was of interest in an old building, to prevent the sweeping away of the associations which had gathered around it. Our old churches are the best textbooks for the young architect. St. Alban's Abbey was a notorious example of the work of the vandalistic restorer, although, perhaps, in this case it was a rebuilding rather than a restoration. While our friends the painters would, no doubt, prefer to allow the old churches to wear themselves away to picturesque ruins, yet a

middle course should be adopted between that extreme and practically rebuilding. Every care should be taken to preserve the old work wherever possible, and only such repairs as may be absolutely necessary should be executed. The roof should be repaired in sections, piecing in new work where required; an old thick wall, because it may be a few inches out of the perpendicular, should not be condemned; and where an old wall may seem to require rebuilding, it may frequently be dealt with from the back, so that the facework need not be disturbed. Where it is necessary to disturb old floors, grave-stones, and tiling, for the purpose of laying a concrete bed under them, they should be taken up one by one and carefully arranged and laid side by side as they were in the floor, while the concrete is being put in. Where the earth outside is above the floor level, it should be cut back to a slope, and a trench formed at the bottom, sunk low enough to keep the walls dry, and the whole should be well drained. Wherever new work is required it should be of an unobtrusive character. The author suggested the appointment of a National Committee for the Preservation of Historical Buildings, the members to be chosen from amongst the best and most conservative artists in the country. The committee should be endowed with powers, absolute and without appeal, to give or withhold sanction for alterations and repairs. Architects, on their part, should report all instances of restorations which they may observe to the Society for the Preservation of Ancient Buildings.

The CHAIRMAN, before inviting Mr. Millard to open the discussion, expressed the regret of Mr. Joseph Pennell that he was not able to be present at the meeting, as announced.

Mr. MILLARD said he did not think so great an objection should be taken to the term "restoration." The men of old did not hesitate to alter an old building when it was necessary; these alterations made the history. The anti-restoration craze was a product of this century. The right of altering an old building belonged to its owner. The question was not whether we should alter, but how should we alter. With regard to Mr. Mallows' suggestion for the formation of a national committee, he instanced that in France restoration work is carried out under a Government committee, and the results are execrable.

Mr. SELBY proposed a vote of thanks, which was seconded by Mr. LANCHESTER, to Mr. Mallows for his paper.

Mr. H. V. C. SMITH concurred with Mr. Millard in considering the question from a commonsense point of view. Many old churches owe their beauty only to accidental circumstances and the additions made in various periods.

Mr. JEMMETT thought that the sentimental aspect received more consideration than the utilitarian. He would be inclined to try and reproduce the idea of the original designer in its completeness, pulling down all work which did not belong to his first scheme.

The discussion was continued by Messrs. W. B. HOPKINS, G. LUCAS, A. S. TAYLER, and H. ROSE.

In summing up the discussion, the CHAIRMAN said he agreed with Mr. Jemmett to a certain extent, and remarked that copying the old work must of necessity be resorted to in some cases, but a new addition should be treated in a modern spirit.

A vote of thanks was then passed to Mr. Mallows, after which he briefly replied.

The CHAIRMAN announced that the next meeting would be held on Nov. 4, when a debate would be opened by Messrs. Elgood, Jemmett, and Lancheester, on "Modern Architectural Tendencies as Illustrated by Contemporary Work."

## BURNE-JONES'S WORK AS A PAINTER.

THE painting of Sir Edward Burne-Jones formed the subject of the inaugural address by Professor Gerald Baldwin Brown to the Fine Art Class at Edinburgh University on Tuesday. After touching on the public recognition at home and abroad of the merit of Sir Edward Burne-Jones's painting, and on the relations between him and the Royal Academy, the lecturer noticed the connection of his art with that of the Pre-Raphaelites, of whose school he was an offshoot. Pre-Raphaelitism was only one phase of a larger movement that presented a reaction in favour of Mediaevalism and Romance against the Classical forms that had dominated literature and art since



the Renaissance. The Romantic revolt manifested itself in various forms in different countries, and one of its forms in England was that of the Gothic revival, based on the ideas that the Mediæval styles of architecture were at once specially religious and specially sincere and truthful. Pre-Raphaelitism was a sort of later Gothic Revival in the domain of painting. It showed its feeling for sincerity in carefully studying from nature while it was at the same time strongly tinged with Mediæval sentiment. Hence there was this paradox about the Pre-Raphaelites—that some of them aimed at realism, in accordance with the formula laid down by Mr. Ruskin, while others were altogether poetic and ideal in their work. Pre-Raphaelitism influenced Burne-Jones through the most Mediæval and poetic member of the brotherhood—Rossetti. Some of the more prominent characteristics of his work, were, first, its literary character, inevitable in the case of one brought up and schooled in art as he had been; next, its conventionalism. This conventionalism was of a worthy kind, and resulted from his deliberate adoption of certain types and methods that he made his own. These were not his own invention, for they had been borrowed partly from Rossetti and partly from early Italian masters, like Botticelli and Mantegna. His work, however, possessed style, because he had so thoroughly assimilated these forms and made them part of his own artistic personality. A dispassionate estimate of the artistic value of his work was difficult, owing to the extravagant way in which he had been praised and blamed. The blame often did not take account of the real purpose of his art, which was decorative rather than dramatic. In praising him his admirers sometimes used expressions that should be kept for the supreme masters of the painter's craft. Phrases such as "play and magic of colour," or "the touch that makes every square inch of canvas thrill with life," did not truly apply to his work in its technical aspects. His painting as painting was flat and spiritless, and in the style of the tempera painters of Florence, and his line was continuous and laboured, not suggestive and vibrant with life like the line of master-draughtsmen of our own or other epochs. Moreover, in his own particular métier, the decorative treatment of the human figure, he was surpassed in many respects by the late Albert Moore. Burne-Jones was undoubtedly the larger man of the two; but for spontaneity and charm and subtle observation of varied beauties of form and drapery the lovely decorative figures of Albert Moore easily bore away the palm. The points of greatness about Burne-Jones's work were its seriousness, its beauty, its idealism, its finish, and these qualities would secure for it a never-dying fame. The art of Britain would always owe a debt to the artist who embodied ideas so pure and lofty in an outward form so seemly. He was content throughout a long artistic career to follow out with the most loving care his own personal ideas of beauty—and of no artist in the world could anything better than this be said.

#### A NEW IDEA ON BUILDING CONSTRUCTION.

THERE is nothing on the earth, nor in the waters that are under the earth, that cannot be resolved into its elements, provided the disintegrating reagents are sufficiently potent. By the aid of the electric furnace, solid paving-stones can be converted into a liquid mass, and caused to flow in a smooth and plastic current similar to that of molten lead. To speak, then, of incombustible substances and materials *per se* is little better than nonsense, for there is no such substance nor material. It is fortunate, however, for the inhabitants of this terrestrial globe, that the ordinary disintegrating forces at work in the form of fires and conflagrations are not sufficiently powerful to consume or burn up all materials. Neither timber nor stone will ever be altogether banished from the sphere of construction, in a limited sense, but iron and steel have virtually ousted them from any employment upon a scale of magnitude. Timber consumes and stone pulverises under the action of a temperature which, in the sense of either consumption or pulverisation, has little or no effect upon the two metals alluded to. But although the temperature may not be strong enough to burn the parts of a structure composed of iron or steel, it may possess an intensity quite

capable of causing them to deflect, to become distorted, to be twisted and bent out of all shape, so as to render them useless for the purpose for which they were erected, and to be practically *hors de combat*. It may be conceded, therefore, that as an absolute fact all the metallic parts of a constructive framework must be protected by some means or another from the action of even a tolerably fierce fire if the design is to be regarded as one of a permanent description.

It must nevertheless be acknowledged that although stone is not adapted for the gigantic examples of bridges and other engineering and



FIG. 1.

architectural structures which have now ceased to astonish the world, yet it has fairly well held its own for bridges of limited span. In London, the new bridge at Putney is a very good specimen of modern stonework, and it has the merit of being real and genuine. This is not the case with the piers of the Tower Bridge, which are externally mere shams. The piers are constructed of steel columns and framing, strongly braced together in three or four different planes, and the only reason of spending many thousand pounds upon casing them in stone was to make, or pretend to make, the whole structure look more like the Tower, an edifice whose every stone is cemented with the blood of the tortured prisoners and victims who perished within its cruel walls. It is very often forgotten, in instituting a comparison between stone and steel bridges, that examples of the latter are far more modern than their rivals. The first iron bridge—that at Coalbrookdale—is not a hundred years old yet, and it has been so frequently patched and repaired that it is, perhaps, very much in the condition of the schoolboy's pocket-knife. On the other hand, the patrons and partisans of the stone type can point to numerous instances where the inevitable *tempus edax rerum* has made little or no impression on them for upwards of eight or nine centuries. It might be asked what will become of our steel bridges and other structures in only half that period of time?

There are evidently two methods by which the metallic parts of buildings may defy with a very considerable amount of impunity the ravages of the devouring element, as it is frequently and very justly termed. One is to incase it in brick



FIG. 2.

or stonework, as, for instance, in the case of the piers of the Tower Bridge, although, as already stated, incombustibility was not the object sought to be accomplished by the erection of that superfluous petrean environment. The second method, and one that is coming rapidly to the fore, is that of effecting such an intimate union between iron and steel, and cement or concrete, as, while insuring the strength of the structure by the use of the former, the preservation of the metal from the action of fire is obtained by the employment of the latter. There are various modes of carrying out this intimate combination of the two materials; but at present we are concerned with one only, for it serves to illustrate the title of our present article. It is that of the well-known expanded metal, which has one very pronounced advantage over many of the ordinary sections of iron and steel, which consists in the circumstance that, by reason of its pliability, it can be adapted to any form of construction, whether it be the framework of a building, the partitions, flooring, ceilings, or external walls.

Our illustration represent a sketch, front and end elevation, of a factory recently erected near the town of Silistria, which is built as nearly as possible entirely of sections of iron necessary for the framework of the structure, and of concrete and expanded metal in the remaining parts of the building, in the manner to be described. In

theory, a good deal more has been claimed for this novel type of building construction than what it has actually achieved in practice. For instance, it will be seen on referring to our illustration that the whole design is but one story in height, and, so far as we know, the system has not yet attained to the dignity of a two-storied structure. To return, however, to the constructive details of the factory. The framework of the building, including that of the external walls, consists of angle, tee, and in some instances of channel steel, all solidly and firmly bolted together, and further strengthened by vertical and diagonal bracing. Over the whole surface of this framework are overlaid plates or sheets of expanded metal, and the whole metallic component parts are imbedded in a mass of Portland cement concrete, with an average thickness of about three-eighths of an inch, as the depth of the external coating. The roof covering and the flooring are constructed of the necessary steel rafters and rolled joists, and a layer of concrete 6in. thick, fortified by strong sheets of expanded metal interwoven with it and thoroughly incorporated with it.

It should be kept in view that in adopting this new style of construction there must be a difference made between the duties to be performed by the different parts of the building. The roof and the side walls and partitions have but comparatively light weight, and what is of far greater importance, but slight shocks to withstand, whereas it is far otherwise with the flooring. Not only are the weights on the latter quite as heavy, and frequently heavier, than what obtains under ordinary conditions, but there is often in large foreign factories a very appreciable absence of gantries, cranes, shear-legs, and other machinery and mechanical appliances, which render the transport of heavy loads easy, safe, and void of all shock and impact. If the internal walls and partitions are made too thin, they are liable to be damaged and knocked about, by the shifting here and there of heavy bales of goods and merchandise, including machinery, rails, and other weighty objects. If the use of the expanded metal principle is to extend to the construction of buildings of two and more stories, as it probably will, then it will be necessary to adjust the thickness of the sheets to the work required of them—a matter we presume of no difficulty whatever. T. C.

#### NOTES FROM EDINBURGH.

BUILDING operations continue to be carried on with increasing volume and undiminished prospects, and at a recent Dean of Guild Court the number of petitions exceeded the number on record for any preceding period. The demolition of two large sections of North Bridge-street, at south-east and north-west extremities, gives a forcible impression of the magnitude of the works contemplated before the street can be reconstructed. The contract for taking down the remaining portion of the N. B. R. property in Prince's-street is being carried out. The shops in the ground floor of the hotel are already occupied, and appear to be well lighted both in front and back. The external walls of the first floor are not yet making much progress, the work of building the internal brickwork being of such magnitude. The offices connected with the passenger traffic of the Waverley Station form an extensive range, extending beyond the east side of the bridge, and are designed with a great amount of elaborate Classical detail, in keeping with the ornate character of the hotel. The same ornamental design has been adopted even for the boundary walls, which are arched on the surface, with the usual accessory details. The arrangement of the platforms has been completed, and a new ticket-office erected in oak for the West and Northern trains; but the glazing of the roof has been in abeyance for a considerable time, to allow of the construction of the foot-passenger bridges.

The offices of the Standard Insurance, now erecting at the east end of George-street and St. Andrew-square, have an extensive frontage to the former, and will thus make a very noticeable addition to the street. The building has made rapid progress, and the section now being carried on has reached the cornice level. The architectural character is that of the old Palladian Classic, with the central portion emphasised with four lofty and massive Corinthian or Composite pillars surmounting the projection on the ground floor. When the remaining wing has been completed, it will no doubt be one of the most imposing of the reconstructions which have given dignity to



this thoroughfare, with exception of the Commercial Bank, which, however, is entirely different in character, being a sample of Grecian Doric of grander proportions, with its pillars and pediment.

The Equitable Assurance offices at the north-east corner of St. Andrew's-square are now all but completed in the masonry, and make a pleasing variety with their Elizabethan gables, &c. The frontage to St. Andrew street extends from the square to the lane behind the National Portrait Gallery, and the steep gradient of the street has called for the exercise of some ingenuity in making the different levels secure the unity of the design as a whole—which appear to have been successfully accomplished. In any case—in forming the whole of one side of North St. Andrew-street, it forms a very ornate addition to the street architecture of the city. The gabled roofing is confined to the tenements in the square, and the St. Andrew-street elevations show a level balustrade above the cornice. This member forms a striking characteristic, and has its corona decorated with semicircular incised sculpture over the spaces between the bracket modillions, giving it something of the appearance of a corbelled course of masonry, &c.

The Royal Insurance new building in George-street has not made progress sufficiently to show the details of its architectural design, which has to contend with the difficulties of a very narrow frontage to the street.

The work of reconstructing and extending the city tramways has turned out a much more serious undertaking than was anticipated, and the prospect of entire completion is still distant. An additional power-station is required, and the one at Stockbridge has to be enlarged. The station at Tollcross is nearly completed, and is of great extent, built in brick with red freestone frontage to the street, designed with considerable ornamental detail of somewhat nondescript character.

The Candlemakers' Row, the steep, narrow thoroughfare leading down from the south end of George IV. Bridge to the Grass Market, has been undergoing improvements at the hands of the city authorities. Old tenements adjoining the Greyfriars' churchyard wall have been removed, and their place taken by a new retaining-wall, which widens the thoroughfare considerably where it was most required. This retaining-wall is not only a most substantial piece of work, but much more ornamental in its detail than usually found in works of this character. The wall is built throughout with dressed masonry, and with its massive cope and moulded corbelling below and numerous offsets, is worthy of a better site. A branch of the free library is to be built for the Northern District at Stockbridge. The site is a narrow piece of ground, with acute angle at the west extremity, where a clock or other turret elevation gives dignity to the whole, which is to be in one floor throughout.

The new Chair of Hygiene, of the Usher-Bruce foundation, is to have its own premises, and these will be another added to the long list of public edifices which of late have done so much for the adornment of the city. Such a chair is greatly needed, and, in order to make the best possible provision for the varied requirements for an effective treatment of this branch of scientific culture and practical experimental study, the architect, Mr. T. Leadbetter, has for some months been engaged in making acquaintance with the Continental methods of providing for this department of instruction. The site for the Usher Hall has been fixed upon, to all appearance, with general approval of the public, if the absence from the public papers of the usual correspondence occasioned by previous decisions of the council is any indication of the state of public opinions. The site selected is the central portion of Athol-crescent. This decision was not quite unanimously given at the general meeting of the council; but the site seems to have been very carefully chosen, as, upon the whole, the best of the road practically available. The decision was made, after revised valuation, of the five sites under review. Of these it was represented as the least expensive (about £60,000). It would be easy to make objections to this site as having railway sidings at the back and a noisy thoroughfare in front; but nothing is really to be said further on the matter at the present stage. Mr. Waterhouse was requested to give his opinion as to the architectural advantages of the several sites proposed, but dismissed them all as far behind the Meadows and St. Andrew-square in respect

of architectural ornamental accessions to the city, and retired position in respect of noisy traffic, with unexceptionable access. In his opinion the site at the west end of the Meadows fulfils all the conditions possibly required for such a building. The popular opinion is strong against any encroachment on the free spaces in the heart of the city; but the portion required for the hall, as Mr. Waterhouse suggested, is infinitesimal, and does not at all destroy the present outline of the open space as a whole.

#### COST OF GOOD ROADS AND LOSS FROM BAD ROADS.

IN a paper read before the Engineers' Club of Philadelphia recently, General Roy Stone, Director of the Office of Road Inquiry in the United States Department of Agriculture, discussed "Various Phases of the Road Question." From data obtained from over ten thousand letters of inquiry sent out from his office, General Stone deduced certain figures, referring to the average length of haul from the farms to market or shipping points, the average weight of load hauled and the average cost per ton for the whole length of the haul. The figures, tabulated, are as follows:—

Group of States.	Average Haul Miles.	Average Weight Pounds.	Average Cost	Average Cost	Total
			per 2,000 lbs. Mile.	per Ton Whole Length of Haul	Average Cost per Ton
			Dols.	Dols.	
Eastern .....	5.9	2,216	0.32	1.89	
Northern .....	6.9	—	.27	1.86	
Middle .....	8.8	—	.31	*2.72	
Cotton .....	12.6	1,397	.25	3.05	
Prairie .....	8.8	2,409	.22	1.94	
Pac. Coast. and Mtn. ....	28.3	2,197	.22	5.12	
Whole United States .....	12.3	2,002	.25	3.02	

\* Middle Southern States.

Assuming the correctness of the data, and using the census return of farm products and forest and mineral outputs, and estimating incidental traffic, General Stone arrives at a total of 313,349,227 tons as representing the total annual movement over country roads. At the average cost, 3.02dol. (say 15s. 6d.) per ton, the grand annual cost of haulage on public roads amounts to 946,414,665dol., or about £190,000,000 sterling. Not including the loss of perishable products for want of access to market when prices are good, and the uselessness of cultivating certain products which depend upon the markets being always accessible, statistics of the cost of operating foreign highways, and the data obtained from the use of the few good roads existing in the United States, would indicate that nearly two-thirds of the above cost is directly chargeable to bad roads. The enforced idleness of men and horses during a large part of the year is another item which should be charged largely to bad roads. The negative or hostile attitude of the rural population toward all effective legislation in this direction is an obstacle also to road improvements in this country, while another is the general overestimate of the cost of such improvement.

A few years ago the macadam roads of New Jersey cost 10,000dol. per mile; now equally good roads are being built for 3,000dol., even where railway transportation of material is required; and in localities better supplied with road material, and where a narrower road is deemed sufficient, 1,500dol. or even less, will make a mile of good stone road. Experience has demonstrated the fact that in most country districts in the States a single stone road, 8ft. or 10ft. wide, with a good earth road on one or both sides, is more generally satisfactory than a wider road of macadam.

The discussion which followed brought up the question of steel for highway construction, and in answer to questions, General Stone said the road proposed by the Department of Agriculture was to be made of longitudinal stringers, with about 8in. of level surface, with a 3in. flange to hold the ballast and a 3in. by 3in. head on the inside of the stringer to assist wheels in keeping on the track. These stringers would rest on broken stone or gravel in a trench provided, and be tied together at intervals by rods. About 100 tons of steel per mile of single track would be required, and he estimated the cost at about 3,500dols. per mile, at present prices for material. As yet the demand has not been sufficient to

warrant the expense of preparing rolls for these special rails, or stringers. But experiments on short lengths had been made with the lightest kind of channel iron, and with plates and angles, and the results had been very satisfactory in the decreased tractive power required and in the ability to resist wear and displacement.

#### CHIPS.

The Annual Dinner of the Royal Institute of British Architects will be held this year in connection with the Birmingham Architectural Association on Friday, December 9, at the Grand Hotel, Birmingham. The President will hold a reception at the rooms of the Society of Artists from 5 to 6 p.m., to be followed by a short business meeting.

The permanent collection, Manchester Corporation Art Gallery, has just been increased by four works—one a gift, "The Chariot Race," by Professor Wagner; and three purchased from the autumn exhibition—"Llyn Dilyn," by Mr. H. Clarence Whaite; "June," by Mr. H. Anderson Hague; and "Corn Ricks," by Mr. A. D. Pepper-corn.

The London County Council has decided to let to Mr. Charles O'Malley a piece of land acquired in connection with the Tower Bridge southern approach improvement. A theatre is to be erected on the site, and a ground rent of £375 per annum is to be charged. The site has frontages to Bermondsey New-road, and to the new road to be formed from the Tower Bridge.

To the Convent of Mercy, built in 1868 in Crispin-street, E., a new wing three stories in height and a chapel have just been added, and were blessed last week. The architect is Mr. W. P. Ryan, and the chapel is 50ft. by 20ft., and contains three altars.

The Cromer Protection Commissioners have received a report from Messrs. W. T. Douglass and H. T. Arnott, of Victoria-street, S.W., their engineers, recommending various protection works and a promenade pier. The latter is proposed to be 500ft., and 40ft. wide, and the former include a sea-wall to extend from the present termination of the western esplanade to the Station-road, the underpinning of the western esplanade wall, the construction of a sea wall between the western end of the new East Parade and the Bath Hotel steps, and the extension of the East Parade. The recommendations were adopted, and it was decided to seek Parliamentary powers next session to carry out the works under the direction of Messrs. Douglass and Arnott.

In consequence of pressure from the West Riding Rivers Board, the councils of the districts of Luddensfoot, Midgley, and Warley agreed to form a joint sewage scheme, and at a special meeting of the Warley Council Mr. G. B. Waugh explained the plans and estimates, which had been prepared by Mr. J. Waugh, C.E., of Bradford. The plans were approved, and it was decided that application be made to the Local Government Board for £12,700 to carry out the works.

The stones which formed the central portion of the old Netherbow Port of the city of Edinburgh have lately been brought to light. One of these stones is of especial interest, because upon it was placed the head of the famous Marquis of Montrose after his execution. This portion of the Netherbow Port was erected for the Provost and Bailies in 1606 by John Mylne, Master Mason to the King of Scotland, as shown by the city treasurer's accounts.

Messrs. Wathen, Gardiner, and Co.'s new factory at Staple Hill, Bristol, is now approaching completion. It covers just an acre of ground, the main building measuring 210ft. by 150ft. The area is lighted from the roof, some 10,000ft. of patent glazing being used in the sky-lights, which are of steel bars, glazed with plate-glass. All the rooms are entered from the central corridor in a line with the main entrance. The elevations are of Pennant stone with face-brick dressings and moulded brick cornices. The whole building is heated with hot water. The work has been carried out by Messrs. Cowlin and Son. Messrs. La Trobe and Weston, of Bristol, are the architects.

In connection with the harvest festival services recently held at the parish church at Felixkirk, near Thirsk, three new bells and a new clock were dedicated by the Venerable Archdeacon of Cleveland. The bells had been cast by Messrs. Mallaby, of Masham, and the clock made by Messrs. Potts, of Leeds.

The value of the estate of Dr. John Hopkinson, F.R.S., of "Holmwood," Wimbledon, and 26, Victoria-street, Westminster, electrical engineer, who was killed in the Alps on August 27, has been sworn at £74,672.

A large clock has just been erected in the parish church at Owslebury, near Winchester, by John Smith and Sons, Midland Clock Works, Derby. It is fitted with all the latest improvements.



## BOOKS RECEIVED.

THE fourteenth handbook issued in *Bell's Cathedral Series*, on which we have frequently commented during the past eighteen months, deals with the Cathedral Church of *Southwell*, and is written by the Rev. ARTHUR DIMOCK, M.A., the son of a former minor canon of the minster, the Rev. J. F. Dimock, who published in 1853, a folio on the architecture of the building. The author traces the rise and progress of the secular college of Southwell and of the minster church, which since 1884 has been the cathedral of a new diocese for Nottingham and Derbyshire, and gives particulars of the various Archbishops of York who made this central and quiet village their residence, and some of whom, like Walter de Gray and John Romanus, carried out works of building at the minster. Southwell, Mr. Dimock shows, occupies a place among our smaller cathedrals, being smaller than Norwich and Exeter, and but little larger than Rochester. The builders were fortunate in their choice of materials, which were derived from Mansfield, some 12 miles away; that used by the Normans is of a dark yellowish hue, while their Early English and Decorated successors used some of a lighter tone with blue veins, but both have alike well stood the test of time. Among the 12th-century features, the massive nave, charming north porch, with its paradise above—almost unique, for the only other example is that at Bredon—and well-proportioned west front may be mentioned, and the choir is a rich example of 13th-century work, with some Early Decorated additions. The author adversely criticises the wooden spires added to the west front by Mr. Ewan Christian in 1880, expressing also a doubt whether they correctly reproduce those removed in the 18th century. The octagonal chapter-house, built at the close of the 13th century, is one of the most perfect works of its period, and is filled with a variety, wealth, and luxuriance of naturalistic carved foliage unequalled anywhere else. A closing chapter is devoted to the Palace, now in ruins, and to Wolsey, who never set foot in Southwell, or, indeed, in his diocese, until after his fall. The handbook is written in interesting style, and is illustrated with 33 process-blocks, chiefly taken from recent photographs.—*Aerial, or Wire-Rope Tramways*, by A. J. WALLIS-TAYLER, C.E., Assoc. Mem. Inst. C.E. (London: Crosby Lockwood and Son). The use and application of wire tramways to various works, such as quarries, fuel and gas works, saw-mills, jetties, fortifications, brickfields, &c., are admitted. There is little doubt that the system for transport of materials and men can be applied with advantage and economy in many manufactories, and its use for passenger traffic where the gradients are too heavy for ordinary tramways must also be acknowledged. Mr. Wallis-Taylor's treatise on the construction and working of these tramways will be found of value. He describes and illustrates various systems of aerial or wire-rope tramways, the running or endless rope system, the fixed wire ropeway. The details of construction give the construction of standards, wire ropes for running rope, carrier boxes, carrier trucks, friction grips or couplings, locking grips for steep gradients, motive power, electrically-driven wire-rope tramways, examples of installations on both systems, and other points. Owners of quarries and factories, engineers and promoters of engineering works, harbour works, jetties, &c., will find this treatise worth reading.

The Board of Trade have recently confirmed an order authorising the construction of a light railway in the peninsula of Gower, in the county of Glamorgan.

St. John's parish church, Chapeltown, Sheffield, is about to be enlarged by the addition of an aisle and the extension of the chancel. Mr. Richard Marsden, of Houseley, Chapeltown, has taken the contract at about £2,000.

For two or three years past a series of experiments has been made in East Kent with the object of ascertaining the water-producing powers of the great chalk areas. From observations made, it is estimated that at least one hundred million gallons of water is daily poured into the sea from the base of the cliffs in the St. Augustine's division of East Kent alone. Notwithstanding the drought, the tests made during the last week at the base of the cliffs between Dover and St. Margaret's show no diminution in the supply of spring water which is escaping into the sea. These outflows of water from the chalk strata occur all along the sea-board from Dover to the Medway.

## OBITUARY.

THE death is announced, at Ottawa, on September 28, of Mr. THOMAS FULLER, late chief architect of the Department of Public Works, at the age of 76 years. Mr. Fuller was born in Bath, and went to Canada in 1857. Two years later in the competition for the Parliament and Departmental Buildings at Ottawa his design for the Parliament Building was adopted, and carried out, and he was awarded second premium for his designs of the Departmental Buildings, which included a residence for the Governor-General. In 1867 he was the successful competitor for a design for the new Capitol Building for the State of New York, at Albany. In 1881 he was appointed chief architect of the Public Works Department, under the Canadian Government, a position he held until about a year ago, when he was superannuated, but retained an advisory position in the department. Mr. Fuller was well known throughout the whole of Canada, and designed the greater part of all the public buildings erected in the last 15 years.

WE regret to hear that Mr. EDWARD GLEESON WHITE, the well-known writer on art and its applications, died on Wednesday, at his residence, 10, Theresa-terrace, Ravenscourt Park, from the effects of typhoid contracted recently in Italy. He was the first editor of the *Studio*, and has been editing *Bell's Cathedral Series*, now in course of publication. Mr. White was associated with the Arts and Crafts series of textbooks issued by the same publishers. He was the owner, too, of a great collection of poster designs.

THE death occurred on Friday, at the early age of thirty-eight, of Mr. JAMES YOUNG, of the well-known firm of James Young and Sons, railway and public work contractors, Edinburgh. Three weeks ago, while out shooting, Mr. Young got chilled, but treated the matter too lightly, and went to Glasgow on business; on his return he took to his bed, and died from pleurisy and pericarditis, at his house, 12, Polwarth-terrace. The deceased, who was born at Shotts in March, 1860, was educated at the Glasgow High School, and joined his father and his elder brother Robert in the business of contractors. His father, who had started the firm fifty years ago, died in 1886. Since then the business, under the management of the two brothers, has become one of the largest in Scotland. The firm has in its employment at present in various parts of Scotland on different railway and public works contracts over 3,000 men. The Messrs. Young have for a number of years past done all the principal work in connection with the various undertakings of the Edinburgh and District Water Trustees, and at present they are engaged in the construction of the Talla Reservoir. Of this great enterprise Mr. James Young took the principal charge, and on his initiative the club for the working-men engaged on the works was formed. The firm has also carried through many important works for the North British Railway Company, including a large contract for the Waverley Station; they have four heavy contracts on hand in Lanarkshire and Ayrshire for the Caledonian Railway; they are the contractors for the Leith Central Railway, and they were the builders of the business premises of Charles Jenner and Co., in Princes-street, Edinburgh. In the management of all these undertakings Mr. James Young was closely identified. He was a man of great ability, force of character, energy, and business capacity, though he laboured under the disadvantage of being very deaf—a calamity which overtook him when a mere boy. He also lost in an accident at Stirling Bridge in 1883 one of his eyes. He was a director of Hailes Quarries, of the Terracotta Fire Brick Company, Omoa, and chairman of John L. Kerr (Limited), carting contractors, Leith, and of the Dumfries Freestone Quarries Company. He leaves a widow and family.

The Lords Commissioners of the Admiralty have accepted the tender of Messrs. A. R. Lethbridge and Son, of Tracy Building Yard, Plymouth, for the erection of a new steam laundry and additions to the existing building at the Royal Naval Hospital, Stonehouse. The amount is about £4,200, and eight months is the time allowed in which to complete the work.

The Gellatly memorial organ in Free St. Cuthbert's Church, Edinburgh, has just been opened. It was built by Mr. Herbert King, of that city, and is contained in a case of oak designed by Mr. John C. Hay, architect, Edinburgh, and constructed by Messrs. T. Murdoch and Son.

## Engineering Notes.

BIRMINGHAM.—The members of the city council visited the Saltley Gasworks on Wednesday week to inspect the important extension which is now being effected. The additional works consist of the construction of a new tank and gas-holder, the enlargement of one of the gas-holders previously existing, the extension of the carbonising and condensing plant, and the building of another retort house. The straightening of the River Rea where it intersects the gas committee's ground and works for confining that stream within due limits are also in progress. The members were received by Mr. Henry Hack, the engineer, who gave an explanation of the main features of the extension, with the aid of plans and pictorial illustrations. When the extension is completed the storage will be raised from 8½ millions to 18½ millions. The new gas-holder will be the largest in the world with one exception. A huge circular excavation, of 264ft. in diameter, hollowed out round its extremity to a depth of 50ft., with a concrete floor rising in dumping shape towards a massive stack of masonry in the centre, forms the tank. To the centre heavy beams radiate like the ribs of an umbrella, forming the crown. Above this will rise four lifts, varying in depth between 41ft. and 42ft. The cost of the tank and holder will be about £72,000, or £8 14s. 6d. per 1,000c.ft. capacity. It is hoped that they will be ready for use by next winter. The addition which is being made to the adjacent holder will nearly double its capacity, this result being obtained by increasing the lifts from two to four; the engineer expects to have it completed in about two months. The cost of the original tank and holder came to £18 3s. 6d. per thousand for two million cubic feet, whereas the two extra lifts by which the capacity will be doubled involve an expenditure of only £7 15s. per thousand.

## CHIPS.

The service reservoir which has been constructed for the Leeds Corporation at Harehills having been completed, the chairman of the waterworks committee opened the valves on Friday, and the reservoir is now being filled with water. The work of construction has been carried out from plans by, and under the supervision of, Mr. Thomas, the city and waterworks engineer.

A meeting of prominent citizens was held at the Guildhall, Norwich, on Friday, to give effect to the wish that the city should possess a portrait of the late Mr. J. J. Colman. It was decided that a portrait in oils should be hung in St. Andrew's Hall, which already contains a collection of local portraits of great value and interest.

The Crewe Town Council have put their seal upon a contract for the purchase of three acres and two rods of land in Edleston-road, near the centre of the borough, for an electric-light station. The land costs £1,200. Sanction has been asked to borrow £26,000 for the electric lighting of the town. The gas undertaking belongs to the London and North-Western Railway Company.

The foundation-stone of the new church of St. Stephen, Bexhill, was laid on Saturday by the Misses Walker, daughters of the donor, who is devoting £10,000 towards the building and endowment of the edifice. The Bishop of Chichester announced that, now the western end of the town would possess a church, Earl Dalawarr had decided to provide one for the eastern portion.

Mr. Meade King, M.Inst.C.E., on behalf of the Local Government Board, held an inquiry at Bangor on the 13th inst. touching an application by the town council for authority to borrow £13,500 for electric light purposes, and £650 for the purchase of land.

The sanction of the Local Government Board has been granted to the loan of £4,000 to the Ipswich Corporation for an overflow sewer to be constructed from Hyde Park Corner to Constantine-road, and for exterior of sewers in Belstead-road and Branford-road, in accordance with plans prepared by Mr. E. Buckham, the borough surveyor.

The death is announced, in his 77th year, of Mr. Levi Newcomb, who once practised as an architect in Boston, Mass., but who in recent years had devoted himself to mining ventures. In addition to the usual run of dwelling-house and commercial work, Mr. Newcomb built dormitories for Tufts College and Dartmouth College, the First Universalist Church and the Causeway-street Street Station of the Boston and Lowell Railroad in Boston. Earlier in his career he was actively employed in northern New England.



## Building Intelligence.

**BELFAST.**—The Congregational church in Clifton Park, built in 1875, was reopened last week after reconstruction from plans by Messrs. J. J. Phillips and Son, of Royal-avenue, Belfast. The contractor was Mr. James Kidd, of the same city. The entire front of the old church has been removed, and the forbidding old frontage replaced by a Gothic façade of brick and Dumfries red sandstone. Cathedral leaded lights have been added. The new frontage is carried higher than the old roof, which it is hoped later, to raise to the new level. The interior has been transformed by the addition of galleries, which give the church a total seating accommodation of over 1,100. The woodwork is throughout of polished pitch-pine. The pulpit and choir platform have been rearranged on one level, and the whole church has been relighted with incandescent gas. The ornamental ironwork of the balconies and Communion are by Mr. Jones, of Great George's-street, and the upholstering by Messrs. Wright and Hunter.—The new electric station in East Bridge-street, built for the corporation to replace one in Chapel-lane, now found inadequate, was formally opened by Earl Cadogan, Lord Lieutenant of Ireland, on Tuesday. The ground floor is occupied by the engine-house, boiler-house, with space for economisers, coal bunkers, pump-house, &c., battery-room, men's mess-room, timekeeper's room, and men's lavatory accommodation. The engine-room is spacious and lofty, being 200ft. by 40ft., and has its walls lined throughout with coloured glazed bricks. On the first floor are the drawing, general, and private offices for the various officials, with strong-room, engineers' room, store-room, sample-room, meter-testing and meter-store rooms, superintendent's room, and lavatory accommodation. The second floor is arranged as a residential flat for the engineer-in-charge, consisting of a large suite of bed and sitting rooms, with bath, lavatory, kitchen, &c. The principal façade, which is towards East Bridge-street, along which it extends for about 225ft., is treated in red brick and Giffnock stone, in the style of the English Renaissance. The chimney is 26ft. 6in. in diameter at base, is 180ft. in height, and is of red brick, with corners of artificial stone; it is carried on 154 round timber piles. The building, which is carried on some 1,200 piles, has been erected by Messrs. J. and W. Stewart, Adelaide-street, Belfast, under the supervision of the firm's manager, Mr. James Hanna, and Messrs. Patrick Brennan and William Service, foremen. The clerk of works was Mr. James Moore. The architects for the work were Messrs. Graeme-Watt and Tulloch, of Belfast.

**BIRMINGHAM.**—On the Colmore estate, between Colmore-row and St. Paul's-square, old properties are being pulled down, streets are being widened and diverted, and a large number of modern buildings are rapidly springing up and taking the place of so many old rookeries. One of this series is a large block of offices in Newhall-street, and also having a frontage to Cornwall-street. In this case advantage has been taken in the difference of the levels to obtain several entrances, and so avoid anything in the nature of a warren. The building has been planned with suites of rooms for doctors or dentists, having separate entrances, and at the back and on the upper floors are professional offices. In the aggregate the number of rooms is about ninety. The elevations, in small red bricks and buff terracotta, and a roof of Stow-in-the-Wold stone slabs (the first used in Birmingham), are a rendering of the Later Dutch style. In Edmund-street a large block of offices for Messrs. G. J. Evson (Limited), in a florid treatment of red bricks and buff terracotta, has just been completed. Almost immediately opposite, new premises have just been started for Messrs. Edmund Worrall and Co., bookbinders. These premises contain shop, warehouses, and offices fronting the street, and will be carried out in Darley Dale stone, Leicester sand bricks, and Westmoreland slate roofs. Immediately adjoining will be two sets of doctor's chambers with residential houses. The elevations show four bold arches on the ground floor in Portland stone, from which rise an equal number of ornamental bay windows, terminating in two high-pitched gables and a green slate roof. New buildings are being built for Messrs. Buckler and Webb (Limited) at the corner of Church-street and Cornwall-street. The elevation to Church-street

is divided into five large spaces with semicircular arches springing from wide recessed piers. Above this is a cornice and window in arcing for the top floor. This treatment is also in small red bricks and buff terracotta. The architects are Messrs. T. W. F. Newton and Cheate, of Colmore-row, Birmingham.

**CHART SUTTON.**—The parish church, which was reopened on Friday, after undergoing extensive repairs and alterations, has been without a chancel for more than a century. It was in April, 1779, that the old building was destroyed by fire, and the church was re-erected without the adjunct which has now been restored to it. In addition to the chancel, quasi-transepts have been thrown out to serve as a vestry and an organ-chamber, and a new porch provided. The old tower arch has been reopened. Decorated stone tracery has been inserted in the six nave windows in place of the iron frames erected a century since, the plaster ceiling has been replaced by a timbered roof, and a new pulpit of oak, brass lectern, altar desk, and credence table have been provided. The four-light east window of the new chancel is filled with stained glass, representing the Annunciation, the Nativity, the Agony in the Garden, and the Resurrection. Stained glass has also been placed in the west window, and on the north side of the church is a third stained-glass window, to the memory of Sir Frederick Horn, G.C.B.; the subjects are Joshua and the Angel, and Cornelius and the Centurion, and the artists were Messrs. Javens and Westlake, of Bloomsbury.

**EDINBURGH.**—The City Observatory, Calton Hill, formerly the Government Royal Observatory, was transferred, with some ceremony, to the city corporation on Monday. When the Government Observatory was transferred to Blackford Hill, the Government offered the site and buildings for a sum of £1,000, and this the city accepted. Since then the place has been thoroughly overhauled. On the north-east corner of the ground within the inclosure a new house and dome 30ft. across has been built, to accommodate a large 22in. reflector telescope, which the city purchased some time ago. The building is of dressed stone, and the dome is of papier maché. It was constructed by Sir Howard Grubb, of Dublin. Certain astronomical instruments, which form the nucleus of the collection, were presented to the city several years ago by Mr. Robert Cox, M.P., who had an observatory at Murrayfield. One of these is a 13in. reflector telescope, which has been erected in the house it formerly stood in at Murrayfield. Being of wood, it could be readily transferred to Calton Hill, and it now stands on the north-west side of the inclosure. Adjoining it is the north-west dome, in which is placed an altitude circle, and further round is a fourth dome, in which is fitted up the Crawford 13in. reflector telescope. In the central building has been placed a 6in. reflector telescope, the gift of Mr. McEwan, M.P., and under the same roof are the library, a transit circle, a mural circle, and a couple of clocks. The house of the City Astronomer is at the south-west corner of the inclosure, and near it is the transit house and a box for thermometers. The sum expended by the city in building the new dome and in repairing the other buildings is about £3,000. The work was carried out from designs prepared by Mr. T. Morham, city superintendent.

**FORFAR.**—The opening of the Meffan Institute in West High-street took place yesterday (Thursday). It is built from a legacy left by the late Miss Meffan. A feature of the institute is the free library. In the new premises accommodation has been provided for 20,000 volumes. A reading-room, along with a reference-room, are also on the ground floor. The reference-room affords sitting accommodation for 24 readers, and in the reading-room chairs will be set for 60 readers. The front room on the upper floor is devoted to the museum, the nucleus of which already exists, and contains a number of curios and antiquities. A large lecture-hall is also on the upper floor. A heating chamber is provided in the basement. The architects were Messrs. Tait and Mitchell, West Regent-street, Glasgow, and the contractors were as follows:—Builder, David Adamson; joiners, Hay and Co.; plasterer, David Masterton; plumbers, Milne and Son; painters, Doig and McPhee; clerk of works, James Laird.

**HARWICH.**—The Congregational Church, Harwich, was reopened on Sunday last, after an embellishment of the interior and new sittings on

the ground and gallery floor, and new rostrum, by Professor Robert Harley, M.A., F.R.S., of London. Mr. E. Saunders, of Dovercourt, carried out the whole of the work. All the joinery has been executed in pitch-pine, and the benches are of the same material. The decorative portion of the work was carried out by Mr. J. A. Saunders, of Dovercourt. The whole of the work has cost about £550. The architect was Mr. J. W. Start, F.S.I., of Harwich and Colchester.

**HULL.**—New corporation baths were opened in the eastern division of the city on Friday. The building is a brick structure, situate in Holderness-road. The front elevation is of red brick and terracotta, harmonising with the adjoining Reckitt library. There is a swimming-bath, 96ft. by 30ft., with 3ft. 9in. to 6ft. 6in. of water; a boys' bath, 60ft. by 30ft., with 3ft. 6in. to 4ft. 6in. of water; nine ladies' slipper baths, and ten men's first-class baths, and twelve men's second-class baths. The large swimming-bath occupies a position at the back, and has a semi-circular roof of iron and glass. A gallery for spectators runs over the dressing-boxes, and provision has been made for turning the room into a meeting-hall in the winter. The boys' bath, behind the library, is built on the same plan, only the dressing-rooms are open recesses. The boiler-house and laundry stand between the swimming-baths, whilst the waiting-rooms face the slipper-baths in the central corridor. The slipper-baths are arranged in short corridors, and are all fitted up with hot and cold showers. The manager's house is over the front part of the building. The plans were prepared by the city engineer, Mr. A. White, and the assistant engineer, Mr. Bricknell, and under their supervision the work has been carried out, at a cost of about £15,000.

**JERUSALEM.**—The collegiate church of St. George the Martyr, on the Damascus-road, about half a mile outside the wall of the city of Jerusalem, was consecrated by the Bishop of Salisbury on Tuesday. The building is of white stone, and is Late Perpendicular in style. The church forms the eastern side of a quadrangle 100ft. square, entered from the old Damascus-road under a gateway tower, in front of which is an ancient Byzantine column. When the scheme is completed the quadrangle will have cloisters, that immediately opposite the gate giving access to the church. An ambulatory runs round the interior of this building, which is only 33ft. wide, and is covered by one roof. A chapel dedicated to St. Michael and All Angels, together with a baptistry, is attached to the south side. The Queen has given a font of Carrara marble, the colour and material of which harmonise with the chancel-screen and the slender columns that support the groined roof. The stalls are of carved oak and chestnut. The house of the Warden, who will be the bishop as long as he accepts the constitution of the college, occupies, with the unfinished library, the south side of the quadrangle, while the north side is taken up by the clergy house. Of this building only the first story is ready. Mr. George Jeffrey is the architect.

**LYNN.**—The rebuilding of the shops which were destroyed last December in the High-street fire is now almost completed; some were occupied weeks ago, and there are now only two in which trade has not been resumed. A great variety of architectural treatment is observable in the new buildings. On the east side, Mr. Count's shop and house at the corner of Union-lane, which was opened on Thursday in last week, is faced with red bricks and cement. The architect is Mr. H. J. Green, of Norwich, and the builders are Messrs. Collins and Barber, of Downham. Next comes Mr. F. P. Pegg's house and shop, in white bricks and stone, erected by Messrs. Renaut Bros., and adjoining it Mr. Curson's, of red brick with white stone facings, built by Mr. W. F. Smith. The next house is faced entirely with stucco, ornamented with dentilled pediments over all the upper windows; Mr. F. W. Jarvis was the architect, and Mr. H. G. Rudrum the builder. Mr. Kendrick's shop adjoining is still in an incomplete state; Mr. Jarvis is the architect of this also, and it is being built by Mr. Rudrum, with a front composed entirely of red bricks. On the west side of the street, the first of the new shops, counting from the south, has been built by Messrs. Collins and Barber, from the plans of Mr. J. R. Fayers. The front is a treatment of red bricks and stained woodwork, two oriel windows on the first floor, and an oriel



turret on the topmost story. Next comes a shop with a front entirely of red bricks, relieved with cornices and panels of ornamental bricks. The design is that of Mr. H. J. Green, and it was built by Messrs. Read and Wildbur. The adjoining shop has a front of white bricks, freely relieved with stone-work. It was designed by Mr. L. F. Eagleton, and erected by Mr. W. H. Brown, and is now being fitted by Mr. H. G. Rudrum. A new drapery shop on the west side of High-street was opened last week, although the exterior and the upper portions of the building are not yet complete. The shop occupies the same site as the old one, with the exception of a strip 9ft. deep, which has been taken off the front to widen the street. The length of the frontage is 46ft. and the depth 76ft. The upper portion of the building is of red bricks, with stucco dressings. The premises of Messrs. Jermyn and Perry and Jermyn and Son, on the east side of High-street, opened for business on Saturday, form the largest block of buildings in the street, having an area of 130ft. by 110ft. The style of the front elevation is a free treatment of the Classic, white cement work, rich in ornamentation, being used upon a ground of red bricks. The architect is Mr. Herbert J. Green, of Lynn, Norwich, and Lowestoft, and the contractors are Messrs. Kerridge and Shaw, of Cambridge.

RICHMOND, YORKS.—That once ancient and picturesque hostel The Fleece has recently passed away, and upon its old but extended site has arisen a new structure bearing the old sign. The new Fleece Hotel, which was opened on Tuesday last, is a building in the Scotch Baronial style, carried out in red bricks and Burmantofts buff terracotta, from the designs of Mr. G. G. Hoskins, F.R.I.B.A., of Darlington; the sole contractors being Messrs. Thomas Stairmand and Son, of the same town.

#### CHIPS.

An official inquiry was held at Battersea last week upon an application to the Local Government Board by the vestry to borrow £42,178 for the erection of new baths and washhouses, the purchase of additional land in Battersea Park-road, and for the sinking of an artesian well at the baths, Latchmere-road.

The Dean and Chapter of Norwich have placed the order for the erection of a new organ in the cathedral with Messrs. Norman and Beard, of that city. The instrument will be placed on the screen, and it is hoped to include a celestial organ similar to that at Westminster Abbey.

The large timber-yard and sawmills belonging to Mr. John Gethin, builder, of Shrewsbury, were destroyed by fire on Tuesday in last week, and damage caused to the amount of £1,000. A Wesleyan chapel, paint warehouse, and offices and workshops adjoining had narrow escapes. The fire was caused by a hot cinder from an engine falling among some shavings.

Mr. G. B. Laffan has resigned his position as surveyor to the Twickenham District Council to take up an important appointment in South Africa. Mr. Laffan, who has been connected with Twickenham for many years, will leave England on the 29th inst.

At Heysham Colonel W. Langton Coke held an inquiry into an application to obtain the sanction of the Local Government Board to a supplementary loan of £1,000 for sewerage works recently undertaken by the Lancaster Rural District Council. A loan of £1,300 had already been sanctioned, the additional loan being for excess of tenders over estimate, new sewers, &c.

A Local Government Board inquiry was held at Cholmondeley, on Friday, by Mr. Wilcox, Local Government Board inspector, with respect to the application of the Nantwich Rural District Council to borrow £1,830 for the extension of the existing mains in Cholmondeley to parts of the township not already provided with a water supply, and to the township of Egerton. Mr. J. A. Davenport, surveyor to the authority, explained the proposals.

The city council of Bristol decided, on Wednesday, to carry out important improvements at the junction of Lawrence Hill and Easton-road, where a disused brewery and adjoining house, with frontages of 383ft. by 290ft., is to be purchased at a cost of £11,250.

The Lord Mayor of Liverpool laid, on the 13th inst., the memorial-stone of a new out-patient department in connection with the Stanley Hospital in that city. The new structure is to be erected in Esby-road, and will cost about £2,500. The plans have been prepared by Messrs. Duckworth and Medcalf, Moorfields, Liverpool, and the contractors for the work are Messrs. J. and G. Chappell, Walton.

#### PROFESSIONAL AND TRADE SOCIETIES.

THE SOCIETY OF ARCHITECTS.—The Council of the Society of Architects have appointed Mr. C. McCa. Butler, member, of Boscombe, to be the secretary of the society in the place of the late Mr. Montagu Baldwin, M.A.

AUCTIONEERS' BENEVOLENT FUND.—The thirty-fifth annual meeting of the members and subscribers of this institution was held on Monday afternoon, at the Mart, Tokenhouse-yard, under the presidency of Mr. Daniel Watney, the treasurer. There was a good attendance of the committee and general subscribers, among the former present being Messrs. Edward Tewson, F. Eiloart, C. R. Foster, E. F. Francis, F. T. Galsworthy, E. W. Rushworth, Henry Wood, G. J. Elwood, Mr. Alderman Green, and Mr. William Cudlipp, secretary. The chairman, commenting on the report of the Committee of Management, alluded with regret to the death of two permanent members of the committee—Messrs. R. C. Driver and Christopher Oakley. He called attention to the fact that they distributed in donations and annuities over £400 a year, remarking that anybody who had held a licence for seven years, thereby establishing himself as an auctioneer, was entitled to a grant in case of need. In the event of death, his widow or children were relieved. Notwithstanding their limited resources, they were progressing. That day they had granted another annuity, and had increased one from £20 to £26. They had received a legacy of £250, and would be able to extend their benefits as their funds increased. Since July they had distributed over £80 in grants, exclusive of annuities. The subscriptions received during the year amounted to £394, against £393 in 1897; while the donations had only reached £8 18s. 6d., against £36 in the corresponding period. On the proposition of Mr. F. T. Galsworthy, seconded by Mr. Alderman Green, the report and accounts were adopted. Mr. Alderman Green moved the re-election of Mr. D. Watney as treasurer. Mr. E. Tewson seconded the proposition, which was agreed to *nem. con.* On the motion of Mr. E. W. Rushworth, seconded by Mr. H. Wood, Mr. G. J. Elgood was re-elected honorary auditor.

GLASGOW INSTITUTE OF ARCHITECTS.—The annual general meeting of this institute was held on Tuesday, in the rooms, 187, Pitt-street, Glasgow, Mr. David Barclay (vice-president) in the chair. Mr. C. J. MacLean submitted the annual report, which stated that the ordinary members now numbered 72, the largest number in the history of the institute. The council for the ensuing year was elected, as follows:—Messrs. Alex. Petrie, John Jas. Burnet, J. A. Morris, David Barclay, Alex. M'Gibbon, W. Forrest Salmon, Alex. N. Paterson, John Keppie, H. K. Bromhead, Jas. Lindsay, John L. Murray, Alex. Cullen, Miles S. Gibson, Jas. Miller, and A. B. Morrison. Mr. N. Macwhannell was elected a representative to the joint house committee.

INCORPORATED SOCIETY OF MEDICAL OFFICERS OF HEALTH.—The annual meeting of this society was held on Friday evening at the Holborn Restaurant, the newly-elected president being Dr. E. Gwynn. The report was adopted, and thanks were voted to Dr. E. Seaton, the retiring president. Dr. Gwynn then delivered his presidential address, the subject of which was "The Medical Officer of Health as a Public Teacher." After referring to the declaration of Lord Beaconsfield, in his electoral address in 1874, that the question of the day was sanitation, and the passing of the Public Health Act, 1875, which consolidated the existing laws on the subject, the speaker said it was not until the appearance of Lord Salisbury's article on the housing of the working classes in 1883 that public attention was again widely directed to the need for sanitary legislation. At the same time the numerous Acts upon various matters connected with public health which were added to the Statute Books between the Acts of 1875 and the Public Health (London) Act, 1891, if piecemeal in their bearing, and confusing in their variety, at least bore testimony to a general, if slow, advance of opinion on sanitary questions. In our own day the sanitary reformer and instructor had become identified with the man of science as represented by the medical officer of health. That office was created in 1855, and there was now a body of highly-educated, skilfully-trained men in the service who had laboured for many years, often with little influence, and meet-

ing with but scanty recognition. Had there not been of late, they might inquire, too great a tendency in many quarters to sink the skilled adviser into the permanent official? Absorbed in administrative details, in questions of drainage and water supply, and in the struggle with epidemics of infectious diseases, there was a danger of the medical officer of health losing sight of many great subjects which affected the national well-being. At the same time, there was every ground for encouragement from the growing intelligence of the public on sanitary questions. He urged upon the fellows of the society to take a large and catholic view of their position—a view that should embrace the sanitary welfare of the whole community, and to themselves apply the noble motto, *Homo sum humani nihil a me alienum puto!* Thanks were voted to the president for his address on the motion of Dr. Seaton, seconded by Professor W. R. Smith.

SANITARY INSPECTORS' ASSOCIATION.—The annual general meeting of this association was held on Saturday evening at Carpenters' Hall, London-wall, Mr. T. G. Dee (chairman of the council) presiding. The report stated that 68 new members and four associates had been elected during the past year. The council regretted that no opportunity occurred during the year for the introduction of the Superannuation Bill in Parliament. They had also to regret that the long-talked-of conjoint board of examiners had at last received definite constitution, and an association had been formed composed of three representatives of the Local Government Board, two of the Sanitary Institute, and one each of the National Health Society, the Plumbers' Company, the Carpenters' Company, the Incorporated Society of Medical Officers of Health, the Royal Institute of British Architects, the Society of Municipal and County Engineers, and the Royal Institute of Public Health, who were applying to the Board of Trade to become incorporated on the same lines as this association. The council had sent a letter of objection to the Board of Trade, and had also written to each of the bodies having representatives on the new board asking them to give full consideration to the claims of this association to due representation on such board. The chairman moved the adoption of the report, which was accepted by Mr. M'Nair. After some discussion, in the course of which it was generally agreed that the association, while proceeding with the own Superannuation Bill, should lend their support to the Metropolitan Officers' Superannuation Bill, the report was adopted. The financial statement was then submitted by Mr. Nurcombe, one of the auditors, who remarked that something would have to be done to increase the income or decrease the expenditure, otherwise they would soon be in a state of bankruptcy. After a long debate, it was decided that consideration of the balance-sheet should be adjourned, and the council requested to consider the matter and bring up a report at the next meeting. It was subsequently announced that Mr. T. J. Moss Flower (Portishead, near Bristol) had been elected chairman of the council for the session 1898-99.

SHEFFIELD SOCIETY OF ARCHITECTS AND SURVEYORS.—The following is the programme for the Session 1898-9:—Nov. 15, Mr. T. Swaffield Brown (Master of the Arts and Crafts Guild), "Ecclesiastical and Art Metalwork"; Dec. 13, Mr. Beresford Pite, F.R.I.B.A., "Michael Angelo's Architecture"; Jan. 10, 1899, Mr. F. T. Baggallay, F.R.I.B.A., "Common Errors in Design"; Feb. 14, Mr. P. Marshall, F.S.I., "Surveying"; March 14, Mr. E. P. Warren, "Theory, Practice, and Tradition"; April 11, Annual Meeting, election of officers, &c.

A Local Government Board inquiry, conducted by Mr. W. A. Ducat, was held in the Shire Hall, Shrewsbury, on Friday, in reference to an application by the corporation for sanction to a loan of £35,800, for the purchase of the undertaking of the Shropshire Electric Light and Power Company, and the subsequent extension of the works.

An orphanage was opened at Sidmouth on Friday in connection with the Convent of the Assumption. The orphanage, which is attached to the convent buildings, is of red brick with white stone facings, and consists of two floors. On the ground floor there is a hall about 50ft. by 23ft., and 15ft. high. The upper story consists of a dormitory, with accommodation for 12 beds, a room for a middle-class school, bath-room, and lavatory. The architect is Canon Scoles, of Yeovil, and the builder Mr. Tucker, of Sidmouth.



## COMPETITIONS.

**SMETHWICK.**—For the proposed Technical Schools, to be built at a cost of £5,500, the urban district council have awarded the first premium of £50 to the plans marked "Experience," submitted by Messrs. Bailey and MacConnell, of Walsall; and the second premium of £25 to "Sunrise and Art," sent in by Mr. H. J. Gill, of Smethwick.

## CHIPS.

**Bury St. Edmund's Town Council** discussed the electric lighting question at their last meeting. The committee submitted a modified scheme the capital expenditure on which was estimated at £16,000, and recommended a deputation to the Local Government Board. Two companies have offered to purchase the Provisional Order. The recommendation of the committee was adopted.

**Sir George Williams**, founder of the Y.M.C.A., laid on Friday the foundation-stone of a new institute about to be erected in the Icen Way at Dorchester, at a cost of £1,000.

The Carpenters' Company have granted the use of their hall to the Builders' Benevolent Institution for the purposes of the festival dinner on Thursday, 17th prox. Mr. Benjamin I. Greenwood will preside on the occasion.

An inquiry was held at the town hall, Leek, on Wednesday week, before Col. A. J. Hepper, D.S.O., R.E., of the Local Government Board, with reference to the application of the urban district council for sanction to borrow £4,000 for the provision of a technical school and public gymnasium, and £350 for the purchase of land for town hall purposes. There was a large attendance. The plans were produced and explained by Mr. Sugden, of Leek, the architect.

At Yeovil a new council chamber, which has been added to the borough house, from plans by and under the supervision of Mr. Armytage, the borough surveyor, was personally opened by the mayor on the 10th inst.

Referring to the projected new town-hall for Singapore, *Indian Engineering* remarks: "Although prizes for plans have been awarded in this building competition, no plan, so far as we can learn, has as yet been definitely accepted. The question of the site is still an open question. The memorial committee cannot be congratulated on their work. The inducement offered was ridiculously small, against precedent, and totally disproportionate to the object wanted."

The employees of the Oswestry Corporation met at the Guildhall on Thursday evening week to present Mr. R. O. Wynne Roberts, the retiring borough surveyor, who has been appointed borough surveyor of Cape Town, with a handsome silver tea and coffee service with tray, in recognition of the cordial relations which have always existed between himself and the workmen employed by the council. The mayor presided, and was supported by the town clerk.

At Huntingdon last week, an isolation hospital, presented to the townspeople by Mr. Fielden, was publicly opened. It has been built from plans by Mr. Keith D. Young, of London, the contractor being Mr. W. Howard, of Huntingdon.

At the October meeting of the town council of Great Yarmouth, the lands committee reported in favour of the corporation obtaining powers to construct and work a system of electric tramways in the borough. The recommendation was adopted.

The new Crown Theatre in Peckham-road will be opened on Monday, the 31st inst. It covers an area of 14,000ft., and possesses frontages to three thoroughfares. The style adopted is the Spanish Renaissance. It has two tiers, and the stage is 140ft. wide and 40ft. deep. There are 17 dressing-rooms, fitted with hot and cold water, and the place throughout is lighted by electricity. Seating accommodation is provided for 2,500 persons. Mr. Ernest A. Runtz is the architect, and the contractors are Messrs. Colls and Sons, of Moorgate-street, E.C.

On Saturday, the employees of Mr. R. Bridgeman, sculptor, Quonians, Lichfield, took part in an outing to Hanbury-on-the-Hill. The route was taken via Hoar Cross, where a halt was made, and the exterior and interior of the church were inspected by the visitors, many of whom had taken part in the adornment of the structure. From there the party drove to Hanbury, and after dinner proceeded to the Alabaster Mines of Messrs. Ford, by whom they were personally conducted underground. The party remained underground over two hours. After leaving the mine, the visitors were conducted over the plaster mills, the different processes in the manufacture of plaster of Paris being explained by Mr. Ford.

At Tregynon Parish Church, Mont., on Friday, a new organ, built by Messrs. Peter Conacher and Co., of Huddersfield, was formally opened.

## STATUES, MEMORIALS, &amp;c.

**LEITH.**—The Burns statue for Leith, which has been erected at the junction of Bernard-street and Constitution-street, was unveiled on Friday by Mr. R. C. Monro Ferguson, M.P. The artist is Mr. D. W. Stevenson, R.S.A., Edinburgh. The figure, 9ft. in height, is of bronze. Burns stands on the right foot, with the left slightly advanced. He wears the coat of the period, with open throat and collar and lapels, and his attire further consists of long waistcoat, knee-breeches, ribbed hose, and shoes. A plaid is thrown over the left shoulder. The right arm is carried across the breast, and grasps the edge of the plaid, while the left, hanging down by the side, holds his hat. The figure stands on a pedestal 10ft. high.

## WATER SUPPLY AND SANITARY MATTERS.

**HASLINGDEN.**—The sewage precipitation works constructed at Ewood Bridge for the Haslingden, Rawtenstall, and Bacup Outfall Sewerage Board, were formally opened on Tuesday. They have been carried out from plans by Messrs. Hinnell and Murphy, of Manchester and Bolton, whose plans were selected in competition for Haslingden and Rawtenstall in 1890, Mr. Baldwin Latham being the assessor. Subsequently Bacup joined the other local authorities, and after several Local Government Board inquiries and modifications of the original scheme, the works were commenced in 1895. The total area of the land acquired for a sewage farm is 120½ acres. The system of treatment of the sewage adopted is that of chemical precipitation in settling tanks with subsequent filtration through land or artificial filter beds. The sewage of the three boroughs, representing a population of 73,000 persons, is conveyed to these works by outfall sewers by gravitation, the main outfall sewer from the Rossendale Valley conveying sewage from Haslingden (part), Rawtenstall, and Bacup, and the Haslingden outfall sewer laid down the valley of the River Ogden. These two sewers have their confluence on the land of the Board close to the catch-pit into which they discharge. The normal dry weather flow delivered down these sewers will be 1,825,000 gallons per 24 hours. The joint outfall sewer to the works from Ewood Bridge is 3ft. 6in. diameter, and has a discharging capacity of nearly 20 million gallons per 24 hours. The outfall sewer along the Ogden Valley consists of 24in. glazed earthenware pipes, and has a discharging capacity of 4½ million gallons per 24 hours. Four settling tanks are provided, each 180ft. long by 60ft. wide, and average 7½ft. deep. Two or three settling tanks can be used together continuously if desired, whilst the fourth is being run off preparatory to being sludged, or is in process of sludging. The artificial filter-beds receiving the tank effluent from a conduit are 16 in number, each 45ft. long by 30ft. wide and 5ft. deep, and are arranged to work alternately; the total area of the filter-beds being 2,400 superficial yards. The principal buildings erected are those for the machinery for chemical mixing and sludge-pressing purposes. They consist of boiler-house, chimney 90ft. in height, engine and air-compressing house, chemical and mixing-house, sludge-press-house, and store. The buildings are faced externally with pitch-faced wallstone and ashlar dressings, and lined internally with buff bricks. The old building, "Ewood Hall," which bears the date of 1641, has been converted into a residence for the manager and a committee-room, and the cottage adjoining is utilised for the engineer for the machinery at the works. The works have cost £47,389, and the purchase of land £14,611. The contractors were, for precipitation tanks, filtration plots, river wall, outfall sewers, storm overflow, and foundations for buildings, Mr. George Ball, of Tottenham, London, assisted by Mr. E. P. Richards, as contractor's resident engineer; for buildings, Mr. Thomas Collinge, Haslingden; for machinery, Messrs. Goddard, Massey, and Warner, of Nottingham; for artificial filter-beds, conduits, chambers, &c., Mr. Enoch Tempest, Marple; and for electric-light installation, Messrs. Verity, Ltd., Manchester.

**SELKIRK.**—The Police Commissioners have issued to the ratepayers a comparative statement of the estimated cost of a water supply to the burgh by two schemes, the first by gravitation from the Lewinshope and Skaddow Burns, Yarrow, and the second by pumping. The statement is framed from reports furnished by Messrs. Leslie and Reid, C.E., Edinburgh, and Messrs. T. Aimers and Sons, engineers, Galashiels, on the two schemes respectively. The estimated capital cost of the gravitation scheme, to supply 350,000 gallons per day, with a reservoir at Lewinshope capable of holding 20 million gallons, or 56 days' supply for a population of 9,000, is £17,804 10s. This includes a high service reservoir to be formed at Thornbush Quarry on Selkirk Hills. Without constructing a reservoir at Lewinshope in the mean time, the capital cost is given as £12,469 10s. Under the pumping scheme the quantity of water contemplated is the same as in the

Lewinshope scheme, with the addition of 40,000 gallons per day for part of Philiphaugh estate, and it would be pumped into the present reservoir, into the proposed one on Selkirk Hills, and into a low service one to be formed. The engineers, in their report on this scheme, recommend the erection of a new steam-driven pumping plant near Selkirk Bridge. The capital cost of this is given at £11,694. The gravitation scheme, with a reservoir at Lewinshope, would mean an increase to the present rate of 5d. or fully 11d. per £1, including the allowance for depreciation. The pumping scheme would require an additional rate of 1s. 2d. per £1. The Commissioners, with only one dissentient, have passed a resolution to the effect that they are of opinion that a gravitation supply from the burns mentioned should be introduced.

Lord Derby presided on Saturday at the annual meeting of the governors of University College, Liverpool, and, urging the necessity of the erection of a building for the school of anatomy, intimated his intention of giving £5,000 towards the £20,000 required. Another donation of £2,000 was announced.

A meeting took place at Aberdeen Grammar School on Saturday in furtherance of the movement for the erection of a statue to Lord Byron, who spent his early days and received the rudiments of his education in Aberdeen.

The Corporation of the City of London are about to carry out an improvement at the west entrance to Cheapside, by removing the projecting buildings at the junction of Newgate-street and Paternoster-row and of the Row and St. Paul's Churchyard, thus widening the street space behind the Peel statue. A proposal is now before the Corporation to extend the widening along the eastern end of St. Paul's Churchyard, and to open out that lane for carriage traffic. A still more ambitious scheme to be brought forward is the making of a new diagonal thoroughfare from the Post Office corner of Cheapside to London-wall, thus shortening the distance to Liverpool-street.

The Duchess of Albany opened the Esher Memorial of the Queen's Jubilee on Tuesday. The memorial consists of a massive granite pedestal, bearing a medallion portrait of the Queen, the whole being surmounted by a bronze figure of Britannia. The memorial, which has been erected on the village green, has been carried out by Mr. F. J. Williamson, of Esher.

At a special meeting of the corporation of Richmond, North Riding, held on Thursday night in last week, the report of a committee was read recommending that the old Toll Booth block of houses in the Market-place near the Cross be pulled down, and new Municipal Buildings and Corn Exchange erected on the site. The cost was estimated at £2,000, and would bring in a rental of £150 per annum. The present buildings were said to be in an unsatisfactory and insanitary state. They were more like dog kennels than anything else. The question was referred to a committee.

The board of guardians for Chorlton, near Manchester, approved on Friday of a recommendation of the House Committee that, in order to meet the growing needs of the union, they should proceed at once with the erection of two new hospital pavilions, each three stories high, and each to accommodate 100 patients, and also a nurses' home as set out on a ground plan prepared by Mr. Broadbent, architect, the plan having been approved by the Local Government Board.

A Local Government Board inquiry was held at Morecambe on Friday, before Colonel Langton Coke, in regard to an application by the district council for sanction to borrow £60,000 for sewage works for the district of Morecambe. Mr. H. Bertram Nicholls, C.E., of Birmingham, the engineer of the scheme, explained that the works will take three years to complete, and will provide for a minimum population of 60,000. No objection was offered.

The River Tyne Commissioners have instructed their engineer to prepare plans and estimates for a new graving dock for large liners, battleships, and cargo vessels, Messrs. Armstrong, Whitworth, and Co. having guaranteed a minimum rent of £45,000 a year. The extreme length of the proposed dock would be 525ft., and the extreme width 125ft. It would be capable of being sunk from 45ft. to 48ft.

The strike of the navvies in Paris, and of the unions connected with the building trade generally in that city, which began a month ago, may now be considered at an end. The troops which have guarded the larger buildings in progress were withdrawn on Wednesday, and the men have returned to work.

At a general meeting of the Royal Institute of Painters in Water Colours, Piccadilly, held on Monday evening, the following gentlemen were elected members:—Messrs. Byam Shaw, Robert Meyerheim, Henry Ryland, and J. S. Crompton.



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## ILLUSTRATIONS.

NEW BUILDINGS, UPPINGHAM SCHOOL.—DETAIL OF PORTION OF NEW GARDEN FRONT OF A MANSION IN CAMBRIDGESHIRE.—HOUSE IN INVERLEITH PLACE FOR THE EDINBURGH ACADEMY BOARDING HOUSE CO.—BUILDINGS ADJOINING THE WORKHOUSE AT NEWHAVEN, SUSSEX.—A WAYSIDE INN AT BROMFORD.—NEW GERMAN FURNITURE AND INTERIOR.—THE PARK BOARD SCHOOL, BOSTON.

## Our Illustrations.

## UPPINGHAM SCHOOL.

THE new buildings designed by Mr. T. G. Jackson, R.A., for Uppingham School, and shown in the illustration, form the street front of a new quadrangle which was begun some years ago from Mr. Jackson's designs, by the erection of a schoolhouse for the head-master and 34 boarders, and a block of class-rooms. The fourth side consists of the schoolroom and chapel, built by Mr. G. E. Street, R.A., several years previously. The new front consists of a museum, lecture theatre, and science schools to the left of a new gateway tower, and classrooms to the right. The science schools were opened in December, 1897, by H.R.H. the Duchess of Albany, who at the same time unveiled a bust of her Majesty in the museum by Mr. Lucchesi. Over the gateway is a statue of the founder, Archdeacon Johnson, by Mr. G. Frampton, A.R.A. The general contractor was Mr. Halliday, of Stamford. The clerk of works was Mr. C. Turkentine. The gas-fittings were supplied by Messrs. Strode and Co., the fireproof flooring by Messrs. Homan and Rodgers, and the carving was executed by Messrs. Farmer and Brindley. The illustration was reproduced from the architect's drawing exhibited this year at the Royal Academy.

## DETAIL OF PORTION OF NEW GARDEN FRONT.

THE detail here drawn by Mr. Dymoke-Wilkinson shows a restoration made as a matter of personal interest to a beautiful old mansion of large size in Cambridgeshire, to replace parts which were destroyed by fire about forty years ago. The three sash-windows on the first floor and the mullioned window below are more or less original, and the gables, bay-window, and the porch are by Mr. Wilkinson. The drawing requires no further description, as it is self-explanatory, and has a key-plan attached below.

## EDINBURGH ACADEMY BOARDING-HOUSES.

THE two houses, one of which is illustrated, are being built by the Edinburgh Academy to provide boarding-houses in connection with the Academy school. They occupy an admirably open situation, looking across the new playing-fields, and beyond commanding a magnificent prospect of Edinburgh. They are built of red stone in two colours, the walls being of Corncockle, the dressings of Lochbarbriggs, and roofed with Elterwater slates. While identical in plan, they are reversed from east to west, so as to bring the two kitchen wings together, an arrangement which also gives variety of outline to the two houses when seen from any one point. To give further

interest and individuality to the respective houses, certain variations in the treatment of the gables and other details have been adopted. They measure roughly 100ft. by 50ft., and are three stories in height, with a basement at one corner, the masters' rooms lying at one end, and those of the boys at the other. The masters' wing of the house communicates, upon the ground and first floors with the boys' wing, and contains a dining-room, drawing-room (with balcony overlooking the field), and study, five bedrooms, two bath-rooms, the kitchen and offices, pantry, laundry, servants' hall, and servants' bedrooms. The boys' wing of the house contains upon the ground floor an entrance-hall, a large dining-room, a reading-room, study, music-room, and matron's room. An annexe upon this floor contains a boot-room, a lavatory, and a dark-room for photography; and in the basement a coal-cellar, a furnace-room, and a drying-room. The first floor contains five boys' bedrooms, and two bath-rooms. The top floor of the house contains two boys' bedrooms, a bath-room, and, next each other, the matron's bedroom and a sick-room. The average cubic air-space assigned to each boy in the bedrooms is about 900ft., and in all points of sanitary arrangement and convenience the plans have been very carefully considered. The architect is Mr. Alexander N. Paterson, of Wellington-street, Glasgow.

## NEWHAVEN WORKHOUSE, SUSSEX.

THE rapid growth of the important port of Newhaven, carrying with it increased demands upon the Poor-law buildings, has necessitated additions to the old workhouse accommodation. New tramp wards and a board-room have been erected, at a cost of about £4,500, by Messrs. Longley Brothers, of Crawley, and a new infirmary is now being built by Messrs. Peters and Son, of Horsham, whose contract for this amounts to nearly £7,500. New kitchens and stores, with connecting corridors, married couples' quarters, and some alterations to the present workhouse, are shortly to be commenced, and eventually the old workhouse, which is in many respects much out of date, will doubtless be superseded by a modern building, on the wind-swept, healthy site acquired by the board of guardians overlooking the town. The architects to the Board are Messrs. Clayton and Black, of Brighton, and the view we publish shows the western portion of the buildings.

## A WAYSIDE INN AT BROMFORD, EDDINGTON.

SOME explanation of the plan of this building, which was executed for Messrs. Ind, Coope, and Co., Ltd., of Burton-on-Trent, is perhaps necessary to enable one to appreciate the need for so much bar accommodation in a wayside inn. The building is not entirely new; the portion on the right-hand side of the plan, consisting of private bar, taproom, and kitchen, has only been rearranged. The extension of the bars and smoke-room, together with lavatories, &c., and new stabling, was necessitated by the new Birmingham racecourse, which has been formed within a distance of about a mile. For the everyday business of the house, the old portion, with a slight extension of the bar, affords sufficient accommodation, so that the new portion is only used on the occasions of race meetings, and is cut off at other times from the rest of the house by a folding screen. There is a large clubroom on the first floor, extending over the two bars, which is approached by two staircases, one for the use of the public, and the other for service in direct communication with the kitchen. The materials used are Sand stock bricks, with Guiting stone dressings, and the roof is of Clynderwyn slates. The external cornices are of wood, the gutter being formed in the top member, lined with lead.

## NEW GERMAN FURNITURE AND INTERIOR.

ANY degree of freshness—at any rate, when it is combined with at least a recognition of good taste—is always to be welcomed in the matter of furniture design, and although of course it is by no means easy to arrive at any marked departure from recognised forms and proportions, there always must remain some scope for individuality. The samples designed by Mr. Wilh. Michael, and Mr. H. E. V. Berlepsch, of Munich, reproduced with these notes to-day, are interesting, because they do display an endeavour to produce personal work. The shaping of the doors in the cabinet and the enriching of the surface of the upper part of the main framing of the piece with flatly carved ornament, if not exactly unprecedented

features, furnish novel and suggestive notions. The shaped feet to the cabinet hardly commend themselves, and give a certain thinness which would be best avoided. The chairs are successes in their way, and look comfortable enough—a great point in their designer's mind, evidently being embodied in the importance attached to curved lines. The same notion prevails in the settee, with its high back and leather squabs. Although the main outline of the design is rigid and square, the ingenious use of the undulating contours is somewhat playfully managed. The hinges to the fall-down front of the locker seat we do not like, though they may be quite according to the most approved fashion in fittings employed in Germany. The two interiors from Munich which we also give are exceedingly interesting. The first of these, with the segmental ceiling, enriched with delicately designed plaster enrichments, is from the pencil of Mr. Wilhelm Bertsch, and the second, with the Chinese-like frieze, was designed by Mr. Martin Dülfer. All these illustrations are borrowed from the current number of *Deutsche Kunst und Dekoration*, published by Mr. Alexander Koch, of Darmstadt. This copiously illustrated monthly magazine is devoted, as its title implies, to all the applied arts. The present number has a great variety of subject-matter in it, and the blocks, chiefly from photographs, are excellently reproduced and printed, including representations of metal-work, ceramic ware, carpets and furniture, plaster-work, carvings, and glass. Among the best things in the magazine are Mr. H. E. V. Berlepsch's studies of plant forms, with medallions and patternings exhibiting the application of these forms to conventionalised enrichment. Some of the window decorations are printed in colour; but the old difficulty of rendering transparencies by chromolithography is by these specimens only once more demonstrated. The coloured frieze executed in tapestry from the design of Mr. M. F. Grادل-München, with the long-drawn-out branchings of the fruit-trees and the odd old church behind the orchard foliations, has quite an art-and-crafty look about it in sad, not to say heavy, indigo, grey-green, and apple-red. The designs for posters printed in the part impress it with a very up-to-date character; but, for the architect and designer, the furniture shown and the interiors represented constitute the most useful part of this capital production.

## CHIPS.

THE work of raising the Berwick embankment at Llanelly has been intrusted to Mr. Henry Page, of Cardiff, who at present is carrying out the Forge drainage scheme in that town.

At a meeting of the Annan District Committee, on Saturday, Mr. Hart, Dumfries, was appointed road surveyor for the Annan district.

At the last meeting of the Buckley Urban District Council, Flintshire, an important report on the drainage question was submitted from Mr. Eayres, Birmingham. He recommended the laying of 9½ miles of sewers at a cost of about £6,500; the drainage of Liverpool-road and the Trap, at a cost of £2,400; and he estimated the extras at £890, and law expenses, &c., at £2,050, making a total of £11,840. On the ratable value of the district this would mean a 10d. rate for 30 years. The matter was referred to a special meeting of the council.

The old Athenæum Buildings in Fawcett-street, Sunderland, which were opened on November 12, 1839, by H.R.H. the Duke of Sussex, are now practically razed to the ground, and the disappearance of the imposing façade of massive Corinthian pillars has left a mournful gap in the architecture of the street. The intention of the members of the Liberal Club, who are the owners of the premises, is to erect a number of large shops, and to use the upper story for club purposes.

Continuing the scheme for housing the working classes, the insanitary property committee of the Liverpool Corporation is about to erect a block of dwellings in the district of Dryden-street. Plans for these have been prepared by Mr. F. T. Turton, deputy city surveyor.

The new offices in Basinghall-street, E.C., erected under the order of the late Commission of Sewers, have been completed. Mr. T. E. Knightley, F.R.I.B.A., of 106, Cannon-street, has carried out the completion of the premises as architect. The contractors were Messrs. I. Chessum and Sons, Messrs. Minton and Co. have supplied the ornamental tiled work of the corridors; Messrs. Strode and Co., of St. Paul's Churchyard, have fitted up the hot-water apparatus; and Mr. James Shaw, of Newgate-street, undertook the plumbing arrangements.





NEW GERMAN FURNITURE.





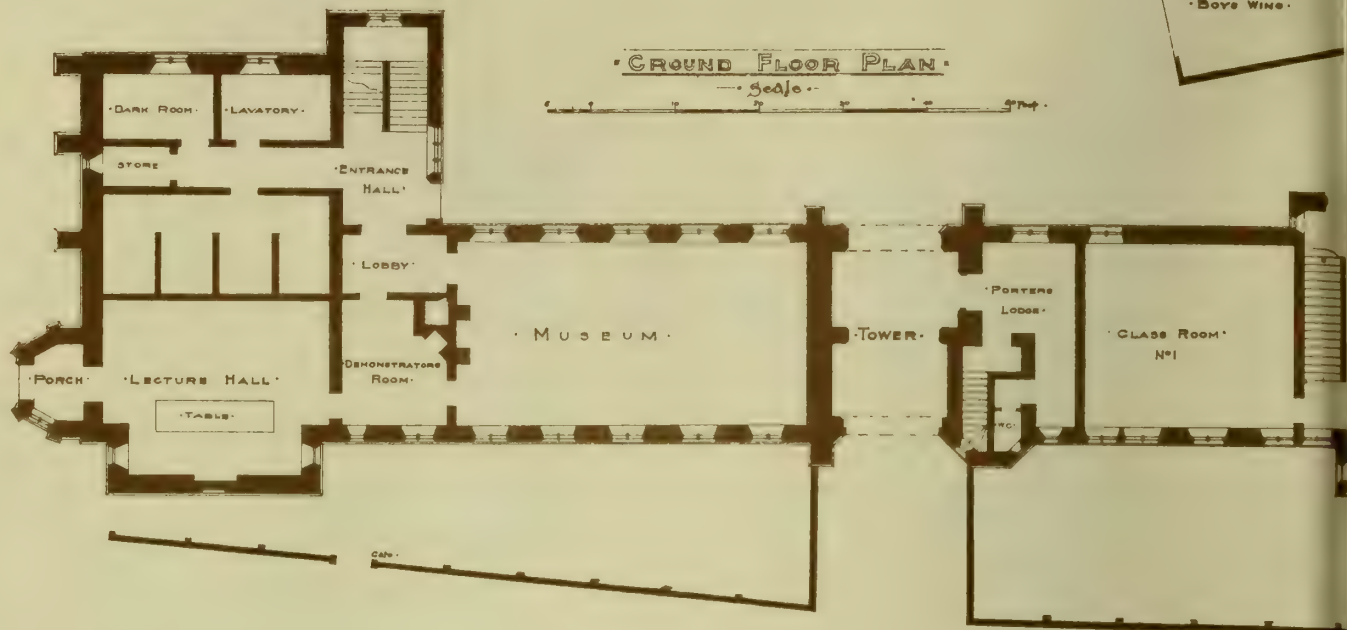




Boys Wing.

GROUND FLOOR PLAN.

Scale.

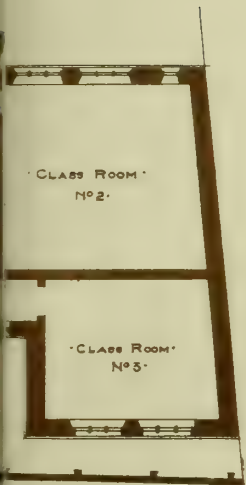


SCHOOLROOM BY G.E. STREET. R.A. —→

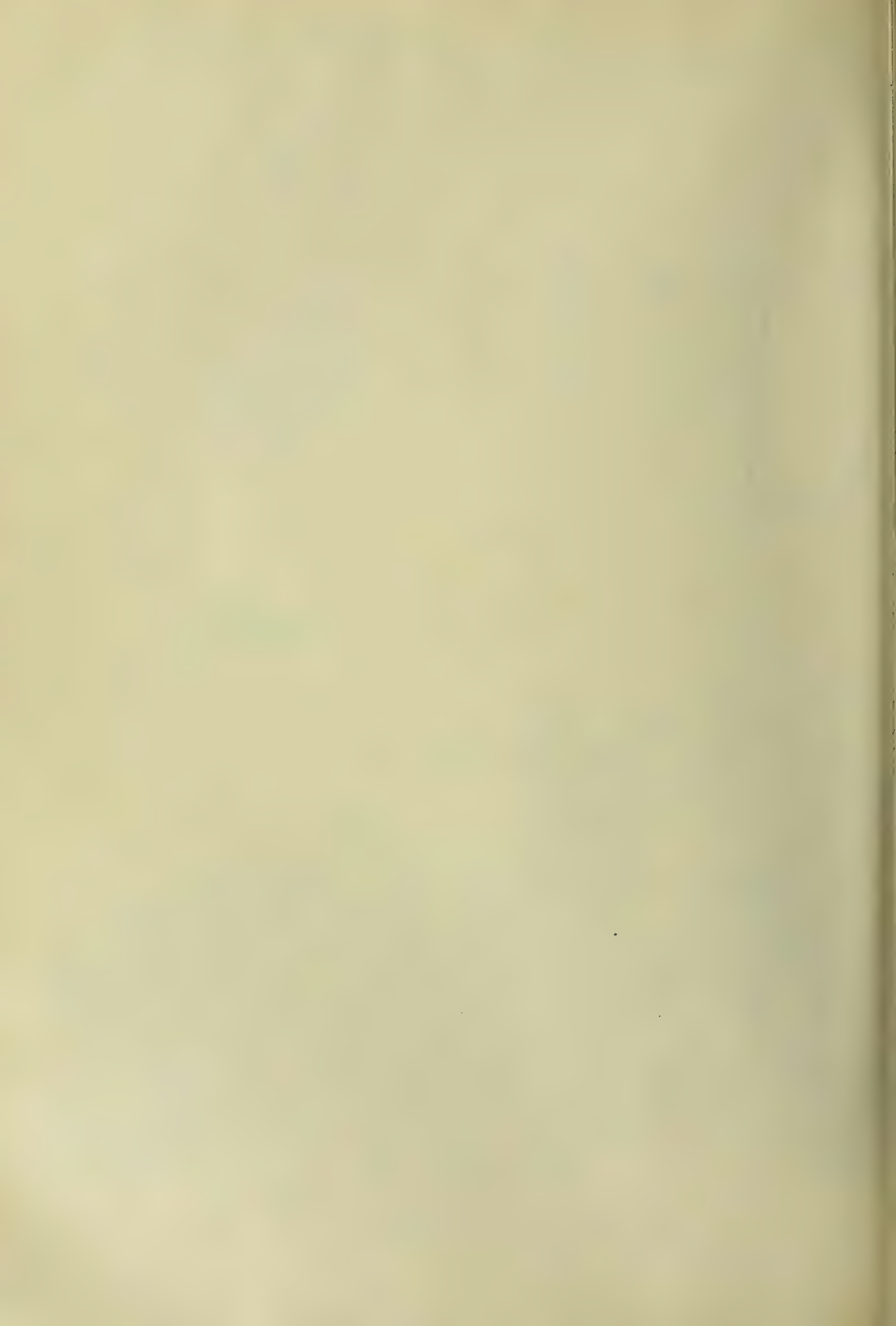


OCT. 21, 1898.

# NEW BUILDINGS FOR UPPINGHAM SCHOOL













PORTION OF A NEW  
GARDEN FRONT WITH  
NEW GARDEN PORCH

M. Dykes - Wilkinson Arch: 1898.









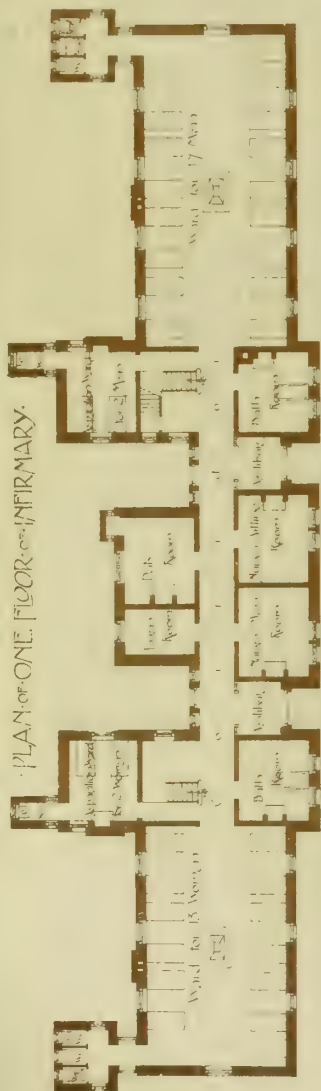




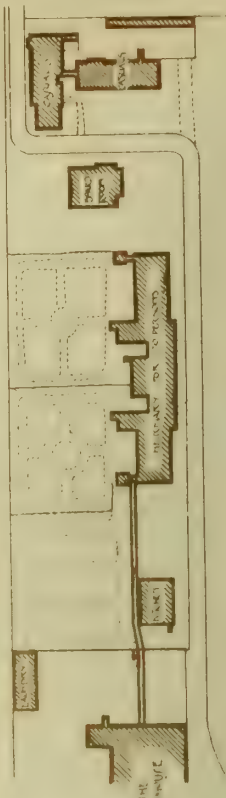
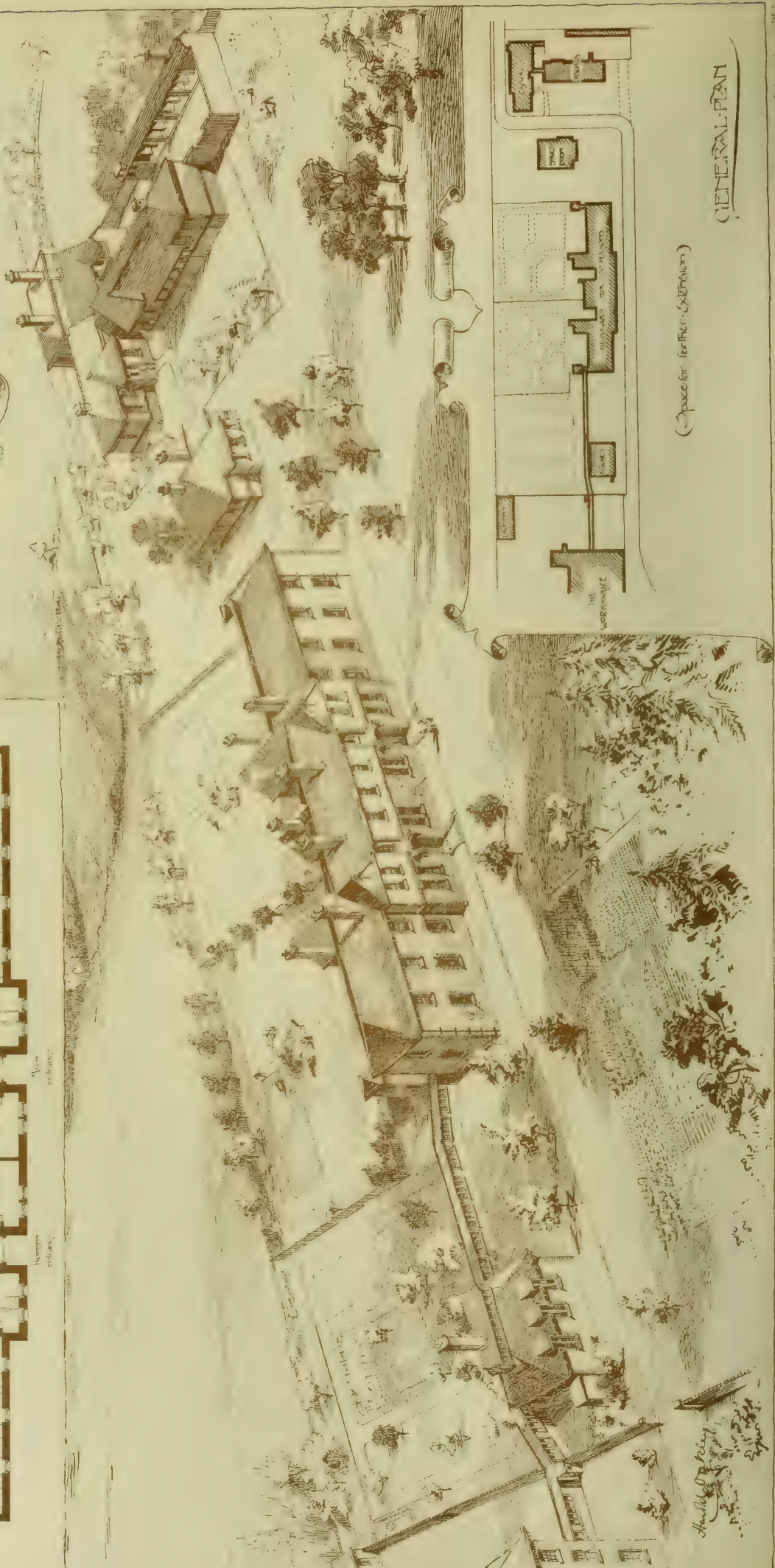




PLAN OF ONE FLOOR OF INFIRMARY.



BUILDING FOR THE MORNING.  
**NEW HAVEN UNION**  
 SUSSEX.  
 { Charles Clayton  
 Ernest Black  
 Architects  
 Brighton.



(Space for further extension)

GENERAL PLAN

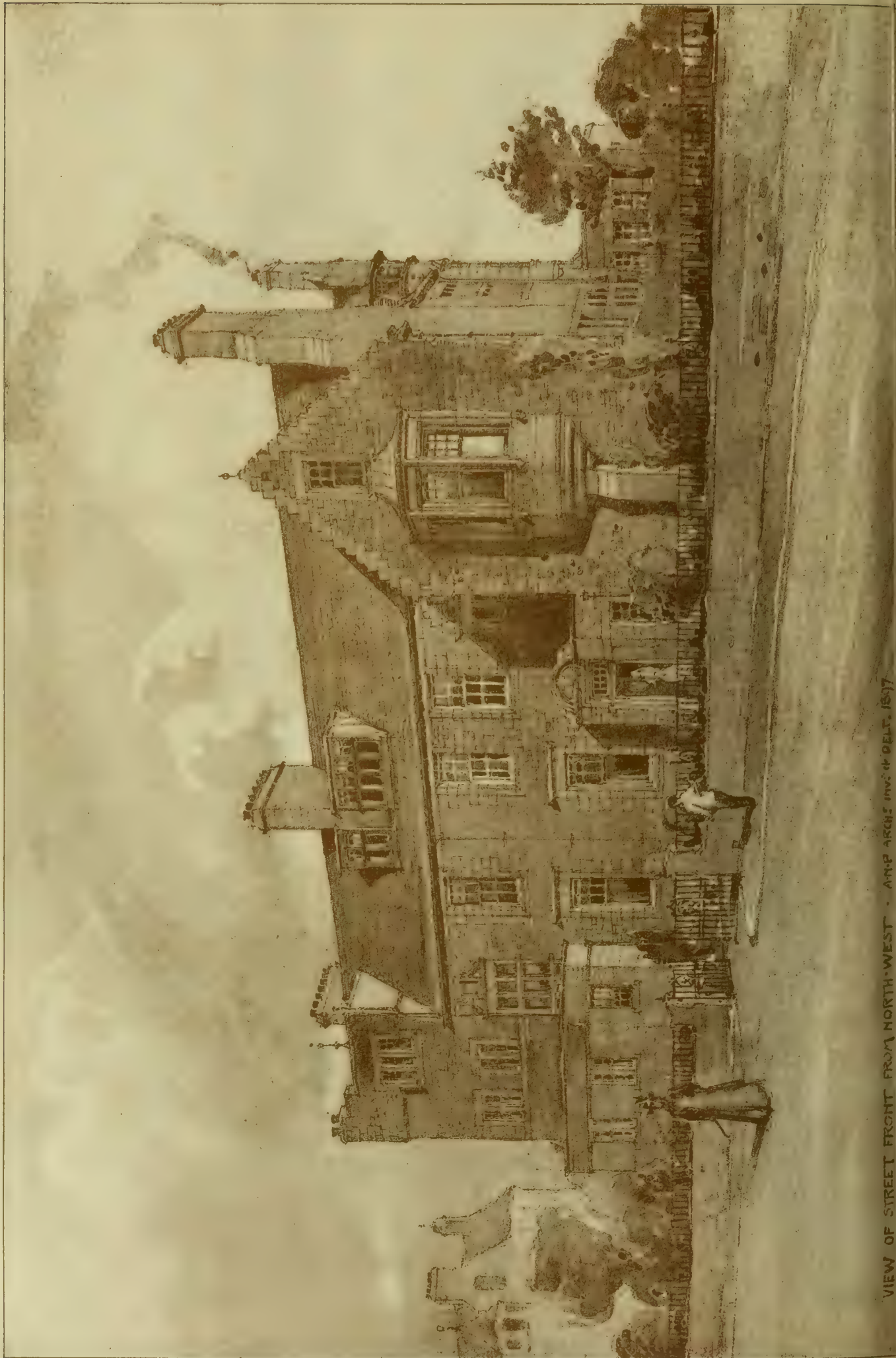
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THE BUILDING DEWS OCT 21. 1898.



VIEW OF STREET FRONT FROM NORTH-WEST. - AN-P ARCHT. INV. & DELT. 1897





VIEW OF GARDEN FRONT FROM

HOUSE IVERLEITH PLACE FOR THE EDINBURGH ACADEMY BOARDING HOUSE COY.

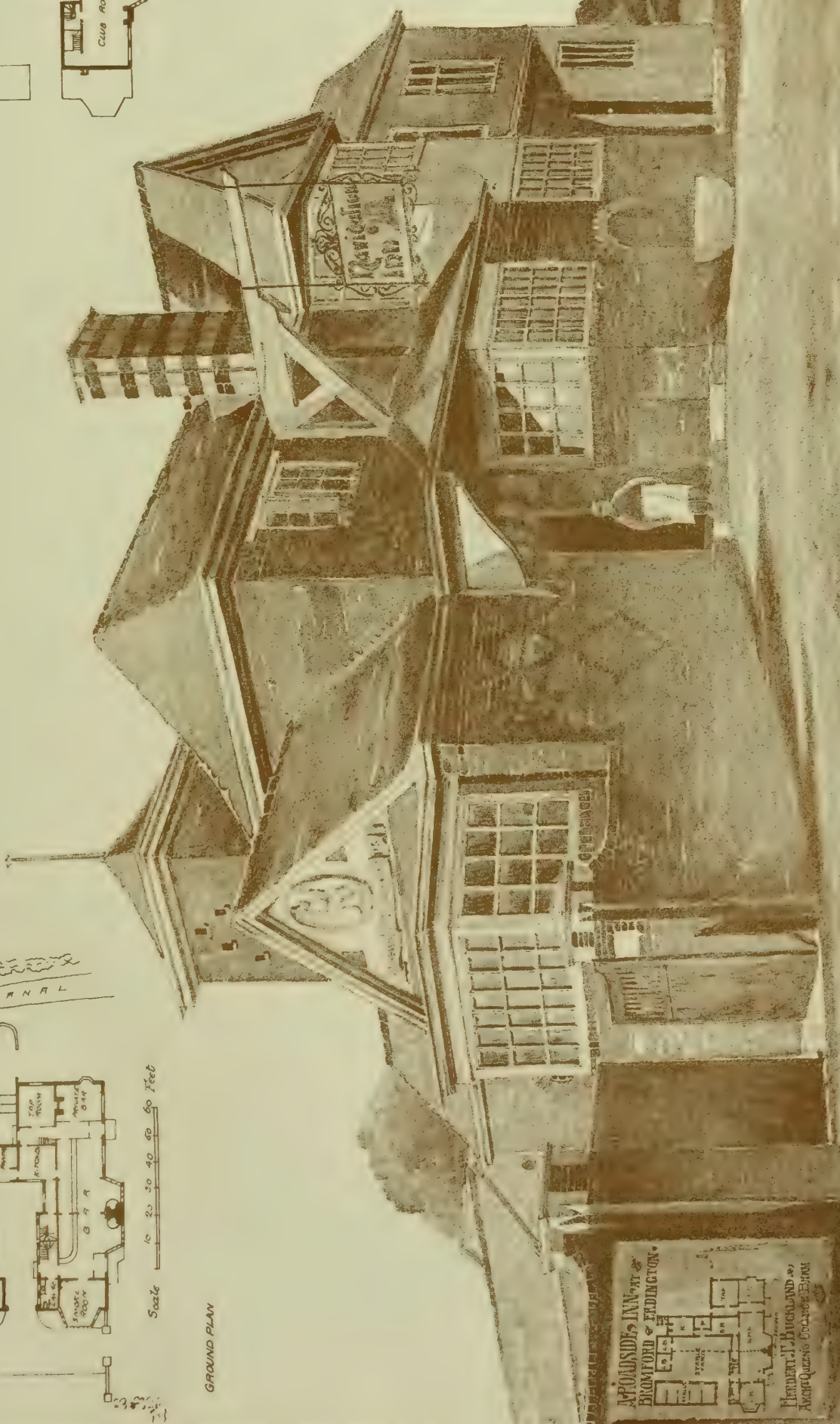
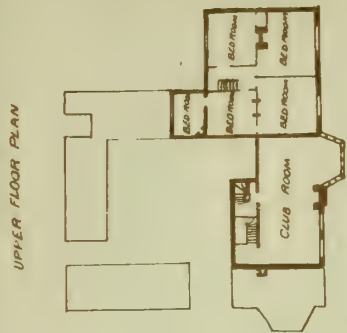
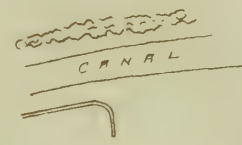
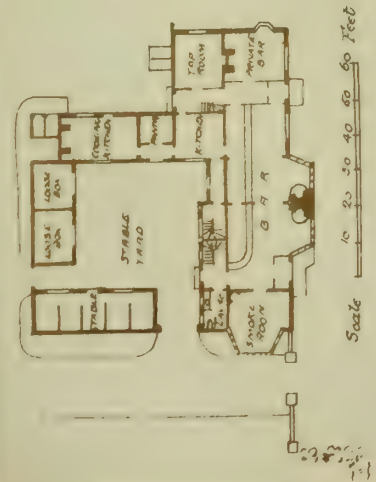
ALEXANDER N PATTERSON M A ARCHITECT

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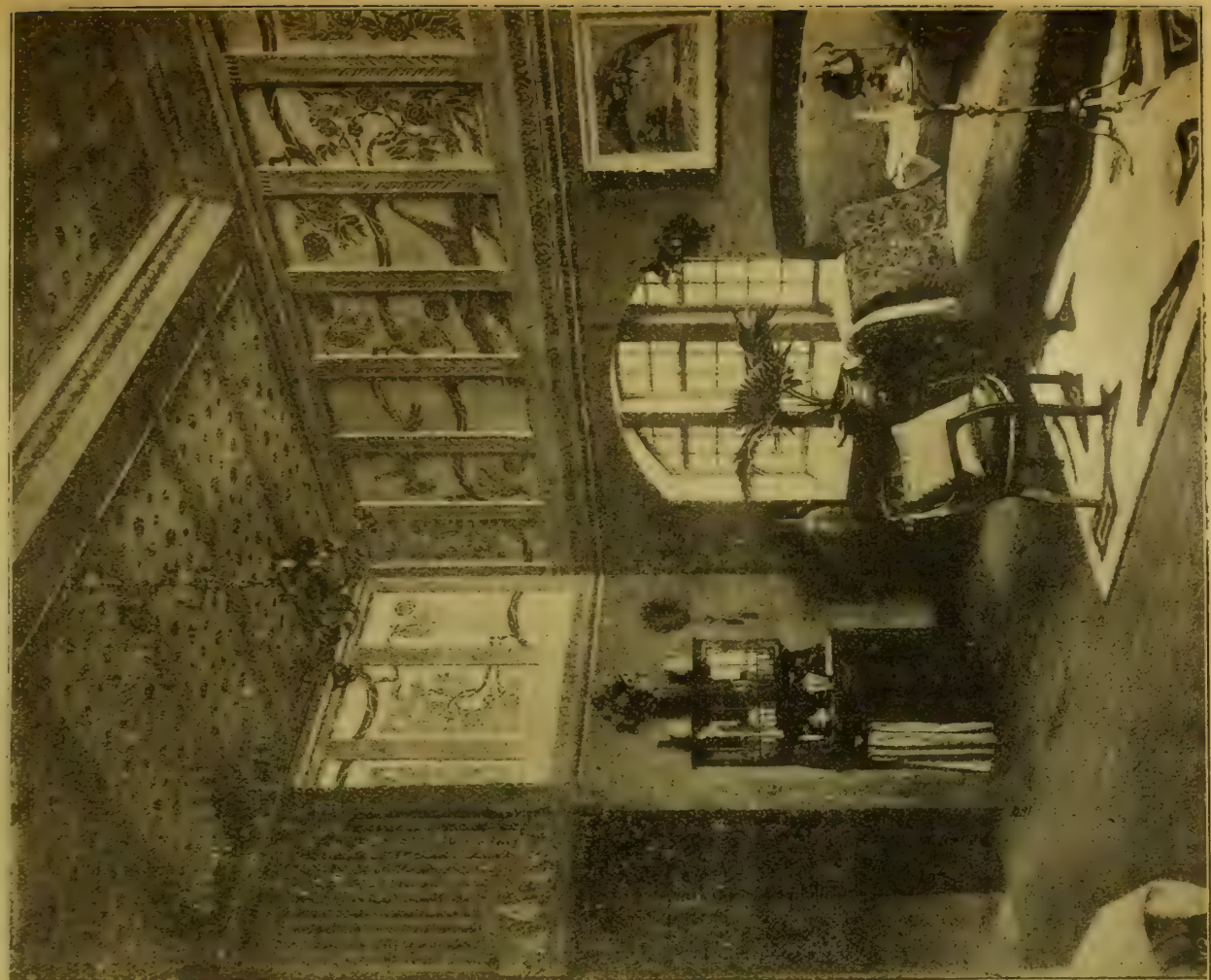


A WAYSIDE INN, BROMFORD, EADINGTON.









NEW GERMAN FURNITURE AND INTERIOR.



## TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the BUILDING NEWS, 332, Strand, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

Cheques and Post-office Orders to be made payable to THE STRAND NEWSPAPER COMPANY, LIMITED.

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One Pound per annum (post free) to any part of the United Kingdom; for Canada, Nova Scotia, and the United States, £1 6s. 0d. (or 6dols. 30c. gold). To France or Belgium, £1 6s. 0d. (or 33fr. 30c.). To India, £1 6s. 0d. To any of the Australian Colonies or New Zealand, to the Cape, the West Indies, or Natal, £1 6s. 0d.

## ADVERTISEMENT CHARGES.

The charge for Competition and Contract Advertisements, Public Companies, and all official advertisements is 1s. per line of Eight words, the first line counting as two, the minimum charge being 6s. for four lines.

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Front-page Advertisements 2s. per line, and Paragraph Advertisements 1s. per line. No Front-page or Paragraph Advertisement inserted for less than 5s.

Advertisements for the current week must reach the office not later than 3 p.m. on Thursday. Front-page Advertisements and alterations in serial advertisements must reach the office by Tuesday morning to secure insertion.

## SITUATIONS.

The charge for advertisements for "Situations Vacant" or "Situations Wanted" is ONE SHILLING FOR TWENTY-FOUR WORDS, and Sixpence for every eight words after. All Situation Advertisements must be prepaid.

## NOTICE.

Bound copies of Vol. LXXIV. are now ready, and should be ordered early (price Twelve Shillings each), as only a limited number are done up. A few bound volumes of Vols. XXXIX., XL., XLVI., XLIX., LI., LIII., LVIII., LIX., LXI., LXII., LXIII., LXIV., LXV., LXVI., LXVII., LXVIII., LXIX., LXX., LXXI., LXXII., and LXXIII., may still be had, price Twelve Shillings; all the other bound volumes are out of print. Most of the back numbers of former volumes are, however, to be had singly. Subscribers requiring any back numbers to complete volume just ended should order at once, as many of them soon run out of print.

RECEIVED.—H. R. F.—D. B. G.—S. A.—O. T. Co.—W. M. and Son.—F. L. (Cardiff).—K. and N.

## "BUILDING NEWS" DESIGNING CLUB.

OBSEON. (A servants' hall will hardly be required; but there is no reason why a day-nursery should not be provided in the country house, which forms the first subject.)—LAKESIDE. (£6,000 is none too much, and you may take it at present prices that one shilling per foot cube will be a sufficiently correct basis to go upon.)

—CLIVE. (We intentionally avoided too many details in our particulars, as we wished to give the members of our club as much scope as possible for individual skill in planning.)

## Correspondence.

## GATESHEAD COTTAGE HOMES.

To the Editor of the BUILDING NEWS.

SIR,—My attention has been drawn to a letter in your last issue, signed "A.R.I.B.A." Relative to this work, there was a distinct clause in the conditions of competition that no payment would be made for plans unless a reliable tender could be obtained within the specified amount of the estimate. Tenders were invited upon the plans prepared by the architect who was placed first in the competition; but the amount was so largely in excess of the estimate, that the guardians could not in justice to themselves, or the other competitors, go on with the scheme, and arrangements were therefore made with the architect, and terms mutually agreed upon in settlement for his services up to date. The guardians then placed the work in the hands of Mr. Newcombe, whose position was second in the competition, and he is now carrying out the buildings well within his original estimate. Mr. Newcombe's original estimate was, of course, very considerably in excess of that of the architect who was placed first, and any injustice in the matter would have been clearly against Mr.

Newcombe, had the work not been placed in his hands. It is only fair to Mr. Newcombe to state that at his first interview with the board he explained that he could not undertake the work unless proper arrangements had been made relative to the services rendered by the original architect.

This brief statement of the circumstances shows the mistake in making statements and charges without a knowledge of the facts.—I am, &c.,

ROBT. APPELCK,

Chairman of the Gateshead Board of Guardians.

## THE SUPERVISION OF LONDON BUILDINGS.

SIR,—On p. 555 I notice a reference to the Building Act Committee. Surely this matter has been fully discussed, and details arranged; but there is now the fact of a building erected by a speculative builder having caused much discussion, because the exemptions were claimed which would be proper in the case of the usual Government building erected by a first-rate firm of contractors and under one of the architects of the Office of Works.

Every effort is being made by the Council to secure the personal attention of the district surveyors, and it seems rather odd that, while on the one hand they require district surveyors to give up private practice, a large portion of the architectural work of the Council should be given to one of the district surveyors. Government buildings, railways, and other exemptions should be abolished, certainly, if not executed entirely under the officials of the bodies named. On the whole, there is very little fault to be found with London buildings; they compare very favourably with the suburbs outside the area of the Building Act.—I am, &c.,

OBSERVER.

## PORTSEA INSTITUTE.

SIR,—In the BUILDING NEWS of last week, Sir Arthur Blomfield is stated to be the architect of this building. This is not the case; I am the architect of the Portsea Institute, and I should be obliged if you would kindly correct the error in your next issue.—I am, &c.,

REGINALD BLOMFIELD.

New Court, Temple.

[An obvious, but, we trust, pardonable *lapsus calami*, for which we apologise.—ED.]

## CHIPS.

Every newspaper editor can only wish that it might be at once made a capital offence by Act of Parliament, to send him any communication unless written on one of the "Author's Hairless Paper Pads," sent by the Leadenhall Press, Limited, of 50, Leadenhall-street;—so handy for author, editor, compositor, and everybody are they. Failing that, we would strongly urge every correspondent to send eight stamps for a sixpenny specimen of the "paper-pad," only we know writing would become such a universal luxury, that our waste-paper basket would at once have to be enlarged!

A new asylum is being erected at Hendon, and special consideration has been given to the ventilation, which will be carried out on the Boyle system.

The new cottage hospital for the Barnes and Mortlake District Council is being warmed and ventilated by means of Shorland's double-fronted patent Manchester stoves, with descending smoke-flues, the same being supplied by Messrs. E. H. Shorland and Brother, of Manchester.

The Bible-Training Institute for Scotland, which occupies the easternmost portion of a fine pile of buildings in Bothwell-street, Glasgow, embracing the Bible-Training Institute, the Young Men's Christian Institute, and the Young Men's Club, was opened on Monday. The institute has been erected and equipped at a cost of £50,000.

The statue of Dr. Martineau presented to Manchester College, Oxford, by his admirers, was unveiled on Tuesday. The venerable doctor is represented as wearing his LL.D. robes; he is seated in a chair with an almost-closed book in his hand upon his knees. Mr. H. R. Hope Pinker is the sculptor.

The Tadcaster Board of Guardians at their meeting on Monday adopted plans prepared by Messrs. Bromet and Thorman for twelve additional male vagrant cells at the Workhouse, to cost £75 a cell.

University Road Church, Belfast, was reopened last week after decoration by Mr. Martin Wallace, of Albion-place, Belfast, and the installation of the electric light carried out by Mr. W. H. Drennan, of Wellington-place, to specifications by Mr. J. Hayton Greenhill, M.I.C.E.

In his opening lecture to the engineering students at Cambridge on Friday, Professor Ewing intimated that the crowded state of their lecture-rooms and laboratories would soon be relieved. A gift of £5,000 had just been made by Mrs. Hopkinson for the addition of a new wing to the engineering laboratory in memory of the late Dr. John Hopkinson and of his son, John Gustave Hopkinson, who recently lost their lives in the Alps.

At Tuesday's meeting of the London County Council the solicitor was instructed to take proceedings against the owner of Covent Garden Theatre for neglecting to carry out an order of the Council directing him to have the scene store under the stage separated from the rest of the theatre by fireproof construction.

Earl Cadogan, the Lord Lieutenant of Ireland, accompanied by the Countess Cadogan, visited Belfast on Tuesday, to lay the foundation-stone of the new city-hall, which is estimated to cost about £200,000. It is being built from designs by Messrs. E. Thomas and Son, of that city, which were selected in competition, and were illustrated in our issues of June 18 and July 9, 1897.

Eleanor, Duchess of Northumberland, opened on Tuesday the Jubilee wing of the Seamen's Institute, Middlesbrough. The new wing adjoins the Mission to the Seamen's Church and Institute, and comprises 12 rooms for officers, apprentices, ambulance, and literature.

The foundation-stone of St. Ninian's Church, Mid-Stockton-road, Aberdeen, an edifice which is being erected in connection with the Church of Scotland to provide needed accommodation in the Rosemount suburb, was laid on Friday by Lord Balfour of Burleigh, Secretary for Scotland. Mr. William Kelly, of Aberdeen, is the architect.

Mr. James Oates, a builder and contractor, of Scarborough, died at his residence, Brunswick-terrace, Scarborough, on Friday, aged 64. Mr. Oates was a Roman Catholic, and a Liberal.

St. Cuthbert's Church, Glasgow, the first fruits of the work done by the Lymen's Association in connection with the Church of Scotland, will be opened on Sunday next. The church is situated at the corner of Hinshaw-street and Doncaster-street, New City-road, a district in which a large number of tenements for occupation by the working-classes have recently been erected. The style is Early Gothic. The total accommodation in area and gallery is 840. The masonry is of Montgremman stone, and the roofs are covered with red Staffordshire tiles, which harmonise with the red stone of the walls. The total cost, including site, is £6,000.

The first sod of the Scargill Reservoir, about to be constructed for the water committee of the Harrogate Corporation, was formally cut on Monday. The drainage area of the reservoir is about 1,100 acres, and the water area, when full, about 32 acres. The earth to form the embankment will be 140,000 cubic yards. The height of the top water will be 645ft. above the sea level, Harrogate being about 400ft. above sea level. The capacity of the reservoir when full will be 220,000,000 gallons. The capacity of the existing reservoirs is 179,000,000. The work will be completed in three years, and at present there are employed on the work between 200 and 300 men. The water from Scargill will have to travel about 5½ miles to Harrogate. The probable cost of the undertaking will be £100,000. Mr. Dixon is the engineer.

The London County Council, on Tuesday, adopted a recommendation by the Improvements Committee that the Council should make a contribution, not exceeding £15,000, to the widening of a portion of Ladbroke, after discussion, by 67 to 41 votes. A recommendation that the Council consent to application being made by the London United Tramways Company to the Board of Trade for powers to reconstruct a portion of their tramway in Uxbridge-road in accordance with the overhead trolley system, on condition that the company also reconstruct another portion of their line on the underground system of electric traction, led to some discussion. A hostile amendment was rejected by a large majority, and the recommendation agreed to.

Mr. H. H. Law, a commissioner on behalf of the Local Government Board, held an inquiry at Cleckheaton Town Hall, on Tuesday, for sanction to borrow £6,000 for the provision of a cemetery, £3,600 for purposes of public walks and pleasure-grounds, £2,200 for street improvements, and £550 for sewage works. The question of the loan for a public cemetery was left in abeyance pending a further inquiry, proposed to be held on an early date, relating to sewerage. The other items were fully dealt with.

Alderman C. A. Head has been approached by the Corporation of Thornaby, and has consented to become the Mayor of the borough for the ensuing municipal year. Alderman Head, who was mayor in 1894-5, is chairman of the directorate of Messrs. Head, Wrightson, and Co., of the Teesdale Iron-works, and a director of the firm of Messrs. Dorman, Long, and Co., Middlesbrough.



# Intercommunication.

## QUESTIONS.

[12079].—**Rent and Repairs.**—Can a landlord claim rent from tenant when rain comes in on bed and door-post is nearly down? He has been told about it, and has come and seen it; he said he would have it done, but has not troubled about it.—W. H.

[12080].—**Details of Carpentry and Joinery.**—Would any of your readers kindly inform me the best illustrated work on carpentry and joinery? Also, if it is possible to obtain plates giving join. scale details?—B. COLE.

[12081].—**Bedding Girders.**—Will a practical correspondent describe any plan for bedding iron joists on piers? Is it not necessary to place a sheet of lead over the template, or a thickness of felt? If the former, what weight of lead per foot ought it to be, and how fixed to stone? Or if felt is better, what kind of felt should be used and its thickness? No doubt there are some others besides myself who would like to know the usual practice.—INEXPERIENCED.

[12082].—**Canterbury Public Library.**—Can anyone inform me the name of the architect of this new building now being finished, and oblige?—A VISITOR.

[12083].—**Lift Pump.**—How is the lifting power found of an ordinary lift-pump?—AN APPRENTICE.

## REPLIES.

[12059].—**Artificial Stone.**—Artificial stone staircases are formed in either of the ways mentioned by "A Novice." For a plain straightforward staircase without difficulties, the cheapest method is forming them *in situ*—viz., a properly-arranged centring with riser-boards and ends fixed to temporary string is put up in position, and the concrete is then filled in and finished off, when the setting process allows of the riser-boards, &c., being removed. When cast in moulds at maker's works the steps are, of course, delivered and fixed precisely as ordinary stone steps; but by the *in situ* process the cost of hoisting and fixing is saved. A satisfactory job can only be insured by having thoroughly experienced workmen, and the durability depends upon the way the material is treated in construction. The artificial stone is formed of fine granite screenings and especially good quality Portland cement.—E. M. BONSON.

[12064].—**Steel Roof.**—Rivington, in his "Notes,"



Vol. II., gives for iron roofs (from actual practice) the following:—

T-iron Rafter.	T-Struts.	King-Bolt.	Queen-Bolts.	Tie-Rod.
2 1/2 in. x 2 1/2 in. x 1/2 in.	2 1/2 in. x 2 1/2 in. x 1/2 in.	1 in.	3/4 in.	1 to 1 1/2 in.
3 in. x 2 1/2 in. x 1/2 in.	2 1/2 in. x 2 1/2 in. x 1/2 in.	1 in.	3/4 in.	1 to 1 1/2 in.
Molesworth's "Pocket-Book" gives as follows:—				
Rafter T-iron.	a.	b.	c.	d.
2 1/2 in. x 2 1/2 in. x 1/2 in.	2 1/2 in. x 2 1/2 in. x 1/2 in.	2 1/2 in. x 2 1/2 in. x 1/2 in.	2 1/2 in. x 2 1/2 in. x 1/2 in.	2 1/2 in. x 2 1/2 in. x 1/2 in.
3 in. x 2 1/2 in. x 1/2 in.	2 1/2 in. x 2 1/2 in. x 1/2 in.	2 1/2 in. x 2 1/2 in. x 1/2 in.	2 1/2 in. x 2 1/2 in. x 1/2 in.	2 1/2 in. x 2 1/2 in. x 1/2 in.
The parts marked a, b, c, d, e, f, g, h, i, j, k, l, m, n, o, p, q, r, s, t, u, v, w, x, y, z.				

[12066].—**Mildew Stain.**—Keep wet towel lying on its face till the dust is thoroughly softened—say three or four days—occasionally rubbing off carefully with a sponge; then rub with clear nut or linseed oil.—REGENT'S PARK.

[12071].—**Oak.**—Fumigate it with liquid ammonia, strength 880°, half-pint in a soup-plate or dish. It acts in a wondrous manner on the tannic acid in the wood. Or whitewash with fresh lime, and, when dry, brush off lime with hard brush. Or lay liquid ammonia on wood, or potash bichromate dissolved in cold water. Or for metallic black stain for wood generally, soak wood in weak solution of nitrate of silver, and then expose to light. Or boil logwood chips in water for a quarter of an hour; wash wood three or four times, allow to dry after each washing; lastly, wash wood with mixture—steel or iron filings 1 oz., vinegar 2 oz.; keep phial near fire to gently heat for two hours, then decant for use. Or for oak, iron filings with a little sulphuric acid and water, put on by sponge or brush; allow to dry between each application.—REGENT'S PARK.

[12072].—**Exchange of Land.**—If A. the freeholder B. the leaseholder, and his freeholder all agree, why not set the fence out to the give-and-take line? The matter could be arranged without any expense. A wall erected boundary, after the lapse of time, become an indisputable boundary.—H. L.

[12073].—**Lantern Slides.**—Mr. E. G. Wood, 74, Cheapside, E.C., has a series of 72 slides treating upon trees. They may be loaned for a shilling a dozen per day. The series range from the Wellingtonia to the Banana. The same optician supplies 51 illustrations of the oak from the infantile acorn to the famous oak of the ancients, destroyed by *Polyphus Sulphureus*.—HARRY HEMS.

[12073].—**Lantern Slides.**—These for timber trees, &c., can be obtained of Mr. R. Suter, 10, Highweek-road, South Tottenham, Middlesex.—H. L.

[12074].—**Lights.**—If the adjoining owner is building so that he has a yard or space 8 ft. wide between the building and the premises of "Anxious," the latter cannot interfere. He could only build a wall on his own boundary line. If he puts up a hoarding in the county of London he will soon get notice to remove it.—H. L.

[12074].—**Lights.**—"Anxious" has two courses open to him: he can make an arrangement with adjoining owner that he should acknowledge his right by a nominal payment, or he can, by erecting a hoarding on his boundary, prevent building owner from claiming a prescriptive right. The Prescription Act requires 20 years' uninterrupted use to obtain an easement over adjoining land; and if at the end of that time the windows remain unobstructed, he can claim a right of light. It has been laid down that if a party having a right stands by and sees another build, and makes no objection while the building is going on, he cannot afterwards complain. "Anxious" does not say if his neighbour is the owner of a previous window overlooking his land; if so, he may, as the owner of the dominant tenement, have a right. Of course, your neighbour has a right to build on his own land; but you have also a right to protect yourself, in case you intend building. By raising a wall or putting up a screen, "Anxious" may prevent his neighbour obtaining a right of light over his land, or he will at any rate be able to test his right. If his neighbour has, however, had free access of light over the garden for 20 years or more, "Anxious" cannot raise a building to obstruct the light.—A. H.

[12075].—**Surveying.**—An elementary treatise treating of the subject of levelling building sites is not published; but articles on the subject have appeared in the "B.N." and "Architect's Assistant" may find all he wants in Baker's and Dixon's "Surveying" (Lockwood), or in Simms's "Principles and Practice of Levelling," Haskell's Work on Surveying, &c.—G. H. G.

[12075].—**Surveying.**—Try the works by Baker in Weale's series; also the book by Mr. G. A. T. Middleton. Apply to Mr. Batsford, High Holborn.—H. L.

[12076].—**Projecting Cornices.**—"W. T. O." has no right to project his cornice over the land of his neighbour; but if it is essential to the design, why not have an agreement drawn up?—H. L.

[12076].—**Projecting Cornices.**—A projecting cornice or eaves would be an encroachment, and "W. T. O.'s" neighbour can demand its removal. I should advise "W. T. O." to come to terms with his neighbour.—S. W.

[12078].—**Sound-Proof Partition.**—"J. B." had better use silicate cotton as a lining on one or both sides of partition, or fill in between the studs. Apply to F. Jones and Co., Perren-street, Kentish Town, N.W.—G. H.

## CHIPS.

The memorial-stone of a new Free Church at Carnock, Fifeshire, was laid on Friday by the Earl of Moray. The church is to provide accommodation for 300 worshippers, and the cost is estimated at about £1,100.

Early on Tuesday morning a fire was discovered in the timber-yard of Messrs. Laverack and Goddard, timber merchants, Great Union-street, Hull. The moulding and turning departments were principally affected, and, although the fire was soon extinguished, the damage done is about £14,000. Great expense had recently been incurred in heightening walls and building arches. This contributed considerably towards keeping the fire in the area in which it had originated. The last great fire at Messrs. Laverack and Goddard's yard occurred on Aug. 11, 1887. Then a much larger area was attacked, and at least four times the damage done.

The Statute Labour Committee of Glasgow Corporation have recommended that Mr. William Wilson, Fort-William, should receive the contract to construct Kirklee Bridge, his offer of £21,729 2s. 10d. being the lowest of the four received. The bridge is to span the river Kelvin in North Kilmarnock to the Kirklee Station of the Caledonian Railway.

At Crewe, on Friday, a deputation of the Northwich Urban Council met a sub-committee of the Cheshire County Council regarding the construction of a new main road and bridging the river Dane at Northwich. At present London-road is treacherous owing to subsidence. The committee offered to give the present town bridge, pay half cost of removal and re-fixing, and a third of the cost of constructing the road. The Salt Union agreed to give land, materials, &c., and contribute £180.

On Saturday last Cardinal Vaughan laid the foundation-stone of the new chancel of the church in Quex-road, Kilburn. The present church was opened in 1879, and is now to be completed. The portion to be built consists of two bays of the nave and aisles, the sanctuary, side chapels, and sacristy. The sanctuary, 40 ft. in length, is to be apsidal in form. The total length of the church when completed will be 122 ft., the width being 50 ft., and the height 60 ft. The fabric is of brick with Bath stone dressings, and is Early Decorated in style. Messrs. Pugin and Pugin are the architects. The cost of the present additions is estimated at £5,500.

Major-General Crozier, R.E., an inspector of the Local Government Board, will hold an inquiry at the Salford Town Hall to-day (Friday) into the application of the corporation for the approval of the modification of the artisans' dwellings scheme relating to the borough, and for power to borrow £45,040 for the purpose of the housing of the poor, £8,000 for public walks and pleasure-grounds, £3,200 for the purpose of defraying half the cost of widening Regent-road bridge, and £10,765 for various street improvements.

## LEGAL INTELLIGENCE.

**DETAILED PARTICULARS AS TO PARTY-WALL ALTERATIONS.**—HOBBS, HART, AND CO., V. GROVER AND ROE.—In the Chancery Division, on Wednesday, Mr. Justice Channell, sitting as vacation judge, heard an application in this case, an action brought by Messrs. Hobbs, Hart, and Co., lock and safe manufacturers, of 75, Cheapside, E.C., against Mr. J. Grover, builder, of Hackney, as the building owner of the adjoining premises, 76, Cheapside, and his architect, Mr. R. Mauleverer Roe, F.R.I.B.A., of Basinghall-street, E.C. Mr. Mulligan, Q.C., and Mr. Gatey, instructed by Messrs. Savory and Stevens, appeared for the plaintiffs; and Mr. D. L. Alexander, Q.C., instructed by Mr. Emanuel, for the defendants. It appeared that, in this case, plaintiffs occupied the ground floor of 75, Cheapside, as shops, letting off the upper part of the premises as offices, &c. They received as adjoining owners a party-wall notice under the London Building Act, 1894, Part VIII., section 90, from the defendants, the building owner of No. 76, Cheapside, and his architect, in which defendants stated that they proposed to underpin, cut into, raise, &c., the party-wall between the buildings, quoting every kind of work referred to in section 88 of the Act, and asking plaintiffs to appoint a surveyor under the provisions of section 91. Plaintiffs applied for particulars as to the precise works to be executed, and defendants replied that at the present stage of proceedings they could not say what would or would not be necessary. Plaintiffs thereupon replied that so general a notice was not one fairly complying with the requirements of the Building Act, and refused to name a surveyor, or to concur in the appointment of one named by defendants, and now brought this action to compel defendants to give detailed particulars of their proposals. Mr. Justice Channell said he would not decide as to which of the parties' contentions was right, but upon defendant building owner and architect undertaking not to act upon that part of the notice having reference to raising the party-wall until he (the building owner) had given a further notice under the Act in respect thereof, and further undertaking to submit the plans to the plaintiff adjoining owner, the motion would be ordered to stand over until the trial of the action.

**A PAIGINTON ARBITRATION.**—At Churston County-court, on Friday, before Judge Woodfall, F. W. Vanstone, architect, of Paignton, claimed £24 10s. from H. P. Rabbich, builder, of Paignton, for professional services rendered. Plaintiff's claim was for professional services rendered in connection with defendant's contract for the recently erected board schools at Paignton. At 1 per cent. the total amounted to £54 2s., less £19 2s. abatement, and 10gs. paid on account, leaving a balance of £24 10s., the amount sued for. The case was referred to Mr. J. W. Rowell, architect, of Newton Abbot, for arbitration, and his award was for £3 10s. beyond the sum of 9gs. paid into court. The costs of the award were £4 14s. 6d. His Honour gave a verdict in accordance with the finding of the arbitrator with costs.

**ALLEGED UNFULFILLED CONTRACT.**—GEARY V. LAW.—At the City of London Court last week, before Mr. Registrar Wild, the plaintiffs, Messrs. Geary, Walker, and Co., 14, Queen Victoria-street, sued the defendant, Mr. V. Law, 18, Chesney-street, Battersea Park-road, to recover the sum of £1 6s. 3d., money had and received. The plaintiffs' clerk said that the defendant undertook to do certain floor-laying work at Wharf-road, City-road. The defendant did not finish the work. In consequence the plaintiffs had to send another man to complete the job, and they now sued to recover the cost. The defendant said he could not finish the work himself because he was laid up, but he left another man to complete the contract. Mr. Sewell, a floor layer, said he completed the work which the defendant was unable to do. The plaintiffs' clerk said they received a complaint from their customer that the defendant had left the work in an unfinished state. The witness Walker said that the work that had been done, and was now being sued for, was extra work, and nothing to do with the contract. The defendant, in answer to the Registrar, said that the plaintiffs had written to him about the work as follows: "If you do not go to this place at once we shall send someone else." Mr. Registrar Wild said the plaintiffs did not give the defendant an opportunity of answering plaintiffs' customer's complaint. There would be judgment for the defendant.

**ABBAY MANSIONS.**—The summons against the owner of Abbey Mansions (north block) instituted by the London County Council, under the dangerous structure clauses of the London Building Act, again came before Mr. Marsham, on Monday, at Westminster Police-court, to whom was presented the award by the arbitrator to whom the matters in dispute had been referred. Mr. Dalby, from the London County Council, said that the arbitrator, Mr. Clifton, had decided in their favour. He said that the building ought to be shored up—his



worship would recollect that this was a great bone of contention—that the defective stonework should be taken out and replaced, and, thirdly, that certain openings on the basement and ground floors should be filled up solid. A great deal of the work had already been done, and he could not say that the award was not being loyally acted upon. The question now was, Who was to pay the heavy costs and expenses? Mr. Pollock, for the owner, Mr. Pawley, said that he did not mind paying his own costs, but inasmuch that he denied the right of the Council to proceed under the Act he refused to bear the expenses of the complainants. After a long argument the question of costs was reserved until the superior Court decision on the earlier summons (heard last July) as to the building being vested in the Government.

**"ARCHITECTURE" (LIMITED).**—Under a winding-up order recently made against this company, the statutory meetings of creditors and shareholders were held on Tuesday at the Carey-street offices of the Board of Trade. Mr. Warley, Assistant Official Receiver, presided. It appeared from the chairman's statement that the company was formed in May, 1896, to take over the periodical *Architecture* from Mr. J. D. Morgan, and shares to the extent of £3,000 were issued to him as fully paid. There seemed to have been an arrangement for a quasi partnership between Mr. Morgan and Mr. D. H. Evans, under which the latter was to put £1,000 into the concern. As he was apparently not desirous of taking upon his shoulders the responsibilities of a partner, it was determined to form a limited liability company, and to issue shares to him for the £1,000. Beyond the shares allotted to Messrs. Morgan and Evans no other capital had been issued. The publication of the periodical ceased in June last. It seemed to him that the capital was considerably less than that required to carry on such a magazine. He understood that one of the reasons for the falling off in the circulation was the publication of a rival paper at half the price. The unsecured debts were returned at £2,539, and the assets at £221, while the deficiency as regards shareholders was stated to be £6,347. It was resolved that the matter should be left in the hands of the Official Receiver as liquidator, a committee of inspection being also appointed.

**CERTIFIED PLANS UNDER THE LONDON BUILDING ACT.**—At the Lambeth Police-court on Monday last Mr. E. W. Mitchell, builder, 322, Coldharbour-lane, Brixton, was summoned by the London County Council for failing to comply with a notice served under part II. of the London Building Act, 1894, to set back the external walls of a building erected in Grove Cottages, The Grove, Camberwell. Mr. Chilvers, from the Solicitor's department of the Council, prosecuted, and stated that the Vestry of Camberwell in April last called the Council's attention to some old cottages that were being pulled down in a way out of the east side of the Grove, Camberwell, and on a survey being made in May it was found that defendant was erecting a building on a portion of the site of the old cottages. He was warned by Mr. Ellis Marland, the district surveyor, that before proceeding with his building he should have had a plan of the old cottages certified. The defendant then sent a plan to the district surveyor, which was not correct, and which the district surveyor could not certify. A plan was, however, prepared by the district surveyor, and he informed the defendant he could have same on payment of his fees (£6 6s.). Defendant, however, never applied for the certified plan, but went on with his building, which was now complete, and at less than 10ft. from the centre of the way in question, which was used for foot traffic. Mr. Marland, the district surveyor, was called, and gave evidence bearing out these facts, and stating also that he had warned defendant not to proceed without the certificate. Defendant now contended that the district surveyor was only entitled to £2 2s. for certifying the plan, and not £6 6s., which he claimed; and he called the magistrate's attention to a case decided on the point by Mr. Bros at the North London Police-court. Mr. Chilvers pointed out that the judge of the Westminster County-court, in a more recent case, had decided just the opposite to Mr. Bros. The magistrate said with the defendant it appeared to be a question of fees; but with that he, the magistrate, had nothing to do. The only question he had to decide was whether the defendant had obtained the certified plans as required by Section 13 of the Act—which he had not, and he should therefore fine him £2 and £1 3s. costs; and he cautioned him that unless he complied with the Act, the Council could proceed to have the building demolished.

**CLAIM AGAINST THE LONDON SCHOOL BOARD.**—At the Surveyors' Institution on Friday, Mr. G. A. Wilkinson sat as arbitrator in the case of "Johnson and Aldridge v. the School Board for London," which involves a claim for compensation in respect of the compulsory sale of an extensive piece of building land at Catford Park, S.E. The claimants are builders, and their claim was based on their estimate of the loss of profit they were likely to sustain in covering the estate with houses, owing

to the erection of a school, which would prevent the property from being used for a good class of residences. Compensation was also claimed for the loss of ground rent on the plot actually taken by the Board; also for severance. The total claim was for £12,537, including the customary allowance of 10 per cent. for compulsory sale. A large amount of evidence was given, among the experts engaged in the case being Mr. Daniel Watney (Messrs. Watney and Sons), Mr. Samuel Walker (Messrs. Walker and Son), Mr. Daw (Messrs. Herring, Son, and Daw), Mr. Stocker (Messrs. Stocker and Ward), Professor Banister Fletcher, Mr. Cooke, and Mr. H. R. McCarthy. Mr. Wilkinson reserved his award in the matter.

**ARCHITECT'S CLAIM FOR UNEXECUTED PLANS UPHOLD.**—"Elwig v. Lewin" was an architect's claim of £12 10s. for professional services in respect of houses at Frant, and was heard last week by Judge Emden, at the Tunbridge Wells County-court. Mr. Robb, for the plaintiff, said that Capt. Lewin, a gentleman residing at Frant, wanted a terrace of four houses turned into one house, with a billiard-room, an entrance-hall, &c. His client worked at the plans for some time, and it was then that defendant said he did not want the cost to exceed £300. Plaintiff said it would be absurd to suppose that four houses could be transformed into a country mansion for that amount, and the cost would probably be £1,200. The plans were then modified, and this claim was brought on modified plans, amounting to £800. Plaintiff described the instructions he received, and said that £300 was not mentioned, and would have been quite inadequate for the work required. His first interviews were chiefly with Mrs. Lewin, and it was when he brought the pencil sketches that he was asked the cost, and stated £1,200, upon which Mrs. Lewin said their idea was about £300. He next prepared modified plans, and these were also considered too costly. Mrs. Lewin then produced a sketch of her own which he was to work out into proper plans, and this plan could not have been carried out for less than £800. This plan was approved, and he was instructed to get quotations as to material. He was then asked his charge, and he said the customary charge of 5 per cent. on the cost of the alterations, and 2½ per cent. in the event of the work not going through. Witness was cross-examined by Mr. Burton, who asked plaintiff how long he had been in his profession. His Honour said he would not allow that class of examination in his Court. Unless the defence was that the plans were not proper ones, the examination was insulting and unnecessary, and an attempt to terrorise a witness. Cross-examined, witness said his preliminary sketches were pencil ones, and if the matter had stopped there he should have been satisfied with two or three guineas. He was told then that the work was on too grand a scale, but he did not admit that the sketch was beyond his instructions. He did say the site was such a good one it would be a pity not to have a nice house. The subsequent plan embodied new suggestions, and the most expensive features were retained. The reason he went on preparing expensive plans was because the work wanted could not be done cheaper. Captain Lewin, for the defence, deposed that he distinctly asked Mr. Elwig at the first interview what his charge would be, and he did not give a direct answer, but said it would not be much. He never had any idea of these grand plans being prepared. He did not commission plaintiff as an architect and expect merely to have plans which he could not carry out. His Honour: If you are fond of luxuries of that kind you must pay for them. His Honour, in giving judgment, said there was no doubt that plaintiff was interviewed on several occasions, and his services were rendered in endeavouring to follow out the wishes of the defendant and his wife. He could not say that it had been in any way shown that the instructions were specifically confined to a £300 outlay. The defence failed, and the plaintiff was entitled to recover. There was no evidence to justify his Honour in coming to the conclusion that plaintiff had acted in any other way than an architect should. Therefore he was entitled to receive a remuneration. There would be judgment for £10 less £5 which defendant had sent to plaintiff in settlement.

**NORTH BRIDGE ARBITRATION, EDINBURGH.**—The proof in the arbitration between the Equitable Loan Company of Scotland and the Corporation of Edinburgh was resumed on Thursday, Friday, and Saturday in the Clarendon Hotel. The claim was for £27,500 in respect of compensation for the compulsory taking of the company's premises in Milne-square, and the consequent disturbance of their business. The arbiters were:—Mr. J. Smith Clark, S.S.C., for the claimants; and Mr. John Blair, W.S., for the corporation, with Mr. David Dundas, Q.C., as oversman, and Mr. John Shaw, S.S.C., as clerk to the reference. On Thursday the examination of Mr. Peter Laurence, surveyor, was concluded, and the claimants' proof was closed. The witnesses for the corporation included Mr. Hamilton Beattie, architect. Mr. Halden Beattie, builder; Mr. Scott Tait, C.A.; and Mr. John

Walker, C.A., all of Edinburgh; and Mr. Alfred James Puttock, auctioneer, London. The arbiters reserved their decision.

**MAIN ROADS MAINTENANCE ARBITRATION.**—The town council of Dorchester have now received the award of the Local Government Board in regard to the inquiry held at Dorchester by one of their inspectors on Tuesday, July 19, as to the difference between the Dorsetshire County Council and the town council as to the amount of contribution payable by the former body to the latter in respect of the maintenance and repair of the main roads for the year ending March 31, 1897. The amount claimed by the town council was £849 4s. 1d. The county council paid £651 15s. 4d., leaving a balance of £197 8s. 9d. in dispute. Out of the amount of £849 4s. 1d. claimed by the council, the Local Government Board have now made an order that the county council shall pay £821 8s. 2d. Thus the town council have an award for the payment of £169 12s. 10d. out of a balance of £197 8s. 9d. in dispute. For the footpath improvements £166 10s. 2d. was claimed, and £163 16s. 8d. allowed by the Local Government Board, this sum to be paid by the county council to the town council in ten equal annual instalments, the first to be paid forthwith. In the arbitration above referred to, the borough surveyor (Mr. G. J. Hunt) was supported in his evidence by Mr. F. W. Lacey, M.I.C.E., borough engineer of Bournemouth; Mr. E. P. Hooley, A.M.I.C.E., county surveyor of Notts, and Mr. J. Elford, borough surveyor of Poole. Evidence was given on behalf of the county council by Mr. W. J. Fletcher, A.M.I.C.E., supported by Mr. T. Codrington, M.I.C.E. This decision appears to have given much satisfaction to the members of the town council.

**RAILWAY ARBITRATION CASE FROM CHESTER.**—At the Surveyors' Institution, on Friday, before Mr. E. P. Squarey, sitting as sole arbitrator, an arbitration case involving a claim of nearly £1,000 came on for hearing. The parties to the action were Lord Kilmorey, claimant, and the London and North-Western Railway Company. The London and North-Western Railway Company are required to divert their line at the approach to Chester city, and for this purpose it is necessary on their behalf to acquire land belonging to Lord Kilmorey outside the municipal boundary of Chester, in order to carry out the improvement. Plans for the proposed diverted line were drawn up, and notice to treat for compulsory purchase was served on Lord Kilmorey's representative. The total area of land sought to be acquired for the improvement covered 2,305 square yards. It was contended that the land had a great rising value for building purposes, and a considerable sum more than that which would be offered by the company would be realised by setting out the land in plots for the purpose of running up houses. All around the neighbourhood, of late years, the value of land had continued to rise, because it was most central, within easy reach of three stations, and, whilst being outside the municipal boundary, had all the advantages of the gas, water, and sewers of the municipality. The claimant had placed his value of the 2,305 square yards at 6s. per yard. Mr. Henry Shaw Whalley, F.S.I., deposed to the growing value of the land. With reference to that proposed to be acquired by the railway company, he placed the 2,305 square yards at a purchase price of 6s. per square yard. That gave a total of £691 10s., and, added to that £69 3s., at the rate of 10 per cent. for compulsory purchase, the total value of the land would be £760 13s. Then there was an area of 1,775 square yards which would be injuriously affected, in consequence of the road having to be raised, and the corner plot having to be taken, and the compensation he placed for this at a value of 2s. per square yard. That gave a sum of £177 10s., and that, added to the other total, made altogether £938 3s. to be paid to Lord Kilmorey. Evidence was called for the company, and the arbitrator reserved his award.

The death took place on Tuesday of Mr. Philip Bracegirdle, the oldest servant of the Wilmsholw Local Authority. Deceased had been the surveyor for Wilmsholw for 20 years, and he was well known in all parts of the country. He had had charge of 34 miles of roadway, and he had also for some years discharged the duties of nuisance inspector.

Although the council of the Royal Academy will come to no final decision until after its meeting next month, it is practically settled that there will be shown for a winter exhibition the works of artists deceased during the past fifty years, while the New Gallery will devote itself entirely to the works of the late Sir Edward Burne-Jones.

The opening of a new Wesleyan school chapel at Meersbrook Bank, Sheffield, took place on Tuesday. The building is in the Free Renaissance style, and is of stone. The large room is 64ft. by 29ft., and with two adjoining vestries, there is accommodation for 350 people. The total outlay is estimated to reach £1,650.



## Our Office Table.

MR. THOMAS ARMSTRONG, Director for Art in the Science and Art Department, retired from the public service on Saturday under the age-limit rule. He had held the post since 1881, having been appointed in the room of Mr. (now Sir Edward) Poynter. The Lord President of the Council has agreed to a minute temporarily intrusting Mr. Walter Crane, lately appointed Principal of the Royal College of Art, with the duties of the Director for Art. If this arrangement is found to work satisfactorily it will probably be made permanent, and a head master appointed to teach the students of the Royal College of Art, the direction of the work and all administrative duties of the College being transferred to the Director for Art. Whereas in 1857 55,000 persons received art instruction under the scheme of the Science and Art Department, there are now over two million and a half students.

A PASTEL SOCIETY is being formed with a very strong committee to take the place of the defunct Society of British Pastelists, which used to exhibit in the Grosvenor Gallery. Mr. G. F. Watts, R.A., is the hon. president, and among the members of the committee are Messrs. Abbey, R.A., Boughton, R.A., Sir W. B. Richmond, R.A., Walter Crane, W. Rothenstein, C. H. Shannon, and Edward Stott, with M. Besnard, Paris, and the Danish artist F. Thanlow. Mr. Melton Fisher is the hon. treasurer, and Miss Marion Gemmel the hon. secretary. It is proposed to hold the first exhibition at the galleries of the Royal Institute of Painters in Piccadilly in February next.

A SPECIAL exhibition of drawings and prints showing the rise and development of popular illustration from the time of Dürer and the early Italian draughtsmen upon wood to the present day is being organised at the South London Art Gallery, Peckham-road, S.E., by Mr. Cecil L. Burns. Apart from the artistic interest attaching to the drawings, it will prove of educational value to students, and of great interest to artists to trace the influence exercised by the method of reproduction upon the style of the draughtsmen at various periods—from the ancient drawings done on the wood planks, through the copper engravings which supplanted them, and again through the boxwood engravings popularised by Bewick, to the modern photo-mechanical process block. The exhibition opens on Monday, Nov. 7, and will continue open till early in January. It is open free to the public from 2 p.m. till 10 p.m. As many pictures as possible by those artists represented by black and white drawings, amongst whom are such masters as Walker, Sandys, Pinwell, Sir J. Gilbert, Houghton, C. Keene, E. A. Abbey, and A. Parsons, are being collected for the exhibition by Mr. Burns, and a large number of illustrations have been lent by the authorities of South Kensington Museum.

UNDER the stimulus of the exhibition by the Northern Art Workers' Guild, a lecture on "Colour Possibilities in Pottery" was given on Monday night by Mr. William Burton, master of the Guild, at the City Art Gallery, Manchester. Mr. Burton referred at the outset to the tints possible to attain, ranging from pale yellow to chocolate, simply by the firing of different clays. We are so accustomed, as he said, in this country to using vessels made of a whitish clay in earthenware or porcelain that we are apt to forget that white is not the colour that clay burns to. White bodies in pottery, Mr. Burton pointed out, are a highly artificial product, neither indigenous to this nor to any other country in Europe, but a result of mistaken efforts to produce something that should vie with Oriental porcelain. He exhibited specimens of the tints produced by natural clays when fired. He showed also how it was possible to produce other tints by putting colouring matter into the clay. Amongst other things, he mentioned that the painted vases of the Greeks were in these earth colours. Mr. Burton made plain the technique of and the different appearances presented by the Oriental pottery and Italian majolica, with sandy faces or tin enamel. He observed that it was asked now why modern potters could not get the same effects of colour that were open to the potters who worked on those methods. The whole difference was one of technique. If we wanted the effects got by the majolica potter or the Persian, we must adopt their methods and materials. The

fact was that people did not want these things, but something else. Having the ordinary white earthenware and porcelain, we had made it imperative on the potter to produce an entirely different palette. In conclusion, Mr. Burton showed the effects of under-glaze and on-glaze, and referred approvingly to the work now made possible by using coloured glass in pottery.

THE town council of Edinburgh met on Thursday in last week for the special purpose of considering the various sites suggested for the Usher Hall, and finally resolved upon the Atholl-crescent site. After sitting in committee for four hours, a vote was taken as between Atholl-crescent and Chambers-street, when the former was carried by 24 votes to 12. Meeting afterwards in open council, an appeal was made by the Lord Provost for unanimity, and approval was given to the Atholl-crescent site by 32 votes to 5 in favour of Chambers-street. The town council had sought advice from Mr. Alfred Waterhouse, R.A., of London, and also of Mr. Hamilton Beattie, a local architect. Mr. Waterhouse in his report condemned the Atholl-crescent site. Only one front of it would, he said, be seen; it would face to the north-west, which was the worst aspect for a building of architectural pretensions; the approaches to it would be bad, while the new site would possibly prove a noisy neighbourhood. Mr. Hamilton Beattie's report was generally to the effect that the cost of the several sites would be much larger than had been officially estimated by Mr. Robert Morham, the Edinburgh city architect, and that the Atholl-crescent properties would cost £64,697, with an addition of £5,500 if three additional houses were acquired. This decision terminated in rather an unsatisfactory fashion a battle of the sites that has been in progress for the past two years.

At the last meeting of the Scarborough Town Council, Councillor Stephenson drew attention to the need for a revision of the existing borough by-laws as regards plans for buildings, saying that he considered it unfair to the architects and builders in the town that plans coming before the Plans Sub-Committee, and which did not happen to come under the by-laws, should be returned to them with "no order made thereon." Councillor Stephenson was ruled out of order in his effort to move an amendment at the council meeting on the subject; but at a meeting of the Streets and Buildings Committee on Friday night he brought the matter forward, and moved that a small committee be appointed, together with the borough engineer and the town clerk, to go through and revise the by-laws. A discussion followed this proposal, at the conclusion of which Alderman Hall rather startled the committee by remarking that the town clerk had been engaged in a revision of the by-laws for some time. Several members of the committee stated that if this were so, it was being done without the knowledge of the committee, and that the better plan would be to adopt Councillor Stephenson's proposal. The motion was then put and adopted.

THE old Nag's Head Inn, which is being taken down to supply a site for the new public library at Jedburgh, is the building in which, tradition says, Robert Burns was presented with the freedom of the Royal burgh. In the diary of his Border tour, Burns, writing of his stay in Jedburgh, says:—"Was waited on by the magistrates, and presented with the freedom of the burgh." This was in May, 1787. There is no corresponding entry in the burgh records, but recently the ticket of another burgess, an undoubtedly authentic document, granted about the same period, was discovered, and a search of the records showed that this also was not entered there, so that those who were fain to believe that Burns was a burgess of Jedburgh are now satisfied of the accuracy of the poet's statement. In dismantling the principal room of the inn, a series of paintings, evidently by amateur artists, were discovered on the plaster near the fireplace. They are six in number, some of them highly coloured views of mansions and woodland. It is suggested that this may have been the work of French army officers, who were prisoners in Jedburgh in the early part of the century. These prisoners were allowed on parole freedom of movement within certain boundaries, and there are several relics of their stay in Jedburgh—one of them a painting of Jedburgh Abbey.

THE secretary to the Society for the Protection of Ancient Buildings writes to the *Times* stating that since the works were begun for rebuilding the north-west tower of Chichester Cathedral,

"the west wall of the nave has been cracked from top to bottom, and a visitor approaching the Cathedral by the western porch will see two fresh long cracks over the large doorway, one being apparently about lin. wide, and the other  $\frac{1}{2}$  in. wide, and on entering the building it will be seen that the cracks go through the full thickness of the wall and run right up to the groining."

A MONSTER blast was fired at Furnace Granite Quarries, Loch Fyne, on Friday afternoon. The quarries have been worked for several years by Messrs. Sim and Company, Glasgow, and since the closing of the Craræ Quarries, they are the only granite quarries in constant operation along Loch Fyne side. Since February the work of constructing the mines for this blast has been proceeding under the direction of Mr. William Nicol, manager of the quarries. The process of tunnelling into Ducleckan Hill was by manual labour and blasting with gelatine. The narrowness of the cutting did not admit of boring with the steam drill. The entrance to the main heading faced Loch Fyne, and was carried straight into the face of the quarry to a distance of 75ft. At this distance into the rock a cutting was made to the left for a distance of 12ft. Here a chamber was cut out, which was 60ft. by 56ft. by 50ft., to contain blasting powder. A cutting was also made to the right of the main tunnel at a distance of 45ft. from the entrance. This cutting ran 43ft. into the hill, where another chamber was made of the same dimensions as that on the left. The height of the rock above the mine was 200ft. The amount of powder stored in each chamber was five tons, making the full weight of powder exploded ten tons. When the work of storing the powder was completed, the whole of the headings were built up with stone and cement. The blast was a great success, about 100,000 tons of granite being dislodged.

## CHIPS.

Mrs. Fowler, widow of Mr. James Fowler, J.P., F.R.I.B.A., of Louth, Lincolnshire, died on Sunday last at her residence, Grove House, Louth. Mrs. Fowler was well known to many members of the architectural profession, as, for many years during her husband's life, she was a familiar figure in the Architectural Association excursions.

Mr. Edwin O. Sachs's work, "Modern Opera Houses and Theatres," will see its completion towards the middle of November, when Messrs. Batsford, the publishers, will issue the third volume, which includes a treatise on theatre planning, with various supplements. This volume, like the others, will be grand folio size, and will include some 900 illustrations. A feature of the volume will be the particulars given regarding the finance, staffing, and management of the subsidised or endowed theatres of the Continent.

With regard to the scheme for the extension of Victoria Station, which has been published in the daily press this week, we are informed that the idea of the Brighton Company taking the Chatham Company's station, and the latter building another alongside with a frontage to Vauxhall Bridge-road, has been abandoned. The Brighton Company has practically resolved to extend on the western side of the station, and it is probable that the company's Bill for the forthcoming session will provide for the carrying out of this enlargement.

On Monday, in the lecture hall of the Literary and Philosophical Society, Newcastle-on-Tyne, Mr. Arnold Mitchell, F.R.I.B.A., delivered a lecture on "Mediæval Architecture" before a large audience. Mr. Mitchell exhibited on the screen a series of photographic views so arranged and so commented on *en passant* as to impart even to the uninitiated a comprehensible explanation of the features of Gothic architecture of the end of the 12th and the beginning of the 13th century.

At a private meeting of the Warrington Town Council, on Monday, it was unanimously decided to ask Mr. Alderman John Edward Wright, architect and surveyor, the present mayor of the borough, to accept the office for a second year.

A new United Presbyterian church at Harlford, N.B., was opened on Saturday. The church is Gothic in style, and is seated for about 400, while an adjoining hall has accommodation for 100. The cost is estimated at £2,700, and the architect was Mr. G. Andrew, Kilmarnock.

Alderman George Dew, of the London County Council, was presented with a money testimonial, accompanied with an illuminated address, by his friends in London and the provinces, in recognition of his services to the labour movement, at the Club and Institute Buildings on the 12th inst. Mr. F. Chandler, J.P., general secretary of the Amalgamated Carpenters and Joiners, was in the chair.



## MEETINGS FOR THE ENSUING WEEK.

SATURDAY (To-morrow).—Northern Architectural Association. Visit to Robinson's New Premises, Clavering-place, Newcastle-on-Tyne. 3 p.m.

THURSDAY.—Society of Architects. Anniversary Meeting, St. James's Hall, Piccadilly, W. 8 p.m. Carpenters' Hall Free Lectures. "Sanitary Construction, Warming, and Ventilation," No. 1, by Professor Banister Fletcher, F.R.I.B.A. 8 p.m.

FRIDAY.—Architectural Association. "Excavations at Thebes," by J. E. Newberry, A.R.I.B.A. 7.30 p.m.

**THE ARCHITECTURAL ASSOCIATION.**  
OCTOBER 25th—ORDINARY GENERAL MEETING, at No. 9, Conduit-street, W., at 7.30 p.m. Paper by Mr. J. E. NEWBERRY on "EXCAVATIONS AT THEBES," illustrated by Lantern Views.

E. HOWLEY SIM } Hon. Secs.  
G. B. CARVILL }

## The Society of Architects.

Founded 1884. Incorporated 1893.

The ANNIVERSARY MEETING of the Society of Architects will be held at St. James' Hall, Piccadilly, W., on THURSDAY, October 27th next, at Eight o'clock p.m., when the OFFICERS and COUNCIL for the Session 1898-99 will be duly ELECTED.

ELLIS MARSLAND, Hon. Sec.

## CHIPS.

The Swindon board of guardians have decided to invite competitive designs for the enlargement of the workhouse infirmary at an estimated cost of £3,000.

The urban district council of Ossett passed, on Monday, with other plans, drawings for sixty-six new houses to be built in the Leeds-road and Gawthorpe districts.

A new Liberal club facing the Market-place at Birstall, Yorks, and built at a cost of £1,100, was opened on Friday.

A Local Government Board inquiry will be held on Tuesday next, the 25th inst., at the town-hall, Manchester, by Major-General Crozier, R.E., and Dr. Theodore Thomson, concerning a site for an asylum for imbeciles and epileptics which the Manchester and Chorlton Joint Asylum Committee propose to erect at Anderton.

The death occurred in Paris on Monday, at the age of 79, of M. Eugène Lenepveu, the historical painter, and from 1872 to 1878 director of the French School in Rome. He executed frescoes for the Pantheon, for several Paris churches, and for the Opera.

A fair amount of business was transacted at the Auction Mart last week, the aggregate realisation amounting to £93,320; but better results might reasonably have been expected from the properties brought forward, which failed, however, in the majority of cases, to find purchasers. The demand continues firm for properties in good letting localities. Last year an aggregate of over £133,000 was compiled in the corresponding week, so that there is an adverse balance against this year of nearly £40,000.

By a fire which occurred on Saturday night in Penn-street, Bristol, Messrs. Griffin and Co.'s steam saw and joinery mills—one building of two floors, 90ft. by 20ft., and another 40ft. by 18ft.—were destroyed, and an adjoining turning mill of three floors, 40ft. by 20ft., was severely damaged.

It is asserted that the building of the long-desired and long-promised new bridge at Kew is once more indefinitely postponed. The lowest tender which has been received for the work turns out to be £50,000 in excess of the estimate upon which the Act of Parliament was based.

A new Congregational Church is to be built close to the site of the late Mr. C. E. Mudie's residence at Muswell-hill, N. The neighbourhood is rapidly changing, and hundreds of houses have lately been built and occupied in the district, while plans are at work for at least a thousand others. A site valued at £1,200 has been presented for the church, and Mr. Morley Horden has prepared plans for a building to cost about £8,500. The church will be faced with Kentish rag and Bath stone dressings. The foundation-stone will be laid to-morrow (Saturday).

Major-General H. D. Crozier, Local Government Board inspector, will hold a public inquiry at the town hall, Manchester, on Monday next, with reference to the application of the city council for the sanction of the board to the borrowing of £200,000 for the purposes of electric-light extensions.

Col. Langton, Local Government Board Inspector, will hold an inquiry at Morecambe to-day (Friday) into an explanation from the urban district council to borrow £60,000 for the re-sewerage of the entire district, and a further sum of £1,590 for works of private-street improvement.

## Trade News.

## WAGES MOVEMENTS.

ASHTON-UNDER-LYNE.—The joiners of Ashton-under-Lynde, Dukinfield, Stalybridge, Hyde, and Denton have decided to give six months' notice in November for an advance of wages and fewer hours of work. They will ask for an increase of 1d. per hour, and 2½ fewer hours per week. If this demand be conceded, they will then have 91. per hour and a week of 51½ hours.

LABOUR DEPARTMENT REPORT FOR SEPTEMBER.—The monthly report of the Labour Department states that employment in September remained generally good, most of the important industries continuing to be well employed. In the 117 trade-unions making returns, with an aggregate membership of 467,075, 12,027 (or 2.6 per cent.) were reported as unemployed at the end of September, compared with 2.8 per cent. in August, and with 4.4 per cent. in the 113 unions, with a membership of 462,292, from which returns were received for September, 1897. Employment in the building trades has continued brisk. The percentage of unemployed union members at the end of September was the same as in August—viz., 0.9, compared with 1.4 per cent. in September, 1897. The furnishing trades, though on the whole still well employed, continue to show a slight falling off in some branches. The percentage of unemployed union members at the end of September was 1.9, as in August, compared with 1.4 per cent. at the end of September last year.

MANCHESTER.—Lodge meetings in connection with the Manchester and District Joiners' and Carpenters' Union, which has a membership of nearly 2,000, took place last week at Pendleton and Swinton, for the revision of rules. It was stated that the building trade in the area covered by the union had been in a most prosperous condition during the summer, and there were at present no signs of depression.

The Birmingham City Council having applied to the Local Government Board for sanction to borrow £35,760 for works of sewerage, £7,000 for depot purposes, £4,735 for street improvements, and £4,205 for purposes of technical instruction, an inquiry on behalf of the Local Government Board was held at the Council House, Birmingham, on Friday, by Colonel A. G. Darnford, C.E.

The Fleetwood Urban District Council have decided to apply to the Local Government Board for sanction to borrow over £3,000 for the purpose of erecting a pavilion on the Mount facing the sea. The pavilion will provide shelter for over 1,000 persons.

The commissioners for Clydebank have now agreed to amended plans for the municipal buildings which they propose to erect at the west end of the burgh. The buildings include halls, court-room, police offices, baths, and a fire-station. The estimated cost is £27,000.

A public inquiry was held at the town-hall, Cleckheaton, on Tuesday, by Mr. H. H. Law, into an application made by the district council to the Local Government Board for sanction to borrow £6,000 for a cemetery, £3,530 for purposes of public walks and pleasure-grounds, £2,200 for street improvements, and £550 for sewerage works.

The cottage homes which have been erected at Mill Hill in connection with the Linen and Woollen Drapers', Silk Mercers', Lacemen, Haberdashers', and Hosiery's Institution were opened on Saturday. The homes, which occupy a site of nearly four acres, given by Mr. J. C. Marshall, of the firm of Marshall and Snellgrove, will afford accommodation for many of the less fortunate drapers throughout the Metropolitan. They have been built at a cost of nearly £13,000, from plans by Mr. George Hornblower, and were illustrated in our issues of May 6 and August 19 of this year.

**W. H. LASCELLES and Co.,**  
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**HIGH-CLASS JOINERY.**  
**LASCELLES' CONCRETE.**  
**Conservatories & Greenhouses.**  
**WOODEN BUILDINGS.**  
**BANK, OFFICE, & SHOP FITTINGS.**  
**CHURCH BENCHES & PULPITS.**

ESTIMATES GIVEN ON APPLICATION.

## LATEST PRICES.

## IRON, &amp;c.

	Per ton.	Per ton.
Rolled-Iron Joists, Belgian.....	£6 0 0	to £8 10 0
Rolled-Steel Joists, English.....	6 10 0	" 7 0 0
Wrought-Iron Girder Plates.....	5 15 0	" 6 10 0
Bar Iron, good Stacks.....	7 0 0	" 8 0 0
Do., Lowmoor, Flat, Round, or Square.....	17 0 0	" 17 5 0
Do., Welsh.....	5 15 0	" 5 17 6
Boiler Plates, Iron—		
South Staffs.....	7 17 6	" 8 5 0
Best Suedeshill.....	10 0 0	" 10 10 0
Angles 10s., Tees 20s. per ton extra.		
Builders' Hoop Iron, for bonding, &c., 2½ lbs.		
Builders' Hoop Iron, galvanised, 2½ lbs. 0d. per ton.		
Galvanised Corrugated Sheet Iron—		
No. 18 to 20. No. 22 to 24.		
6ft. to 8ft. long, inclusive	Per ton.	Per ton.
gauge.....	£10 15 0	to £11 0 0
Best ditto.....	11 5 0	" 11 10 0
Cast-Iron Columns.....	£8 0 0	to £8 10 0
Cast-Iron Stanchions.....	6 0 0	" 8 10 0
Rolled-Iron Fencing Wire.....	7 0 0	" 8 0 0
Rolled-Steel Fencing Wire.....	7 0 0	" 7 10 0
" Galvanised.....	10 10 0	" 11 10 0
Cast-Iron Sash Weights.....	4 0 0	" 4 2 6
Cut Clasp Nails, Sin. to 6in.	8 15 0	" 9 15 0
Cut Floor Brads.....	8 10 0	" 9 10 0
Wire Nails (Points de Paris)—		
0 to 7 8 9 10 11 12 13 14 15 B.W.G.		
8/6 9/0 9/8 10/8 11/0 12/0 13/0 14/9 15/9		
Cast-Iron Socket Pipes—		
Sin. diameter.....	£5 10 0	to £5 15 0
4in. to 6in.....	5 5 0	" 5 10 0
7in. to 24in. (all sizes).....	4 15 0	" 5 0 0
[Coated with composition, 2s. 6d. per ton extra; turned and bored joints, 6s. per ton extra.]		
Pig Iron—		
Cold Blast, Lillieshall.....	105s.	to 110s.
Hot Blast, ditto.....	87s. 6d.	to 92s. 6d.
Wrought-Iron Tubes and Fittings—Discount off Standard Lists f.o.b.:		
Gas-Tubes.....		75p.c.
Water-Tubes.....		70
Steam-Tubes.....		62½
Galvanised Gas-Tubes.....		80
Galvanised Water-Tubes.....		55
Galvanised Steam-Tubes.....		45
10cwt. casks. 5cwt. casks.		
Sheet Zinc, for roofing and work- ing up.....	£23 0 0	to £24 0 0
Sheet Lead, 8lb. per sq. ft. super.	14 17 6	" 15 17 6
Pig Lead, in lewt. pigs.....	14 17 6	" 15 17 6
Lead Shot, in 28lb. bags.....	17 10 0	" 18 10 0
Copper Sheets, sheathing and rods.....	82 0 0	" 85 0 0
Copper, British Cake and Ingot.....	75 10 0	" 77 10 0
Tin, Straits.....	60 0 0	" 65 0 0
Do., English Ingots.....	75 10 0	" 80 0 0
Spelter, Silesian.....	22 10 0	" 22 15 0

## TIMBER.

Teak, Burmah.....per load	£13 0 0	to £15 10 0
" Bangkok.....	10 10 0	" 14 10 0
Quebec Pine, yellow.....	4 2 6	" 6 0 0
" Oak.....	4 2 6	" 6 0 0
" Birch.....	3 10 0	" 5 10 0
" Elm.....	4 10 0	" 5 10 0
" Ash.....	3 15 0	" 5 0 0
Danish and Memel Oak.....	2 2 6	" 4 2 6
Fir.....	2 15 0	" 4 15 0
Wainscot, Riga P. log.....	4 15 0	" 6 5 0
Lath, Danish, p.f.....	4 10 0	" 5 10 0
St. Petersburg.....	4 0 0	" 6 10 0
Greenheart.....	8 0 0	" 8 10 0
Box.....	4 5 0	" 15 0 0
Sesquial, U.S.A. ....per cube foot	0 1 8	" 0 1 10
Mahogany, Cuba, per super foot		
lin. thick.....	0 0 5	" 0 0 6½
" Honduras.....	0 0 4½	" 0 0 6½
" Mexican.....	0 0 4	" 0 0 5
Cedar, Cuba.....	0 0 4	" 0 0 4½
" Honduras.....	0 0 3½	" 0 0 4½
Satinwood.....	0 0 5	" 0 1 0
Walnut, Italian.....	0 0 3	" 0 0 7
Deals, per St. Petersburg Standard, 120-12½ft. by 1½in. by 1½in.:		
Quebec, Pine, 1st.....	£13 0 0	to £24 10 0
" 2nd.....	13 0 0	" 16 10 0
" 3rd.....	6 0 0	" 9 10 0
Canada Spruce, 1st.....	8 10 0	" 10 10 0
" 2nd and 3rd.....	7 0 0	" 8 10 0
New Brunswick.....	7 0 0	" 8 0 0
Riga.....	7 15 0	" 8 15 0
St. Petersburg.....	9 5 0	" 13 15 0
Swedish.....	9 5 0	" 16 5 0
Finland.....	9 5 0	" 9 15 0
White Sea.....	10 5 0	" 17 10 0
Battens, all sorts.....	5 0 0	" 16 0 0
Flooring Boards, per square of lin.:		
1st prepared.....	£0 9 9	" £0 16 3
2nd ditto.....	0 8 3	" 0 13 3
Other qualities.....	0 6 6	" 0 7 6
Staves, per standard M.:		
Quebec pipe.....		
U.S. ditto.....	£35 0 0	" £42 10 0
Memel, cr. pipe.....	210 0 0	" 220 0 0
Memel, brack.....	180 0 0	" 190 0 0

## OILS.

Linseed.....per ton.	£16 15 0	to £17 7 6
Rapeseed, English pale.....	23 0 0	" 23 5 0
Do., brown.....	21 15 0	" 22 0 0
Cottonseed, refined.....	15 10 0	" 16 0 0
Olive, Spanish.....	23 15 0	" 29 0 0
Seal, pale.....	21 5 0	" 21 10 0
Cocoonut, Cochin.....	27 10 0	" 27 15 0
Do., Ceylon.....	24 5 0	" 24 10 0
Palm, Lagos.....	22 10 0	" 22 15 0
Oleins.....	18 15 0	" 19 15 0
Lubricating U.S. ....per gal.	0 6 8	" 0 7 6
Petroleum, refined.....	0 5 0	" 0 5 ½
Tar, Stockholm.....per barrel	1 0 0	" 1 5 0
Do., Archangel.....	0 12 6	" 0 15 0
Turpentine, American.....per ton	23 15 0	" 24 0 0



# THE BUILDING NEWS

## AND ENGINEERING JOURNAL.

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### COMMONPLACES OF PRACTICE.

ONE of the many things one learns by experience is the value of commonplaces. The aspirant to architectural honours or fame is impatient of practical details: he is apt to look with aversion on a great many things of a prosaic kind or of everyday occurrence; to him quantities, specifications, valuations, and the like are degrading and tedious minutiae of professional practice, which he thinks are most troublesome and distracting. The artist is supposed to be above all this, and seeks his rest and solace in design, archaeological research, or artistic work. The young architect who has fairly emerged from the art studio or sketching club very soon discovers that his fondest hopes are destined to be shattered; that his first and most lucrative clients are those who come to him for such very humdrum services and advice as to want him to assess the value of fixtures; to make a survey and report to him about an easement of light or support; to examine a builder's account, or to give his opinion on the drainage of his house. Can we imagine young Hopeful, full of lore and travel, who has been dreaming of palaces, churches, and great municipal buildings, in which he will be called upon to exhibit his art, settling down to such very ordinary work? But it has to be done. The anxiously looked-for gentleman's residence or church is long turning up, and he must live somehow, even if it is to plan the extension of Mr. Jones's house, or to plan a shop-front—a terrible fall for a man full of ideas worthy of stone or marble. Naturally he thinks he has mistaken his vocation; that modern architectural practice is really made up of surveys, valuations, and shops. It is galling, but has to be endured, and the main thing is how to master these neglected duties of his profession. We know that not one in fifty can turn his hand with any confidence to these matters. The youth goes into an architect's office because it is a profession in which his aptitude for drawing is satisfied, without knowing anything of the business in its many branches. He sees a number of very commonplace operations: measuring, squaring dimensions, quantities, surveys, preparing quantities, making details; but he thinks they are only accidental, not all necessary, and in this frame of mind he goes through his term of apprenticeship. But he soon discovers that it is just these things that are wanted, and he seeks to repair his deficiency. He writes to the professional journals for the names of books on sundry subjects, like light and air; advice on drainage, or how to specify certain things; how to calculate the strength of girders or roofs—just those things that ought to have been acquired during his pupilage. He blames his master for not teaching him—perhaps not without reason. Class-rooms and technical schools have to some extent supplied the deficiency of the office in practical or workshop details; but the real commonplaces of the profession, such as how to take out quantities, how to make a survey of dilapidations, or to advise on any legal question of easement or tenure, are not taught. We do not assert that all the things required by the practical architect are architecture; but they have come to be regarded as part of the business, and as such they cannot be neglected.

There are also the commonplaces of building. These are to a great extent, as Professor

Roger Smith said the other day, "mastered unconsciously while at work on drawings and tracings in the office." A great many things are learned, as it were, by heart. Such things as cornices, mouldings, architectural ornament, certain details of mason's work, joinery, and the like are learned by having to draw or trace them so often, and this is, of course, the best way of learning commonplaces. A youth has to draw or trace a drawing of a cornice or a piece of stone tracery, probably a great many times, and he cannot forget what they are like, or how the joints are made; or he has to trace the details of a timber or iron roof, and he learns almost intuitively after a few times how the members are put together or are connected. By drawing a thing the mind is set to work on a concrete example, the faculties of observation and reason are brought into play, which no mere reading of or inspection of a diagram in a book can exercise so thoroughly, and this is why the classroom diagrams or the lecture, unless followed by drawing, fail to teach so thoroughly as the office or the contract drawing. And there are numerous details of building that can be only learned through drawings or buildings. We doubt whether anyone has learned stonework by going through a course of lectures on theoretical masonry. The working drawings and the building mutually throw light on each other. Hundreds of details, like enrichments and mouldings, can only be learned by having to draw them. No definitions could impress them on the mind, and the commonplaces are nine-tenths of a building. They comprise everything from a girder to a door-fastening. Every operation has to be mastered in the shop or on the building, and involves the use of measurement, materials, and workmanship. Every detail has to be brought to a practical test: drainage must be perfect in line and gradient, good workmanship is demanded in the joiner's work or in iron construction, so that we cannot despise commonplace. Even the higher qualities of art call for a due sense of the limitations of materials and the demands of utility, so that we cannot conceive of a building planned or carried out successfully by anyone who has learned art in a scholastic or amateur-like way.

### ROYAL SOCIETY OF BRITISH ARTISTS.

WITH a few exceptions, no very strong or pronounced canvas is to be seen in the Suffolk-street Galleries. French, Italian, and Dutch influences are now so frequently seen that we can only estimate the merit of a picture by its realisation of nature. The old traditional manner is fast disappearing. In the Central Gallery perhaps the most important pictures are those by W. Holman Hunt, the original study for "May Morning on Magdalen Tower, Oxford" (7), Adam E. Proctor's "Seaweed Gatherers" (5), Arthur Meade's large picture "A Summer's Morn" (114), the symbolic pictures of R. Macell, and A. E. Fellowes-Pryne's decorative subject, "Rex Judæorum" (72); though several other smaller and less ambitious works have merit. Mr. Adam E. Proctor's "The Seaweed Gatherers"—three old women laden with baskets of seaweed on their backs trudging along the beach, is full of delightful atmosphere and pathos. William Kneen's "Child Reading" is natural, well-drawn, and in good colour (13). R. Macell's curious piece of symbolic painting "The Cup," in which the carved frame forms a part of the composition, is clever. The dejected artisan and his wife and child are painted with feeling. Despair is expressed in the faces seen in a dim light. Above, carved as a part of the scheme, is a figure bearing the chalice—the cup of compassion, a decorative way of

teaching the lesson of patience and hope. Montague Smyth's "Shades of Evening" (28), an avenue of tall poplars through which a solitary rider on horseback is passing, is full of quiet sentiment. The landscape, an open country, is seen in a dim light, and the painter has realised skilfully the subject he paints. The large sunny picture of T. F. M. Sheard, "The Blind Men Sitting by the Wayside," represents the incident narrated in Matt. xx. 30. The two blind men seated on the ground near the walls of the city are painted with realistic skill. The sunlight is strong and the shadows are sharp, but it is simply a narrative; the brilliant effect is cleverly depicted. Terriek Williams has a pleasing piece of colour in his "Market Place, Dieppe." The large figure subject, a woman in red cloak seated by a casement, under the title of "The Royal Standard" (32), by Hal Hurst, is strong in colour. Gilbert Foster has a grey-toned study "The Dewy Morn," rather too conventional in composition (40). Near it we must notice "Azaleas," by N. Prescott-Davies, a charming face of a girl with wreath of the flower, relieved by a background of white blossom—a figurative study. Impressionism is not rampant in W. H. Y. Titcomb's view of St. Ives, with the red glow of the setting sun on the village. J. Sanderson Wells's "Whitby" (51) is nice. Leonard Watts's "Across the Sands," two young girls in blouses, shoeless, walking along a sandy beach washed by the sea, is somewhat hackneyed; but the sense of freshness and clear sunlight has been realised. There is richness of colour in Alfred S. Edwards's "Craft on the Kil, Holland" (61). At the end of gallery, A. D. McCormick's small study of horses, "The Ploughing Team," is clever and vigorous; above is a large view of Cantyre, N.B., in which Frank Spenlove-Spenlove shows the desolate waste of coast under the shades of night, in rich tones of turquoise blue. Nos. 82 and 85 are upright panels, by Philip H. Newman, from the romance "Lieder Ohne Worte." The composition and handling are rich and decorative. In E. A. Fellowes-Pryne's decorative subject, "Rex Judæorum," Our Saviour is shown being led forth, His hands bound with cords, with the crown of thorns, from Pilate's tribunal. The procurator washes his hands before the multitude, and the calm figure of Christ, robed in red, between two officers, is about to descend the marble steps of the tribunal. Beyond are seen the clamorous mob, Jewish faces furious and relentless, and an excited throng. The narrative as recorded in Matt. xxvii. seems to have been taken by the painter. Horace Mann Liven's "The Mower" has movement and is charming in tone. Hal Hurst's full-length portrait of a handsome lady in white satin, wearing a rich fur-lined cloak, is excellently painted. Impressionism finds few exponents. C. H. Eastlake's large "Autumn Gold" (91) comes under this definition. The sunlit cottages of red brick and tile roofs, in front of which a river ripples along, reflecting the yellow, red, and golden tints of the trees, make a rich harmony of colour. The still larger picture of R. C. W. Bunney, "Returning from the Rose Garden," is an Italian scene; ladies carrying flowers are crossing a charming meadow, bordered by clipped trees, the whole suffused in the roseate tints of the evening sun. Conventional in composition, it has the charm of rich colour. Passing Horace M. Levens's portrait (108), William Strutt's little piece of genre, "Wallflowers"; the large grey canvas, "A Summer's Morn," by Arthur Meade is a finely rendered landscape of grey morning light, full of poetic feeling. The man ploughing a field and the early haze realise the freshness of English country life.

Robert Morley's important landscape, "In



Flood Time," a waggon drawn by horses crossing a swollen stream, is carefully handled, but lacks atmosphere. There is breadth in J. Percy Inskip's charming village by the sea, "In the Morning Gleam" (123), and we also note the large pathetic subject "Rescued" (125), by Walter Morgan, where the hauling-in of a lifeboat in a tempestuous sea that breaks over the sea-wall is painted with much power. A young lady in a helpless condition has been rescued, and is carried in the arms of a stalwart lifeboatsman to the landing-place. Another boldly-painted picture is Wright Barker's group of horses and colts, "Maternity." William Hunt's large imaginative subject "Ashtaroth," representing the imposing and gorgeous mythic moon-queen, is decorative in its brilliancy and colour. We can only glance at Arnold Heleke's "Christchurch" evening effect; Hal Hurst's clever "Portrait of Hal the Younger" (137), broad and grey in tone, and the small figure-subjects by T. Watt Cafe, the nice colour in Harry G. Shield's "Inverkeithing Bay"; W. Henry Gore's "Culprit" (159), a little girl reprimanding her dog, Gilbert Foster's large landscape, "Creeping Shadows," Ralph Hedley's "The Skipper's Guests" (168), a clever cabin interior with young girl and child sitting down, about to partake of a hot soup served by a black waiter. Robert Christie's decorative panel, "Music," some clever figure studies by J. Sanderson Wells and Haynes King; a brilliant seaside scene, "A Summer Nursery," children disporting themselves on a sandy beach; an ambitious composition by Abbey Altson, "Paradise Lost"; a pleasing study of a child and kittens (201), are among the pictures that will win popular, if not more appreciative, favour. No. 218, by W. Lee Hankey, "The Tangled Well," is a delightful study of a peasant girl at a well, one of the best things of the kind; there is breadth and simplicity in the handling, and the summer evening light adds to the quiet sentiment sought to be conveyed. His "Little Sister" is also a broad clever study of cottage life, and the colour very charming. "A Grey Day" (246), "A Vicarage Garden," "Cotter's Son," are other unaffected and sympathetic renderings of country life. A fine breeze-swept landscape, a road through open common, by W. Tatton Winter (205), is fresh and atmospheric; so is his "The Wet West Wind" (219). Reginald Smith's No. 217, a sandy beach, with reflection in the pool left by ebbing tide, is worth notice; and other creditable works are L. Burleigh Bruhl (222), "Alone," a touching cottage interior and figure of a solitary woman (226), by H. Childe Pocock; A. D. McCormick (229), a clever figure scheme in dark grey and white. W. Harding Smith has two views of streets in Goslar, North Germany, 291 is the best. A soft seaside harmony comes to us in R. Smith's large "Blue Sea" (272), and Leopold Rivers, as usual, charms with his soft evening village scenes, as in 276 and 277, both in Surrey—one at Witley; and works by W. Ayerst Ingram (247), John Eyre (284). The President's work on the screen is a most interesting and unique collection of colour studies, in Sir Wyke Bayliss's charming and poetic manner. The sketches in Siena Cathedral as the baptistery and the pulpit; Bourges cathedral, ambulatory of choir, and those of Coutances, Treves, St. Peter's, are delightful studies in simple colour, in Sir Wyke's sketchy and brilliant manner. The large interior of Milan from south aisle of choir is a noble perspective, full of colour and mysterious gloom. In the North-West and East Galleries we also find a few admirable water-colour studies and sketches by John Eyre (284), John M. Macintosh (340), Gifford H. Lenfestey's "Field Flowers," W. Luker's "Among the Broom," G. S. Walters, H. Sylvester Stannard (330),

Geo. C. Haité's "Cloud and Vaporous Mist" (303). In the vestibule are several clever studies by F. Hamilton Jackson.

## MODEL SPECIFICATIONS.—XXXVI.

FOUNDER AND SMITH—IRON ROOFS—CASEMENTS.

**L**AST week we described a few general items, such as cast-iron columns, stanchions, and rain-water goods; and we now dwell on a few other matters, like iron roofs and metal casements. It is necessary to require the wrought iron to be of a certain quality and strength, and for superior work the best South Staffordshire iron is often specified, especially for plates, bars, tees, and angles. The specification test varies; some require a tensile stress of 20 tons per square inch, others 22 tons per inch, with a reduction of area at fracture of 10 to 15 per cent. Specimens of the iron ought to be submitted to the architect to be tested at Kirkaldy's, or other testing place. Rolled iron should be of English manufacture, all plates and bars to be planed at the ends to make true joints, and the bolts, nuts, and straps may be Low-moor iron. Specify market sections and scantlings. These are numerous, and include plain flat bars, angle-irons, T-irons, I-beams, and channel sections, and from these roofs and other trusses can be built. Some engineers specify that iron bars should bear a tensile stress of 23 tons per square inch, with an elongation of 30 to 40 per cent. They also require that the iron be tested by being bent hot or cold to different angles without showing signs of fracture.

For iron roofs the student is referred to special treatises. We shall here only refer to a few details for specification. Principal rafters of small spans are often of T-section; for spans of over 60ft. the upper flange may have plates bolted to it, or double angle channel iron is used, connected in the centre, of H shaped section. Purlins may be of angle, T or I-shaped section, or they may be of timber or combined with iron. Struts are of angle or T-iron. Tie-rods may be of round iron or steel, or of flat bars. The sectional areas of all these are determined by calculation or graphically.

**Connections.**—These are important in specifying iron roofs. We give a few examples from executed work. The joint of a queen-bolt truss between the two centre struts, king-bolt, and tie-rod may be formed as in sketch 4. If the tie-rod is of flat iron or L-shaped, the struts and rod may be held by two  $\frac{3}{4}$ in. plates, as in sketch 5. For the feet of principal, flat wrought-iron plates,  $\frac{3}{4}$ in. or  $\frac{1}{2}$ in., may be used on each side, or if the rafter is of two-angle irons, one plate of, say,  $\frac{3}{4}$ in. or  $\frac{1}{2}$ in. may be placed between. All these plates are bolted or riveted to the rafters.

The patent joints or couplings of Messrs. Handyside, of Derby, may be used for steel tie-rods. Instead of the ends of rods being forked, they are bolted to steel straps. Eyes and forks are thereby avoided, and the joint is neater in appearance. We show in sketch 5 a tie made of flat bar-iron, or T-iron, and the way the king and struts are connected. Two plates of the shape shown, of  $\frac{3}{4}$ in. thickness, are placed one on each side of the tie-bar and struts, secured by  $\frac{3}{4}$ in. bolts. The joint of tie-bar may be in centre. Sketch 3 is the ordinary mode of joining a round tie-rod with two  $\frac{3}{4}$ in. circular plates placed horizontally, through which the eyes of the tie-rod are bolted by  $\frac{3}{4}$ in. bolts. The king-rod passes through the centre of plate, and is secured by nuts top and bottom, and the T-iron struts,  $\frac{3}{4}$ in. by  $\frac{3}{4}$ in., are also bolted through as shown.

Purlins of wood can be secured to iron rafters by angle irons bolted to upper flange

of rafter, and the purlin placed on the upper side of angle and bolted through.

Cast-iron connections between struts and ties should be avoided, and for all tension rods screwed ends are the best, as they can be adjusted; welds are objectionable.

Details 1 and 2 show how the shoes on a girder for a roof of 40ft. span can be arranged from an actual example. The roof is of a trussed rafter type, with two struts, rafters of T-iron, and the struts at right angles of double T-iron, riveted back to back; the tie-rod is of round iron. Detail 4 shows a similar connection made on cast-iron girders and columns. The tie-rod is attached to chairs on ends of girder next the head of column; they are separate castings bolted to girder. The ends of girders bulge or grasp the head of column, and are secured by burrs cast on them, round which a coupling link of wrought iron is placed which holds the ends together. The gutter shown in section discharges through casting at top of column, which is hollow, and forms a down pipe.

Sections 6 and 7 show some patented iron casements made by Messrs. Burt and Potts, and 8 and 9 are those manufactured by Jas. Hill and Co.

**17. Wrought Iron.**—The whole of the wrought-iron to be of the best double-wrought Staffordshire iron, capable of bearing the following strains:—For angle and T-irons, 22 tons per square inch; contraction of area at point of fracture, 15 per cent. For flat, round, or other shaped iron, 23 tons per square inch; contraction of area at point of fracture, 20 per cent. The contractor is required to supply samples of all materials for testing. Or—for plates, flat bars, angles, tees, &c., the tensile resistance is not to be less than 21 tons per inch with the grain, and 18 tons across the grain, with elongation of 12 and 9 per cent. respectively.

**18. Rivets and Bolts.**—The rivets and bolts to be made of the best scrap iron; the bolts and nuts to have strong and clean threads of uniform pitch, and all exposed heads to be hexagonal; or bolts are to be made to Whitworth's standard, with ample length of screwed part. All bolt and rivet holes to be accurately marked from templates, and the rivet holes to be carefully drilled, and sharp edges to be taken off. The rivets to have proper diameter and pitch (as shown), and the heads to be neatly formed. No plugging of wrong holes will be allowed. Or—the rivet iron to have a tensile strength of not less than 24 tons per square inch.

**19. Bars, Angles, Tees.**—All bars, rods, angles, tees, and other iron must work well at a cherry-red heat, and must bear swaging, drifting, and welding without undue wasting, splitting, or cracking. All angle and tie-irons, &c., must be brought to a proper heat and carefully bent.

(Rolled iron or steel joists are often strengthened by being placed side by side, and bolted through with bolts, nuts, and heads and cast-iron or barrel tubing; or cover-plates are riveted to flanges. These compound girders are made in several forms. A simple box form can be built up with two rolled joists, and a top and bottom plate riveted, or two channel irons or steels and two plates riveted together).

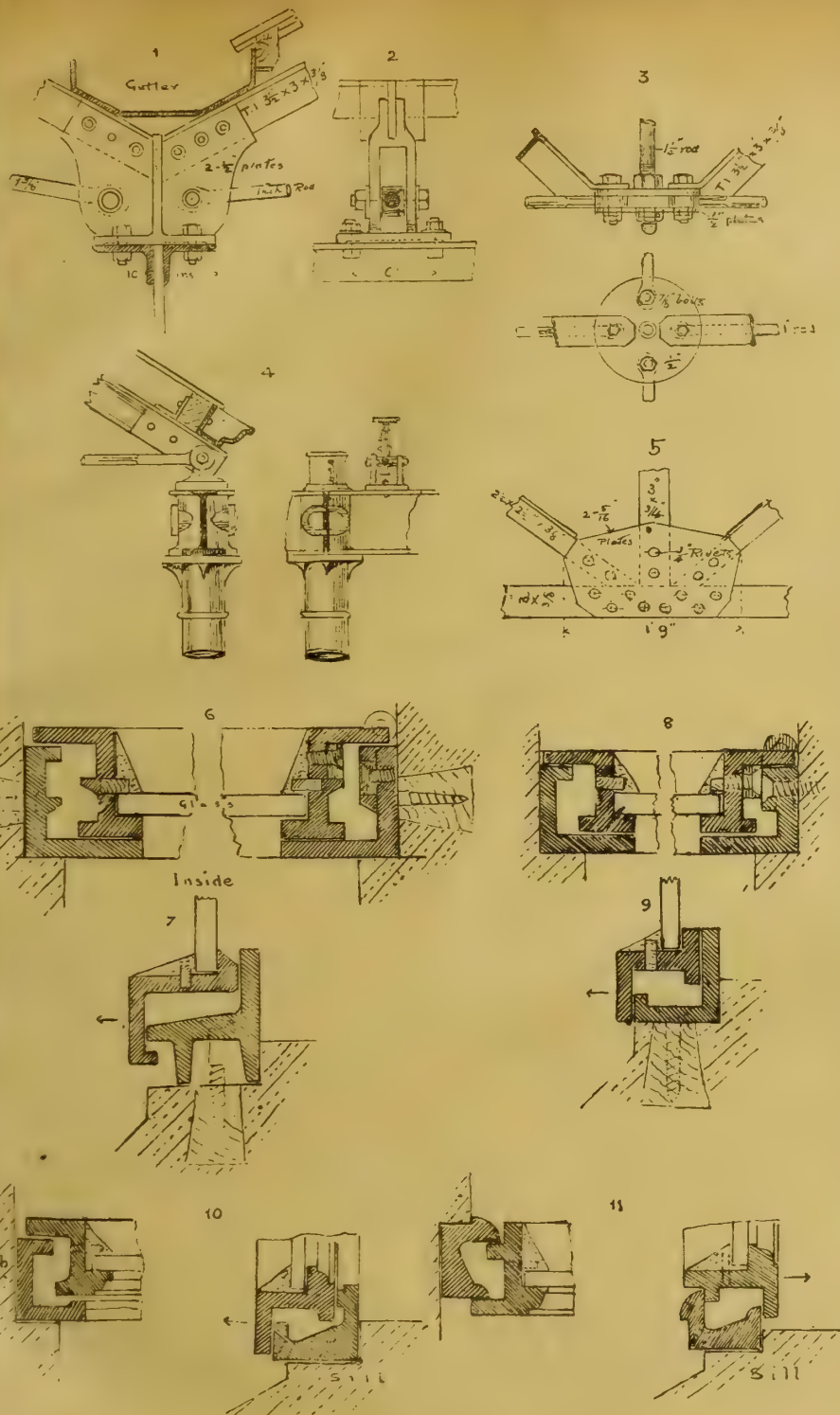
**20. Rolled Girder.**—The wall to be carried by two rolled iron joists 8in. by 5in. (or 9 $\frac{1}{2}$ in. by 4 $\frac{1}{2}$ in.) of 21lb. (or 27lb. per foot) of 16ft. or 18ft. span, riveted together side by side, with top and bottom flange plates, supplied by Messrs. Homan and Rodgers (or Messrs. Measures Bros.), each girder tested to carry a safe distributed load of 4 $\frac{1}{2}$  tons or 7 $\frac{1}{2}$  tons.

**21. Plate Girder.**—The girder supporting wall marked A on plan is to be of the dimensions shown in detail drawings (or describe depth, width of flanges, thickness, &c., and angle-irons, flanges, stiffeners, cover-plates, the distance apart of rivets, and to be tested to carry — a safe central or distributed load of — tons.

(For details we refer the reader to special treatises. Specify  $\frac{3}{4}$ in. rivets, and  $\frac{3}{4}$ in. plates at the least; that the ends of cover-plates should be evenly planed, and be made to butt truly at the joints. Specify the number of rivets and pitch; if ends are to rest on rollers, &c.)

**22. Generally for Wrought-Iron Work.**—All the plates, bars, covers, and stiffeners to be made of the sizes marked on the drawings, and make the number, size, and position of rivets in each part as shown. The edges of web-plates to be truly planed (not chipped) after straightening, so that they may meet each other, and the inside surfaces





of the flanges to make close joints. The flange-plates are to be carefully straightened, and if the flanges are more than 12in. wide, or are of more than one layer of plates each, the edges of the plates are to be planed at right angles to length, to bring them to the same width, to fit properly, and their ends to be planed at right angles to length of plate, to produce uniform bearing at the joints, especially in the upper flange. All packing pieces to be fitted to the spaces they are to fill. All rivet-holes are to be drilled out of the solid or punched  $\frac{1}{8}$ in. less in diameter than the finished size, and broached out to the finished size in a broaching machine. The rivets to have cup-heads not less than three-quarters of the diameter of the body of rivet, and the diameter of the finished head to be nearly twice its diameter. All rivets to be thoroughly closed by hydraulic riveters; or, if by hand, the rivets are to be made extra hot, and riveted up quickly, to insure the filling of the holes.

**23. Iron Roof (40ft. span).**—The iron roof trusses over bath (or shed) to be constructed in strict conformity to the working drawings and details, and to have the following scantlings. The principals to be 7ft. apart. Principal rafters of T section  $3\frac{1}{2}$ in. by 4in. by  $\frac{1}{2}$ in., struts of T iron

$3\frac{1}{2}$ in. by  $2\frac{1}{2}$ in. by  $\frac{1}{2}$ in.; king-bolt (a)  $1\frac{1}{2}$ in., queen-bolt (b and c)  $\frac{1}{2}$ in. and  $\frac{1}{2}$ in.; tie-rod in centre bay,  $1\frac{1}{2}$ in. diam.; in end bays  $1\frac{1}{2}$ in. and  $1\frac{1}{2}$ in. The tie-rod to be cambered 1ft. in the centre. The shoes to be as detail, of 1in. metal in thickness,  $7\frac{1}{2}$ in. long, and to be bolted by  $\frac{1}{2}$ in. bolts, nuts &c. to girder plate in centre, supported by L iron brackets, 3in. by 3in. by  $\frac{1}{2}$ in., with packing as shown. At the ridge principals are to be bolted to two  $\frac{1}{2}$ in. plates, with  $\frac{1}{2}$ in. bolts, and the king-bolt to have  $1\frac{1}{2}$ in. bolt nuts, heads, &c. The ridge to be formed of T iron,  $3\frac{1}{2}$ in. by  $3\frac{1}{2}$ in. by  $\frac{1}{2}$ in., on top flange of which the wooden ridge for common rafters to be laid, fixed by  $\frac{1}{2}$ in. bolts to iron cleats. The connection of struts to principals and queen-bolts to be as shown, with  $\frac{1}{2}$ in. straps 10in. long, and  $\frac{1}{2}$ in. bolts; the wooden purlins to be connected to rafters by 2in. by 2in. by  $\frac{1}{2}$ in. cleats, bolted to iron principals by  $\frac{1}{2}$ in. bolts, and the wooden purlins to be secured by  $\frac{1}{2}$ in. wood screws, 3ft. apart. Provide all necessary bolts, cleats, straps, plates, and packing. Make all riveted joints with  $\frac{1}{2}$ in. rivets, and with neat heads. (Wind-bracing is usually required in these roofs.)

**24. Roof of Drill Shed (50ft. span).**—Construct iron roof as shown in detail drawing, and of the

following scantlings:—Principal rafters, 4in. by  $3\frac{1}{2}$ in. by  $\frac{1}{2}$ in.; the struts to be each of two flat bars, 3in. by  $\frac{1}{2}$ in., kept apart by three cast-iron distance-pieces or ferrules, so as to form a bowed or tapering strut, and riveted together by  $\frac{1}{2}$ in. rivets, the tension-bars to be of round iron, 1in. and  $\frac{1}{2}$ in. diameter, and the tie-rod to be  $1\frac{1}{2}$ in. in centre, and  $1\frac{1}{2}$ in. at ends. The wooden purlins to be bolted to angle-iron cleats, six to each rafter. The ends of rafters to be constructed as shown in detail (Fig. 4). The tie-rod to be attached to cast-iron chairs on the heads of columns carrying the roof, and to be bolted to cast-iron girder close to head of column. (These columns are cast iron and hollow, and the gutter shown in sketch discharges through the socket next to chair. The ends of girders are made to expand and grasp the head of column, and have burrs or lugs cast on them, secured by a coupling link to hold them and the column in place.) Provide all necessary plates, bolts, rivets, and packing for connections.

**25. Truss of Roof (60ft. span).**—The roof over shed (or bath) to be constructed with trussed rafters with three struts, as shown. The rafters to be of T-iron, 5in. by 4in. by  $\frac{1}{2}$ in.; struts of double T-iron, riveted back-to-back, 4in. by 4in. by  $\frac{1}{2}$ in.; king-bolt  $1\frac{1}{2}$ in., tension-rods  $\frac{1}{2}$ in. diameter, and steel tie-rods  $1\frac{1}{2}$ in. diameter in centre,  $1\frac{1}{2}$ in. second bay, and  $1\frac{1}{2}$ in. in end bay. The connections to be formed as shown in detail, the tie-rod and king-bolt to pass through a steel strap or loop  $2\frac{1}{2}$ in. by  $\frac{1}{2}$ in., and to be bolted inside loop with hexagon and square steel nuts. Or—the connections of struts, tension-rods, and king-bolt to have Handyside's patent couplings of the form shown. At the apex or junction of rafters, steel tension-rod and bolt to be formed by two  $\frac{1}{2}$ in. plates on each side of rafters, with steel straps and steel pins to tension-bars, and  $\frac{1}{2}$ in. bolts and packings each side of rafter. The ends of tie-rod at wall to be secured by  $1\frac{1}{2}$ in. steel pins, passing through steel strap  $3\frac{1}{2}$ in. by  $\frac{1}{2}$ in., and to two  $\frac{1}{2}$ in. plates, bolted on each side of rafters by  $\frac{1}{2}$ in. bolts. The whole to be bolted to stone template in wall by  $\frac{1}{2}$ in. lewis bolts, with all necessary angle-irons, bolts,  $\frac{1}{2}$ in. packing each side of rafter, &c. (The struts may be formed as in last clause, of two flat bars bowed out in centre with cast-iron ferrules 3in. by  $\frac{1}{2}$ in., and 2in. by  $\frac{1}{2}$ in.)

**26. School Casements.**—The windows of school (marked A) to be fitted with wrought-iron casements without frames, of lin. by  $\frac{1}{2}$ in. by  $\frac{1}{2}$ in. angle iron, 4ft. 6in. high, hinged at side on strong brass hinges to open outwards, and prepared for plate or leaded glass in one pane each. Or—

**27. Cottage Casements.**—Provide and fix to windows of cottages Burt and Potts' wrought-iron casements, section No. 5, quality No. 1, fitted with bronzed gunmetal handles, and push-out stays dropping on to pins. The casements (without frames) to be hung with brass hinges to open outwards, and to be lin. by  $\frac{1}{2}$ in. angle iron. (These casements can be fixed to wood mullions and frames, but they are not guaranteed watertight. Or—specify the same of gunmetal.)

**28. Iron Casements.**—Provide and fix to all the windows of ground floor Burt and Potts' (York-street, Westminster) wrought-iron (or gunmetal) casements and frames, section 1, quality 2, complete with hinges, gunmetal stays, and fastenings fixed and bedded in white-lead to stone (or wood) frames. Or—

Provide and fix to windows wrought-iron (or gunmetal) casements and frames, 4ft. 6in. (or 5ft.) in height, with all corners riveted and brazed, with gunmetal lever handles, with plates and swivel stays at bottom, or with double-slide fastenings. Or—

The windows of principal rooms to have wrought-iron (or gunmetal) casements and frames 4ft. 6in. high, of the sections shown in sketches 6 and 7, or of Burt and Potts' manufacture (section No. 9, quality 1), fitted with gunmetal lever handles, polished, fixed to plates, with best quality swivel stays at bottom, and treble slide fastening. The casements to be fitted into a rebate on the stone jambs, screwed to dovetail blocks, and to be glazed with  $\frac{1}{2}$ in. plate-glass bedded in putty (or leaded lights).

There are several kinds of patented arrangements of the N.A.P. metal casements. Specify as follows:—

**29. Side-Hung Casements.**—Provide and fix to window openings marked on plan (after the plastering is finished) the patent N.A.P. steel "slip" casements (opening outwards) fitted with handles and stays (first or second quality), the designs numbered 29 or 32 in catalogue of the N.A.P. Window Company, Limited, 159, Victoria-street, from whom the casements are to be obtained. The side-hung casements to be fitted with saddle bars for lead glazing—in. apart, and glazing bars to divide light into—panes. (State if fillets are to be provided for grooved mullions, heads, and sills, condensation channels,



and if fixed lights to match the "slip" casements are to be provided, and if top-hung, bottom-hung, or otherwise.) Or—

Provide and fix to openings marked on plan the N.A.P. steel casement "double knuckle" patent, fitted with handles and stays (first or second quality) designs numbered in catalogue; or the "Clear Frame Intermediate Stile Patent" (or any other of the descriptions enumerated in the N.A.P. catalogues. Ventilation and cleaning facilities are given by these casements). See catalogue.

Provide and fix to all windows of ground and second floors Jas. Hill and Co.'s new registered section of brass (orgunmetal) casements in rebates of jambs, heads, and sills (see sections 8 and 9), properly screwed to jambs, with plugs, and bedded in white lead, and fit same with Jas. Hill and Co.'s gunmetal lever handle, with best gunmetal fastenings and stays No. 2,710 (or No. 1,278R. to be approved).

30. *Transom Lights*.—The transom lights to have wrought-iron (brass or gunmetal) lights, hinged at bottom to open inwards, with gunmetal bearings and approved patent opener; or fitted with Hill's patent opener, cord and screw action; or specify Hill and Co.'s No. 1687R wrought-iron or brass light, 2ft. 6in. wide, fitted as above.

#### THE ORDNANCE SURVEY.

THE report of the progress of the Ordnance Survey up to March 31, 1898, has been issued as a Parliamentary Blue-book. Dealing first with England and Wales, the report states that the publication of the revision of the cadastral survey on the 1-2500 scale is proceeding as rapidly as possible, the total area published being 9,236 square miles, of which 5,217 square miles have been published during the year. The revision has now been taken up of all the counties of England and Wales which were surveyed more than 20 years ago. The publication of the revised maps on the 6in. scale has been hitherto much retarded by the publication of the new maps on this scale of London and the Tyneside towns. This latter work is, however, now approaching completion, and more rapid progress is expected in future. The total area on this scale published is 3,788 square miles, of which 3,609 square miles have been published during the year. With regard to the revision of the 1in. map, which was sanctioned by the Treasury in 1893, the report states that the fieldwork of the revision was begun in 1893, since when the whole of England and Wales has been revised on the ground, with the exception of a few streets in the midland counties and North Wales, which will be completed this year. Of a total area of 58,527 square miles thus revised 14,643 have been revised during the year. The revised maps of 28,305 square miles have been engraved and published, 5,282 during the year. The general result to be obtained by the revision is that in 1899 there will be available to the public for the first time a 1in. outline map of the whole of the country, prepared on one uniform system, and with its principal details nearly up to date. It is further stated that the revision of the map in the scale of 4in. to the mile will follow on that of the 1in. map, but cannot proceed very rapidly until the latter has been completed. After giving some details with regard to Scotland and Ireland, the report, in a summary and tabular statement of progress for 1897-98, shows that, so far as the original surveys of the United Kingdom are concerned, the town surveys for Great Britain and Ireland, the 1-2500 maps for Great Britain, the 6in. maps, and the 1in. maps for Great Britain and Ireland have all been completed, while the hill engraving for the new series 1in. map of England and Wales is proceeding, 4,262 square miles out of a total of 27,569 published on March 31, 1898, having been published in 1897-98. Considerable work has also been accomplished in the way of resurveying.

#### THE LONDON SKETCH CLUB.

THE private view of the London Sketch Club's first exhibition of "time" sketches and sketches from nature was opened on Tuesday last, at the Modern Gallery, 175, Bond-street, and the exhibition will remain open till the 29th. Amongst the contributors we notice several pleasing sketches from the president, Geo. C. Haité, R.B.A. A study of trees (9) and a charming grey-toned sketch, "On the Broads,"

and No. 78, "Beaulieu Fair," amongst several others. Dudley Hardy, R.I., the vice-president, contributes several very vigorous and brilliant sketches; Nos. 23 and 24 are spirited—one a figure subject, "The Spaniard," another, "An Interior," also the L.S.C. sketches, "The Reunion" (31) and "Gone," a dark cottage interior. An empty cradle tells the tale. The solitary figure of the mother and the accessories are touching. "After the Bath," a lady in her bathing costume, enveloped in light drapery running up the beach is well drawn. Phil. May, R.I., sends a few sketches of interest. Walter Fowler, R.B.A., has several landscape studies, under varied conditions of atmosphere; "An August Day," a coast and river sketch; "On the Common" (68), "Path Over the Hills" show a felicitous discernment of nature and colour. One of the chief contributors is W. Lee Hankey, R.I., whose work always has a charm of breadth and colour. His view of old bridge, "Tewkesbury" (58); the simple and unaffected drawing of "The Wheelbarrow"; a study of a peasant lass; and "Sussex Meadows" and "Haunt of the Gull" (61) are delightfully broad landscapes. His other subjects as "The Lonely Shore" (89), and "A Way to the Well" all exquisite in drawing and tone, and a true sentiment pervades Mr. Lee Hankey's work. The work of Frank H. Jackson is admirable in drawing and colour. His lock view on the Thames, "The Bye Way" (43), and other river sketches and landscape studies, breathe a true spirit. Walter Churcher is a real Impressionist. His "Twilight" (28) and "Marshland" are both effective. A. Dampier May sends two nice sketches—one of a girl, in *négligé*, reading, quite French in treatment; another a girl at her toilet, both graceful and refined. Robert Sauber, R.B.A., has several spirited and brilliant studies of figures. "After the Theatre" (54)—a lady in evening dress and cloak, and auburn hair, coming out of a theatre corridor, is a clever sketch; movement is expressed in the throng of playgoers. "Gamblers" (77) and "The Challenge" are both vivacious, and "A Good Story" (102), a group of gentlemen in the Empire costume, is bright. The sketches by Claude Shepperson, the Surrey sketches of Champion Jones (19, 25), "A Kentish Lane," by Tom Browne, R.B.A., are broad in handling and nice in colour. J. Hassall sends several quaint nursery rhyme and story subjects, and other examples of book illustrations are by Arthur Layard; Cecil Aldin is also a clever delineator of rhyme subjects. All readers interested in sketches by our leading painters and amateurs ought to visit the Sketch Club's exhibition at the Modern Gallery, 175, Bond-street, W.

#### THE CANTILEVER BRIDGE: ITS DESIGN AND CONSTRUCTION.—IV.

THE general principles which govern the design and construction of cantilever bridges and continuous girders having been enunciated in our preceding articles, we now may pass on to the consideration of the particular type which constitutes the modern structure. The typical cantilever bridge, brought up to date, and reduced to its simplest form, may be said to consist of three spans, one central and two side spans, or, as they may be termed, semi-spans. A skeleton elevation of this description of cantilever bridge is represented in Fig. 1, in which B D is the main central span, and A B and D D, the two side-spans respectively. In the diagram the thick lines show the members of the truss which are in compression, and the thin lines those which are in tension. It will be seen that the main central span consists of the two cantilever arms B C and D C, which are projected or thrown out, as it were, from the intermediate supports E and H, and of the central independent girder C C, which is in exactly the same position, and under precisely the same conditions with respect to loading and the stresses upon its different parts, as if it were a simple horizontal girder resting upon two abutments F and G. In other words, the horizontal independent trussed girder C C might be lifted off its bearings at F and G without in the least degree affecting the equilibrium of the rest of the structure. This combination of the two projected arms thrown out from the intermediate piers, and connected together by a central independent girder, is the essential characteristic which distinguishes the modern cantilever bridge from all other bridges.

The design shown in Fig. 1 may be regarded as the simplest and most economical example of

the cantilever system; but it does not follow that it can always be adopted. It very frequently occurs that it becomes necessary to have a perfectly uninterrupted headway from one end of the bridge to the other, that is, that the soffit of the bridge must be on the same level throughout the whole breadth of the river, chasm, ravine, or whatever may be the nature of the obstacle it has to be thrown across. Under these conditions the introduction of the inclined parts of the design A E, E F, G H, and H D become impracticable, and some other form of truss must be selected to meet the altered requirements of the case.

Assuming, however, that local circumstances do permit of the employment of the design shown in Fig. 1, it will be as well to consider the manner in which the loading affects it, and to investigate the nature of the stresses to which the various members are subjected. Commencing with the side span A B, which is also termed the anchorage span or arm, it will be found that it must be regarded from a two-fold point of view, according to the distribution of dead and live loads. In the first place, let it be supposed that there is no reaction at the support A, in which case the side span will become a simple cantilever arm, just swinging clear of the support, and balanced by the weight of its neighbour on the other side of the pier E. It is evident that while in this position the loading upon the cantilever arm B C, and upon the central independent girder C C, will produce no stress upon any of its members, whether beams or braces. The whole effect of the loading upon the arm B C and upon half of the central girder C C, will be resisted by the upward reaction over the centre of the support E, acting along the line B E in a vertical direction. If we make W to represent the load per lineal foot upon the cantilever arm B C and L its length, W<sub>1</sub> for the load per same unit of length upon the girder C C, and L<sub>1</sub> its span, and R for the reaction of the support E due to this loading, then—

$$R = W \times L + W_1 \times \frac{L_1}{2} \dots\dots\dots(1)$$

from which we obtain—

$$R = \frac{2WL + W_1L_1}{2} \dots\dots\dots(2)$$

If W should be equal to W<sub>1</sub>, as would occur in the case of a moving or live load, the expression becomes—

$$R = \frac{W(2L + L_1)}{2} \dots\dots\dots(3)$$

In instances in which we have L = L<sub>1</sub>, the equation is still further simplified, and may be written—

$$R = \frac{3W \times L}{2} \dots\dots\dots(4)$$

The proper relative proportions and dimensions, such as the respective spans, lengths, and depths of the three chief parts into which the whole cantilever girder in Fig. 1 has been divided, will be given as we proceed with our articles. Under the conditions just mentioned, it is clear that the arm A B is a pure cantilever, and exercises no vertical pressure upon the support A. The maximum stresses upon its members will take place when the arm is uniformly loaded, and it should be borne in mind that then the upper boom A B will have a tensile stress upon it, and the lower boom one of compression. When acting in this manner the arm A B is rigidly fixed to its neighbour over the support at B, and free at the end A. We may now consider the same side span A B from the second point of view, when the load upon it is of a magnitude sufficient to cause the end of the arm to be brought down to its bearings and rest upon the support at A. In this position it is obvious that it becomes a simple trussed girder carried by supports at each end. It will be necessary when designing a cantilever girder of this description to calculate the stresses upon the members of the anchorage arm for each position. When the stresses are of like kind—that is, both compressive or both tensile, the sum of them must be taken as the maximum, and the net sectional area of the members must be proportioned to that maximum. If they should be of unlike kind in the two positions—suppose compressive when the arm is acting as a cantilever, and tensile when it acts as an ordinary girder, resting upon two supports—then members exposed to this alternate action of the different stresses, or "reversals," as they are called, must be designed to resist both, or, in other words, they must be counter-braced. There is an important point here to which attention should be paid. It has been



FIG. 1.

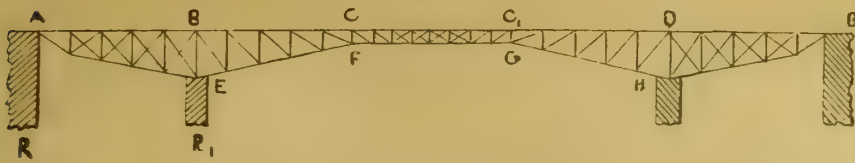


FIG. 2.

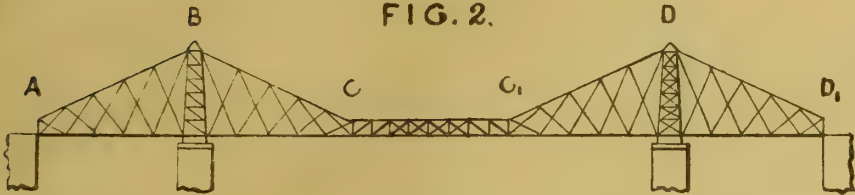


FIG. 3.

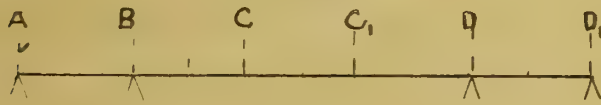


FIG. 4.



FIG. 5.

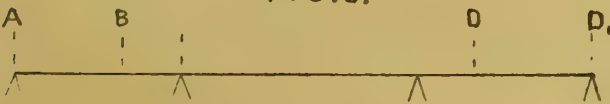
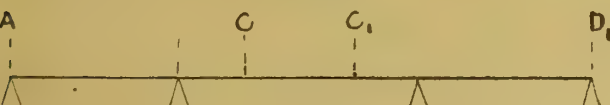


FIG. 6.



already stated that when the arm A B was doing duty as a cantilever, the upper boom was in tension and the lower in compression. When, however, the arm becomes an ordinary girder, these conditions are exactly reversed, and the upper boom is in compression, and the lower in tension. Thus the booms, accordingly as the arm may act successively in one manner or the other, are constantly exposed to the action of reversals, which, if of any magnitude, are usually avoided as much as possible. A reference to Fig. 1 will serve to point out that the shape of the cantilever arm A B is not exactly a type that an architect or engineer would select as a model for the design of a horizontal girder supported at both ends. Upon the supposition that the side span has to act in a dual capacity, it is not easy to perceive how the difficulty is to be overcome. In the example shown in Fig. 1, the side spans must be of sufficient weight and length to balance the total weight of the central span under all conditions of loading, or they must be anchored down to enable them to do so.

To find the reactions at the points of supports at A and B, on the supposition that the anchor-arm is acting as a girder supported at those points, is the next calculation to be made. Let  $L_1$  = span of the central independent girder, and, as before, let  $W_1$  = the total weight upon it dead and live. Put  $W$  for the total weight of the cantilever arm, B C and L for its length, and let  $L_2$  = the length of the side span A B. It will be

sufficient to consider one-half of the whole girder—that is from A to the centre of the independent girder. Put R and  $R_1$  for the required reactions, and let moments be taken at the point B. Since half of the structure balances over the pier E, it is evident that the moments upon each side of it must be equal. Taking the moment to the left of B first, which is that of the side span, and calling it M, and the leverage or lever arm of the upward reaction R, which is vertical, will be equal to the perpendicular distance from a vertical line at the abutment to the point B at the pier. But this distance is equal to A B, the length of the side span, or equal to  $L_2$ , so that, according to the rule governing moments, we have—

$$M = R \times L_2 \dots\dots\dots(5)$$

Let  $M_2$  equal the total moment upon the other side of the point B, which will be composed of two separate loads, with their respective lever arms. The two loads are the weight of one half the central girder, and the weight of the cantilever arm B C. If C F be the junction of the central girder and of the cantilever arm, half the weight of the former may be regarded as acting at that point, and its lever arm with respect to B will be B C, which is equal to  $L$ , so that its moment which is  $M_1$  will be given by the equation—

$$M_1 = \frac{W_1 \times L}{2} \dots\dots\dots(6)$$

For the moment  $M_2$  of the cantilever arm, the

total load may be supposed to act at its centre of gravity—that is, at a distance from B to  $\frac{L}{2}$  and is equal to—

$$M_2 = \frac{W \times L}{2} \dots\dots\dots(7)$$

But from above—

$$M_2 = \frac{W_1 \times L}{2} + \frac{W \times L}{2} \dots\dots\dots(8)$$

from which we obtain—

$$M_2 = \frac{L (W_1 + W)}{2} \dots\dots\dots(9)$$

Consequently equating the two values of the moments M and  $M_2$  on each side of the point B gives us the expression—

$$R \times L_2 = \frac{L (W_1 + W)}{2} \dots\dots\dots(10)$$

whence—

$$R = \frac{L (W_1 + W)}{2 \times L_2} \dots\dots\dots(11)$$

To find the value of the reaction  $R_1$  at the pier E we proceed in a similar manner, using the same notation. We have the general equation—

$$R_1 = R + \frac{W_1}{2} - W \dots\dots\dots(12)$$

and substituting the value for R in (11) the formula becomes.

$$R_1 = \frac{L (W_1 + W)}{2 \times L_2} + \frac{W_1 + 2 W}{2} \dots\dots\dots(13)$$

and solving for the value of  $R_1$ , we have—

$$R_1 = W_1 \frac{(L + L_2)}{2 L_2} + \frac{W (L + 2 L_2)}{2} \dots\dots\dots(14)$$

The cantilever arm B C will undergo the maximum stresses on the booms when the central girder is fully loaded, and also the arm itself.

In order to prove the statement that the moments on one side of the piers E and H must balance those on the other, we may take a practical example, and assign numerical values to the weights and dimensions hitherto represented by symbols. Let  $W = 40$  tons,  $W_1 = 10$  tons. Put  $L = 150$ ft.,  $L_1 = 100$ ft., and  $L_2 = 150$ ft. Then for the value R from equation (11) we have—

$$R = \frac{150 \times 50}{150 \times 2} = 25 \text{ tons} \dots\dots\dots(15)$$

and from (10) we obtain—

$$25 \times 150 = \frac{150 \times 50}{2} = 25 \times 150 = 3,750 \text{ tons,}$$

which identity will hold for any values which may be given to the lengths and weights in any particular instance. At the points C F, C<sub>1</sub> G, where the central girder meets the cantilever arms and the points of inflection or, as they are more correctly termed, the points of contrary flexure occur, a hinge or joint is introduced, or some mode of connection between these parts of the whole truss adopted which will allow of some degree of play between them.

When, in consequence of the necessity of allowing a free and uninterrupted headway beneath the bridge, it becomes impossible to employ the type represented in Fig. 1, recourse can be had to that shown in Fig. 2. The cantilever arms in the second design are simply inverted; but this inversion entails the erection of high piers, which are expensive constructions, although their introduction unquestionably adds to the general appearance of the whole structure. There is no doubt that the design shown in Fig. 2, although not perhaps particularly handsome *per se*, is superior from an aesthetical point of view to that in the other figure. It should be mentioned that the central or cantilever span B D<sub>1</sub> in both Figs. 1 and 2, which is made up of the two cantilever arms B C<sub>1</sub> C<sub>1</sub> D<sub>1</sub>, and the central independent girder C C<sub>1</sub>, must be held in equilibrium by the two anchor-spans A B and D D<sub>1</sub> under all conditions of loading.

While there is no limit to the number of spans which may be given to a cantilever bridge, the number is usually restricted to three. There are a variety of modes, according to one or other of which the different spans and separate parts composing the whole cantilever truss may be arranged. Some of these are shown in the diagrams in Figs. 3 to 6, and the different methods by which the whole distance from one abutment to the other can be spanned, is worth attention. In Fig. 3 the same arrangement is adhered to as Figs. 1 and 2, and requires no further explanation. The arrow heads beneath the horizontal lines in the diagram show the position of the abutments and piers, and the vertical dotted lines,



which are all lettered, so as to facilitate comparison between the different systems, indicate the points at which the separate girders or trusses are connected together. Referring to the type in Fig. A, it will be observed that the anchor-arm AB in Fig. 3 is replaced by an ordinary girder, which rests at one end on the support A, and at the other on one of the free ends of the cantilever arm BC, which is common to both diagrams, and so is the central independent girder. In Fig. 5, the type is different from both those in the two former diagrams. The whole of the central cantilever span from B to D consists of one main girder, BD, projecting over each support, and throwing out a pair of cantilever arms, to support at their free ends the simple trusses A B and DD<sub>1</sub> forming the end parts of the whole cantilever. Another arrangement is shown in Fig. 6, in which a pair of side girders are carried from the abutments A and D<sub>1</sub>, and project beyond the piers a short cantilever arm, each to support the central girder. A bridge over the Rue de Tolbiac, in Paris, has been erected on the lines shown in Fig. 5, and there is no doubt that, theoretically, a less quantity of material is required; but, owing to the number of joints and articulations introduced between the different members, an extra quantity of metal is practically needed to secure the proper amount of rigidity and stability to the polygonal truss, which is the system to which it belongs.

Of all these systems, the two most in use are those represented in the diagrams in Figs. 3 and 6. This latter is an excellent type to use when it becomes necessary, as it frequently does, to build the bridge step by step out from the ends. As a rule, it is generally possible to use staging and scaffolding for the side spans, but seldom for the centre span. A cantilever in which the separate girders or trusses are adjusted in their relationship with one another, as shown in Fig. 6, is peculiarly well adapted for building out, without the use of false work, and is coming a good deal to the front in that particular branch of bridge construction.

#### THE ARCHITECTURAL ASSOCIATION OF IRELAND.

THE opening meeting of the session of the Architectural Association of Ireland was held in the Grosvenor Hotel, Westland-row, Dublin, on Tuesday night, the President, Mr. J. Howard Pentland, R.H.A., presiding. The hon. sec. (Mr. R. M. Butler) read the report of the committee for the past session, which stated:—It had long been a cause of surprise that no effort had been made in Dublin to form an architectural society which would afford to its members facilities for professional and social intercourse. Some five-and-twenty years ago, such an association had been established; but, after a few years of usefulness, it ceased to exist. A number of those interested in the matter decided to call a public meeting to consider the question. This meeting was held in the Grosvenor Hotel, on November 4, 1896, Mr. Albert E. Murray, A.R.H.A., being in the chair. It resulted in the immediate formation of the present association. A committee and officers were elected, and an educational scheme formulated. During the session 27 general meetings were held, at which lectures were given or papers read. The committee remark that there is cause for disappointment at the manner in which the classes have been attended. The committee have had under consideration the question of persons who are not members of the architectural profession engaging in practice. They have unanimously decided that any such person offering himself for membership under the second sentence clause 4 of the article of constitution, as defined in the form of application B, covenants, *ipso facto*, not to engage in architectural practice. The Committee regret to record the deaths of two of the members, Mr. F. Farmer and Captain Samuel Reddy, J.P. Twenty-one new members have joined during the session, and the Association now numbers 111 members, of whom 11 are country members. The hon. treasurer (Mr. F. Hicks) submitted his financial statement.

Mr. Doolin moved the adoption of the report. He pointed out that considerable difficulty was thrown in the way of studying for the profession in Dublin. Sketching in the museum was prohibited, and no architect was allowed to study in it. Means of study in Dublin were of the fewest. He would ask the President to say something in his address about what the architects thought of

the proposed extension of the city boundaries. He believed they held different views from what the pauper proprietors of slimy slums in the suburbs did.

Mr. W. Kaye Parry seconded the motion, which was passed by acclamation.

On the motion of Mr. Albert E. Murray, seconded by Mr. George Sheridan, a cordial vote of thanks was passed to the past-president, Mr. R. Caulfield Orpen, for his great services to the association, special recognition being also made of the valuable services rendered by Mr. Butler, honorary secretary.

The President then delivered his inaugural address on

#### THE NEW ARCHITECT: HIS WORK AND REGISTRATION.

He pointed out that, having regard to modern developments, the necessity for definite views on the general position of architects, the correlation of art, science, and business in their calling, and the necessity of legislative protection both for themselves and the public, was one of growing importance. He gave a number of amusing examples of the difference of opinion, not only amongst the general public, but amongst Royal Academicians, and such architectural dignitaries, as to what really constituted architecture and architects. He reviewed the *Times* controversy of 1891 as to whether architecture was an art or a profession, which only showed that the contempt affected by some types of professional men for "trade" was eclipsed by that of an Academician for the professions. Referring to the contention of the Academy party that art was of too elusive and ethereal a character for the hall-mark of the Architects' and Engineers' Bill, and that an architect was such in virtue of his artistic and not of his scientific ability, he inquired whether, leaving the various studentships out of account, the letters "R.A." did not constitute a diploma, and whether these very Academicians did not hold every spring a great competitive examination in Piccadilly, when, not only was the palm of place awarded, but the appreciation was tempered with the finer distinctions of "sky" or "line." These people forgot that if art could not be weighed in the balances, taste sank to preference, criticism to dialectics, and the Grand Prix de Rome to an empty honour. He then took up the other contention, and showed by an appeal to history and criticism that architecture was unthinkable without science, and that it was difficult to realise who was the greater fool—the man who looked down on construction from the pinnacle of art, or on art from the pinnacle of construction; the warp that despised the woof or the woof that despised the warp, and regarded itself as the sole constituent of the fabric. Bad design included bad construction, and in the absence of legislation everybody who put up buildings was an architect, just as bad doctoring included bad prescribing, and in the absence of legislation every cheap-jack who peddled pills at a fair might pose as a practitioner. But the public were not the only people who suffered: the medical architect and the medical engineer had arisen; they posed at congresses instead of fairs, they wrote books on domestic plumbing and sewage works, they advised and took fees and endeavoured to oust the architect in his own business (even Royal Academicians had been known to design soil-pipe disconnections). These therapeutic poachers were countenanced, not only by a one-sided legislation which prevented them being paid back in their own coin, but by a clique of architects who seemed quite incapable of realising that what they regarded as design *par excellence* was bound up with the organism behind it as indissolubly as the human face and form. Having illustrated the latter from the history of art, he admitted that there were doubtless some styles in which this characteristic of the best art of the best times had not been so prominent as in others. Everything that left the hand of a designer, from a cathedral to a pitcher, should bear the honest stamp of origin and use. He went on to refer to the general nature of art, and architectural art in particular, pointing out that as a matter of aesthetics alone, architecture was the material expression of a want beautifully satisfied, and as such included not only engineering, but pottery, jewelry, and even tailoring and millinery. As time went on division of labour became necessary. Things were therefore as we found them, and it was no wonder that with the views

of architecture that resulted from philosophical and aesthetic considerations, and the work of architects in past ages, the exact limits of the business of the new architect should be a matter involving some doubt. Architecture in such a connection is best defined as that for which the architect charges 5 per cent., and when we considered the vast amount of practical and scientific considerations that had to be in constant circulation through an architect's brain, we were forced to recognise that the gap between Ictinus, or even Sir Thomas Tresham, and the New Architect was enormous. But it was the same at the other end of the line: the mechanical engineer had to turn out Pullman drawing-room cars with elaborate architectural interiors. How was any one man to embrace in his constitution the varied experiences and aptitudes of science and art that were demanded by the necessity of a perfect result? One man had to be responsible for the whole, and that man, whether the work was a cathedral or a lunatic asylum, should be the man who knew most about the general run of the work involved. As the engineer provided himself with good architectural draughtsmen for architectural guidance in cases where engineering work prevailed, so should the architect provide himself with good engineering draughtsmen for engineering guidance when architectural work prevailed. In short, the designer should fit the aggregate of the work he had to do and supplement the gaps in his experience by the aid of experts in art or science. Trade is conducted on similar lines, and professions and arts must follow suit. The necessity of one man being responsible for a whole had to be carried out even when co-operation was deemed advisable. No lay individual or body was, of course, capable of dealing with a number of experts employed to produce one efficient result; but in such cases consulting architects or engineers were employed as intermediaries, and the question was reduced to very much the same lines as before, the head of the office being replaced by the consulting architect or engineer, and his various assistants by the independent experts employed. He finally advocated a more systematic system of education, in the principles at least of steam, hydraulic, and electric engineering, so far as office administration was concerned, for in no other way could one hope that the modern structures, whose very veins, nerves, and sinews these things constituted, could be artistic and efficient wholes.

Mr. Thos. Drew proposed a vote of thanks to the President for his very able, original, and amusing address. Sir George Moyers seconded the motion, which was supported by Mr. Kaye Parry. Mr. Joseph Holloway, Mr. O'Callaghan, Mr. Murray, Mr. Rawson Carroll, and Mr. Doolin having also spoken, the resolution was passed with applause.

#### COTTAGE HOMES FOR WESLEYAN LOCAL PREACHERS.

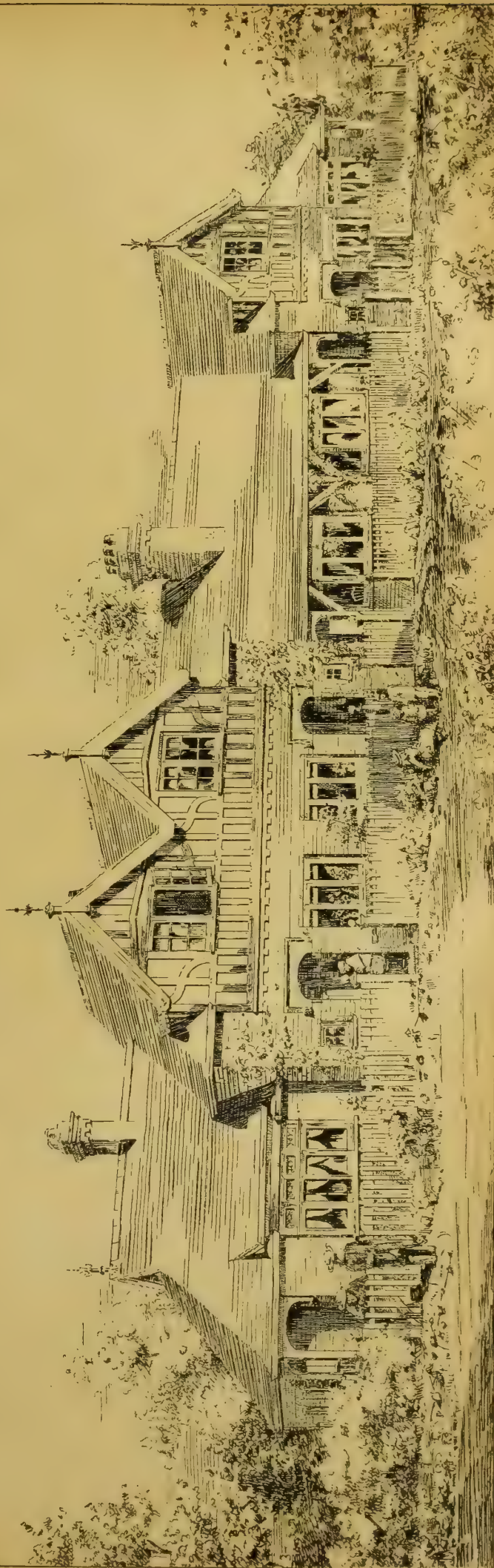
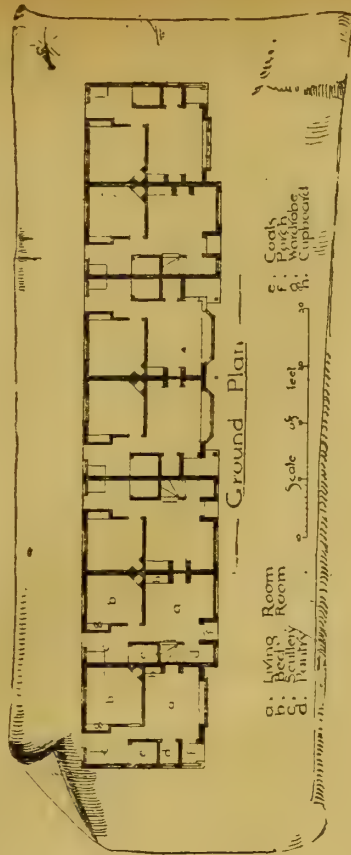
THE houses illustrated are now being erected at Fillongley, near Coventry. Each cottage is self-contained, and the accommodation consists of a living-room with porch entrance, bedroom, scullery, pantry and coals, while three of the seven houses have a second bedroom in the roof. Local bricks are being used with Heather brick facings and Broseley tile roofs. The builder is Mr. R. Bowen, of Leamington, and the architect is Mr. F. J. Yates, of Birmingham.

The Norfolk Hotel at Norwich is about to be converted into a theatre and restaurant, from plans by Mr. Ernest A. Runtz, of London, at an estimated cost of from £25,000 to £30,000. The new owner proposed to surrender to the corporation of the city some 800ft. of frontage—a strip of land 10ft. deep by 8ft. in length. The magistrates of the city have formally approved the plans and granted a provisional theatrical license.

The Wear Commissioners have decided to carry out an extensive scheme of dock extension and quayside improvements at Sunderland. Works have already been commenced at a new coal-tipping place at the Hudson Dock, the estimated cost of which is £40,000. The other works contemplated are a new graving dock, cost £74,000; enlarging and deepening the Hudson Dock, new jetties and coal staiths, and widening and deepening the entrance. The area of the dock is to be increased by 8½ acres, and the depth to 30ft. The total cost of the scheme is £375,697. The plans have been prepared by Mr. H. H. Wake, M.Inst.C.E., the engineer to the commissioners.



Cottage Homes  
at  
Fillongley, Warwickshire  
— for —  
Wesleyan Local Preachers





## MR. THOMAS BLASHILL'S RETIREMENT.

THE important appointment of superintending architect to the London County Council has become vacant by the impending retirement of Mr. Thomas Blashill, F.R.I.B.A., who has attained the age of 68 years, and is entitled to a pension. The normal age for retirement is 65, but under special resolutions of the Council Mr. Blashill's services have been retained during the past three years. He was appointed to the post by the Metropolitan Board of Works in March, 1887, in succession to the late Mr. George Vulliamy, having been for eleven years previously one of the district surveyors, first for Bethnal Green, East, and afterwards for West Hampstead. Mr. Blashill, whose portrait was given in our issue January 31, 1890, has carried out his onerous, and oftentimes delicate, duties with firmness and impartiality; he is a well-read and practical archaeologist, has read many papers before different societies on various professional subjects, all of which we have published and some with illustrations, and has ever been willing to aid students, especially in connection with the Architectural Association, of which he is a past-president.

In announcing the impending retirement to the County Council on Tuesday, the works committee expressed the opinion that Mr. Blashill's services had been most devoted and valuable, and recommended that his pension should be £525 a year, being at the rate of 21-60ths of his salary of £1,500 a year, ten years being added to his eleven years of actual service, as authorised by the Superannuations Act, 1866. Mr. Dew moved, and Mr. Piggott seconded, an amendment to refer the matter back to the committee with instructions to assign the pension to which Mr. Blashill was entitled by the eleven years of his service. After considerable discussion, in the course of which Mr. Beachcroft, Mr. Dickinson, and others paid high tributes to the value of Mr. Blashill's services to the Council, whilst Mr. Hubbard, Mr. Glanville, and others objected to the suggested increase in the pension, the amendment was rejected by a large majority. The recommendation was then adopted.

Representations have recently been made to the Southampton Corporation by the Society of Antiquaries and the Hampshire Field Club and Archaeological Association of the desirability of preserving features of antiquarian interest in the town. The petitioners state that they view with extreme regret the proposition now before the council to appropriate the land to the south of the West Quay for building purposes, involving as it would the total destruction of a most interesting portion of the Town Walls, and point out that the present clearance offers an opportunity of forming an open space of great beauty and attraction.

The need of a more direct and level route from Newcastle-on-Tyne to Washington and further south has been felt for some years. The main road at present is through Sheriff Hill, which rises from an altitude of 190ft. at Gateshead to 549ft. above sea-level at Wreckenton, a rise of 359ft. in two miles. The proposed new road, which is expected to commence at Gilling Gate and come out at New Washington, not only cuts off a distance of about three miles, but has a total rise of 11ft. in two miles, or 39ft. in five miles. The landowners in the locality some years ago offered the land free for the project, and towards the estimated cost, £3,000, some £1,350 has already been promised.

The engagement of Miss Elise Mercur, a well-known architect of Pittsburgh and a most energetic business woman, to Rudolph Wagner, of the Social Settlement, "Economy," has been announced. Originally from Towanda, Penn., Miss Mercur, having tried art, music, and several other departments of work, found in architecture her proper sphere. She has drawn the plans for a number of large public buildings, the Woman's Building at the Atlanta Exposition being designed by her. Marriage, in this case, Miss Mercur declares, will in no way interfere with her chosen career.

The Free Church at Viewforth, N.B., was reopened last week, after internal decoration and painting carried out by Messrs. Forsyth and Son, Forest-road, Edinburgh; and the building on the pulpit screen of a new design, by Messrs. Bracket and Howden, of Newcastle. The organ case was designed by Mr. G. F. Catchpole, York-place, Edinburgh, and erected by Messrs. Montgomery, Merchiston-avenue, who also carried out the structural alterations involved. The electric motor for blowing the organ is supplied by Messrs. Loudon Brothers, Dundee and Edinburgh, who have also installed electric light throughout the premises. There has been an outlay of over £1,000.

## BOOKS RECEIVED.

*King René's Honeymoon Cabinet*, by JOHN P. SEDDON, architect (London: B. T. Batsford).—This interesting monograph, just published by B. T. Batsford, contains twelve illustrations from photographs of the panels of this cabinet, painted by Dante Gabriel Rossetti, Sir Edward Burne-Jones, Ford Madox Brown. The author and designer of this unique cabinet, Mr. John P. Seddon, F.R.I.B.A., describes the design of the piece of furniture, first shown to the public at the International Exhibition at South Kensington in 1862. An offer to purchase it was made to the author by the authorities of the South Kensington Museum; but he retained it, and made it a wedding-present to his daughter, Mrs. Birch, to whom the volume is dedicated. The panels, painted in oils by the three illustrious painters above mentioned, illustrate King René's Honeymoon. Other gifted artists assisted in the decoration of this cabinet—viz., William Morris, Valentine Prinsep, &c. It was originally intended as a piece of office furniture, to hold architectural drawing, and, by the author's taste, has been made to illustrate the unity and fellowship of the arts. Mr. G. H. Birch, F.S.A., Curator of the Soane Museum, contributes a chapter on the heraldry and history of the subject and the hereditary Earls of Anjou, which bear upon the country and buildings of René. We leave our readers to the history of the cabinet as told by the author, who describes its design, the decorative metal-work and inlays on it, and its painted panels. The painter, Ford Madox Brown, suggested that the imaginary incidents in the Honeymoon of King René should be made the mode of expressing the unity of the Arts represented on the panels of the cabinet. These represent "Architecture," by that painter; "Painting and Sculpture," by the late Sir E. Burne-Jones; "Music," by Dante Gabriel Rossetti. Six smaller panels are also illustrated, representing "Gardening," "Embroidery," "Pottery," "Weaving," "Metal-work," and "Glassblowing," by other artists. These are taken from photographs, and have much interest as the work of great contemporary painters and craftsmen.

## CHIPS.

A provisional license has been granted for an hotel proposed to be erected at a cost of £4,000 in the seaside village of Reydon, which is only separated by a creek from Southwold. Fifty acres of land near the site of the proposed hotel have been purchased by the East Coast Development Co., who intend to build houses thereon.

The water sub-committee of Aberdeen Town Council have requested Mr. Jenkins, C.E., to draw up reports on the feasibility of bringing the water supply of the city from the Avon, near Inchrochy, direct to the town, and also from the Avon to join the present supply at Invercannie.

Stained glass is about to be placed in a window of St. Mary's Church, Bosley, Cheshire, as a memorial. The subject of the stained-glass window would be "The Presentation of Christ in the Temple."

Alterations are to be effected in the parish church of Sotterley, Suffolk, at the cost of Lady Constance Barne, from plans by Sir Arthur W. Blomfield, A.R.A. The gallery at the west end of the church, which has not been used for many years, is to be demolished. The chancel roof, which is out of repair, is to be removed, and a new one put up, the construction and details of which are to be the same in character as at present. The old vestry is to be removed, and a new vestry and organ chamber are to be erected on the north side of the chancel.

The Imperial Defence Commissioners, who are now in Montreal, have decided to recommend the construction of long-range batteries on Mount Royal to cover the approach to Montreal; also a long line of powerful detached forts along the international frontier.

At a general meeting of the Society of Portrait Painters, Messrs. Charles H. Shannon, Roche, and Santer were elected members.

A block of business premises comprising four shops has just been built in Wine-street, Bristol, from plans by Mr. Henry J. Williams, of that city. It is Renaissance in style, the ground floor has a frontage of 65ft. and a height of 17ft., and there is a show-room and bedroom floor. The elevation is of Cattybrook bricks, with freestone dressings. Mr. John Perrott is the contractor.

Sir William Ogilvy Dalgleish, of Errol Park, has intimated his intention to pay the whole expense of the introduction of the water supply to the village and district of Errol. It is estimated that the cost will not be less than £8,000.

## OBITUARY.

THE death took place on Wednesday in last week at 1, Park-square, Newport, Mon., of Mr. J. F. FAWCKNER, head of the firm of Habershon and Fawckner, architects, of Newport and Cardiff. Mr. Fawckner had been suffering from an internal complaint for about two months; but partially recovered from that, and was out of the house about a fortnight ago. Since then heart trouble supervened, from which he died. The deceased, who was in his 70th year, was a native of Bideford, North Devon. He served his articles with Mr. W. G. Habershon, of London, and in 1857 he was sent to Newport to take charge of the Newport branch of the firm's business. He was ultimately taken into partnership, and for many years the firm had offices in London, Cardiff, and Newport; but on the death of Mr. Habershon, which occurred some seven years ago, Mr. Fawckner became the head of the firm, and the London office was given up. The firm have for many years been the architects to the Tredegar Estate. On taking up his residence in Newport, Mr. Fawckner from the first took an active part in the social and religious work, and for many years he was one of the deacons of the Dock-street Congregational Church, and he was at the time of his death president of the Newport branch of the Young Men's Christian Association. Mr. Fawckner leaves a widow and two sons and two daughters. Both the sons are partners in the firm of Habershon and Fawckner.

By the death of M. PUVIS DE CHAVANNES, the decorative painter, which occurred in Paris on Tuesday, French art has suffered a very severe loss. Puviss de Chavannes was born at Lyons on Dec. 14, 1824, became a pupil of Henri Scheffer and Couture, and devoted himself specially to mural and decorative painting. His first considerable work was a series of five compositions intended for the dining-room of his brother. One of these, "Un Retour de Chasse," was exhibited at the Salon of 1859. In 1861 he exhibited "La Paix" and "La Guerre," destined for the Museum at Amiens; and two others of the same series, "Le Travail" and "Le Repos," appeared at the Salon of 1863. These decorations were completed by eight symbolical figures and an allegorical representation of the Department of the Somme, "Ave Picardia Nutrix," 1865. He also exhibited "L'Autonne," 1864; "La Nuit," which attracted great attention; "La Vigilance" and "La Fantaisie," 1866; "Le Jeu," 1868; "Massilia, Colonie Grecque," and "Marseille, Porte de l'Orient," executed for the Museum of Marseilles, 1869. In 1872, "L'Espérance"; in 1874, "Charles Martel, Vainqueur des Sarrasins," "Radeconde au Convent de Ste. Croix" (staircase of the Poitiers Museum); 1875, "La Famille du Pêcheur." From 1873 to 1878, "Scènes de la Vie de Ste. Geneviève," for the Panthéon—perhaps his greatest work. In 1881 he exhibited "Le Pauvre Pêcheur"; in the Salon in 1882, "Doux Pays," and the great composition "Pro Patria Ludus," now on the staircase of the Amiens Museum. In 1884, "Bois Sacré," to which must subsequently be added three other compositions, "Vision Antique," "Inspiration Chrétienne," and "Le Rhône et le Saône." These four compositions are placed in the staircase of the Museum of Lyons. From 1886 to 1889 M. Puviss de Chavannes painted the large hemicycle of the Sorbonne; and in 1890 "Inter Artes et Naturam" for the staircase of the Rouen Museum. He was frequently styled the Burne-Jones of France; but his work was more reposeful, simple, and classical in its conception and treatment.

The Harrow memorial to the late Dean Vaughan is fast approaching completion. It consists of two additions to the chancel which Dr. Vaughan himself gave in 1855 to the new chapel. These additions include a reredos and a medallion portrait in relief.

The new loop line on the Highland Railway—from Aviemore to Inverness—by which the journey from London to the Highland capital will be shortened by an hour and a half, will be opened for traffic on Tuesday, 1st prox.

An order for Paris has just been completed by Messrs. Garden and Co., Victoria Granite Works, Aberdeen. The order consists of about 30 granite pillars for the splendid memorial church which is being erected at the scene of the terrible charity bazaar disaster about two years ago, when 137 members of Parisian society met their death in a wooden building in the Rue Jean Coujou.



## Building Intelligence.

**ABERDEEN.**—The new Palace Theatre, erected in Bridge-place, on the site occupied by the music hall, destroyed by fire two years ago, was opened on Monday. The proprietors have expended £15,000 on the building, from plans by Mr. John Rust, city architect. The theatre is seated for 1,800, but is capable of holding nearly double that number. The width of the stage is 28ft., while the depth is 34ft., the fireproof curtain being of asbestos. Special precautions have been taken throughout the building against fire by having the plaster fixed on patent steel lathing, the pillars and joisting being also of steel. The passages are wide, and the walls fire-proof. In all, there are fourteen doors for exit; water hydrants have been placed on every floor, and the electric lighting is employed.

**BO'NESS.**—At a special meeting of Bo'ness Town Council, a scheme for carrying out an extensive improvement in the centre of the town was considered. Dr. Marshall, medical officer of health, submitted a special report, calling the attention of the local authority to the sanitary condition of an area embracing all the houses and other property situated between North-street and South-street, from the Post-office to West Partings. In his opinion this was an unhealthy area, many of the houses within it being unfit for human habitation, and he recommended the local authority to deal with the area under the Housing of the Working Classes Act, 1890. The burgh surveyor submitted a plan of the area, which covers one acre, occupied by 100 houses, two taverns, twelve shops, and several stables, and a population of 397 persons. He also submitted a plan showing how the area could be remodelled, if all the old property were taken down. Two new streets might be formed, while South-street would be widened considerably. Provost Stewart reported that he had obtained a report from Mr. Ormiston, valuer, Edinburgh, as to the values of the respective properties in the area. Mr. Ormiston estimated the total value, with business disturbance, and 10 per cent. for compulsory purchase, £7,000. Adding to that for making the streets, laying the sewers, and water mains, £1,000, and for contingencies, £1,000, that gave a gross total of £9,000. That left as net cost of the scheme £5,000. The Provost was of opinion that the improvements which would be effected would be well worth the money, as the centre of the town would be entirely remodelled. After discussion it was decided to proceed with the scheme.

**COVENTRY.**—The development of an extensive tract of land to the east of the Stoney Stanton-road, and known as the Red-lane Estate, is in progress, and many houses are being erected. The estate, which is bordered on the north by Red-lane, and on the south and east by the Coventry Canal, has an area of some 30 acres, and the original scheme provided for the erection of about 800 houses. Seven streets have been mapped out, having a total length of  $1\frac{1}{2}$  mile, the most important of which is Smith-street. This street is practically completed, Messrs. Webster and Co., Stoney Stanton-road, being the contractors. Upon this road 22 houses are already occupied, while there are a like number nearing completion. Two other of the streets have also been laid out, and are now kerbed, channelled, sewered, and excavated. Building is also progressing rapidly on the Red-lane frontage, where there are 14 houses and four shops now in the course of erection. Houses of a selling price of about £225, and with rents at about 7s. per week, are being built. It will, therefore, be almost entirely a workman's quarter. The management of the scheme rests in the hands of Mr. G. Edward Jenkins, Assoc. M.Inst.C.E., and Messrs. Isaacs and Son have been intrusted with the building contracts.

**LEITH.**—The Academy, which has just been completed by the Leith School Board at Leith Links was, on Saturday, formally opened by Lord Reay. The building affords accommodation for 2,097 pupils, and is an elementary, secondary, and technical education school. It has been erected at a cost of about £40,000. The building, which replaces one erected in 1806, consists of six floors. The length is 135ft., breadth 80ft., and the height from the pavement to the top of the centre tower is 123ft. In the sub-basement the apparatus for heating and ventilating is placed. The system adopted is known as that of

Key's. The air, after being thoroughly washed and dried, is driven by a fan into the different class-rooms and a stream of fresh air, which in winter is heated, is thus constantly made to circulate. On the basement floor are placed the cloak-rooms, luncheon-hall, and the modelling-room in connection with the art-school. The infant and junior departments are on the ground floor, while the senior and secondary departments are on the first floor. The second floor contains mechanical and physical laboratories, a lecture-hall, and an art-school. The chemistry laboratories are on the third floor, and on the same floor are the biological laboratory, the spectroscopic-room, the photographic-room, and the photometric-room. The style of architecture is Renaissance, with a centre wing and two side wings. The centre wing is one story higher than the rest of the school. On the top of this story is a mansard roof, surmounted by a fleche. Towers surmount the other two wings. The building is lighted throughout by electricity. The architect is Mr. George Craig.

**LIVERPOOL.**—The Town Hall, which was built in 1745 by Wood, of Bath, and enlarged at the close of the last century from plans by James Wyatt, has just been redecorated under the direction of Professor F. M. Simpson, of University College, Liverpool. The great staircase has been treated in red and white, and the dome, which is just 100ft. in height, in blue and gold. The main idea has been to make the staircase and dome much lighter. Between the walls and the dome there is a transition in the blue and white frieze. When Mr. Charles W. Furze has finished the four paintings he has in hand for the base of the dome, the scheme will be rendered complete and harmonious. Among the minor features are the placing of pediments over the doors and the introduction of the liver and its mantlings as a leading note of the decoration. As to the saloons, the idea has been to make each successively lighter, taking the central reception-room as a point of departure.

**PENSHURST.**—The Hills memorial church of St. Luke at Peshurst-causeway, built from the designs of Mr. J. W. Bentley, of John-street, Adelphi, W.C., was dedicated last week. The church is Middle Decorated in style, and is faced with Bath stone, red tiling being used for the roofs. It consists of nave, 51ft. by 24ft.; chancel, 28ft. by 22ft. 6in.; and a pinnacled tower, 22ft. square and 45ft. high, connecting the vestries. The altar and pews are of oak. The contractors were Messrs. Norris, of Sunnydale, represented on the work by Mr. Morris, their foreman. Messrs. Farmer and Brindley, of Westminster Bridge-road, supplied the Cippoline and alabaster font.

**PETERBOROUGH CATHEDRAL RESTORATION.**—The Dean and Chapter and the Restoration Committee have convened a meeting to be held at the Grand Assembly Rooms on Wednesday next, Nov. 2, for the further promotion of their next work. The Marquis of Exeter will occupy the chair, and among the speakers will be the Bishop of Peterborough, the Bishop of London, and Dean Ingram. Mr. G. F. Bodley, A.R.A., who was appointed to succeed the late Mr. J. L. Pearson, R.A., as architect, has reported that works were necessary the cost of which would involve a total expenditure of £8,659 5s. 4d. As to the first item in this estimate, the centres at the south-west arch of the west front—expenditure £60—are now in position, and the work necessary to remedy the dangerous settlement at the north-east angle of the eastern chapel—expenditure £861, referred to in Mr. Bodley's report as "urgent"—is now approaching completion. The cost of these works has, however, exhausted the funds at the disposal of the Restoration Committee. The next most important work to be undertaken at the west front is the south-west gable, which Mr. Bodley proposed to treat in the same manner as the satisfactorily completed north-west gable, at an estimated cost of £1,878.

**QUEENSFERRY.**—The parish church, which during the past four months has been undergoing extensive alteration, was reopened on Sunday. The church, which was erected in 1633, bears the marks of frequent alteration. The fabric remains as it was, but the interior has been entirely renovated and decorated. The old-fashioned pulpit, with its heavy canopy, and the straight-backed pews have been removed. The interior has been replastered, and stone mullioned windows, with cathedral-tinted glass, have been introduced. A broad central aisle now replaces the former side

aisles, and the cumbrous gallery has been greatly modified. A characteristic feature of the new work is the stone chancel, containing oak communion table, a baptismal font and reredos. In the east gable a two-light stained-glass window has been inserted, representing, by the figure of a prophet, with hand shading eyes, the expectancy of the Old Testament, which finds its complement in the second light, portraying Christ triumphant. The architect was Mr. P. M'Gregor Chalmers, Glasgow.

### CHIPS.

A water-colour drawing by Mr. R. B. Nisbet, R.S.A., "Between Showers," which is hung in this year's Salon, has been acquired for the Reims Art Gallery.

The rural district council of St. Germain's, Cornwall, have decided to instruct Messrs. Jenkin and Son, engineers, Liskeard, to prepare plans and specifications for taking water from their mains, for the supply of the village of St. Stephen-by-Saltash.

The Local Government Board have practically refused the application of the Cheltenham Corporation to borrow £13,410 for the purposes of sewerage and sewage disposal.

The foundations of the Jubilee clock-tower at Skegness have been laid, and the work of erection will be promptly proceeded with by Messrs. Parker and Son, builders, Boston.

Mr. Tom Mostyn, a Manchester artist, has accepted from a committee representing the Welsh residents of Manchester and Salford a commission to paint a portrait in oils of Mr. Alderman J. F. Roberts, to commemorate Mr. Roberts's term of office as Lord Mayor of this city, and to be afterwards placed in the town-hall collection of portraits.

The Local Government Board has given sanction to the proposal of the Batley Corporation to borrow £15,500 for works of surface-water drainage.

At Heanor, Notts, a new chapel and schools are about to be built for the Christian Disciples near the Midland Railway Station. The contract has been let to Mr. Isaac Attenborough, of Heanor, for £440. The building is to consist of a chapel 40ft. by 30ft., with a schoolroom at the rear to accommodate 50 children. The total cost of the building, including heating apparatus, seating, &c., will be £600.

A bust of the Right Hon. Jacob Bright, ex-M.P., by Mr. Onslow, R.A., has been accepted by the Manchester Corporation, and will be placed in the town-hall.

The altar-tomb in Chichester Cathedral, which was erected early in the year to the memory of the late Bishop Durnford, has been further enriched by an appropriate background. The old chapel of St. Clement in the rear of the tomb has, under the direction of Mr. G. F. Bodley, been restored and fitted up for worship. The chapel is situated in the south additional aisle, which consists of four bays, and was originally divided into two chapels of St. Clement and St. George. Here is to be found the "Cromwell" tablet, which is always regarded as Flaxman's masterpiece. The arches of the reredos are filled in with statues of St. Clement of Rome occupying the central position, and of St. Alphege and St. Anselm on the sides. In the quatrefoils above are the figures of two angels.

At the last meeting of the Devon County Council it was agreed, on the recommendation of the county building committee, that Mr. E. Harbottle, of Exeter, be engaged to supervise all work in connection with the judges' lodgings and the militia stores, and in the case of the lunatic asylum to carry out all duties connected with the repair, maintenance, and improvement of the asylum, and hitherto performed by Mr. Little; and that, for the performance of these duties, Mr. Harbottle be paid a salary of £80 a year.

At St. Mark's Church, Peterborough, on Sunday a stained-glass memorial window in the north aisle was formally dedicated. The artists were Messrs. Powell and Sons, of London.

On Monday in last week, Mr. G. W. Harries, chief sanitary inspector of Walsall, was seized with a stroke, and died on Thursday without having recovered consciousness. Mr. Harries had been a sanitary inspector in the town for over twenty years, and was appointed chief about eight years ago.

Winsford was endowed on Friday by Mr. W. H. Verdin, of Darnhall Hall, with the Albert Infirmary, which is for the use of the people of the sister towns of Winsford and Middlewich. The Albert Infirmary, which was formerly a mansion known as Highfield House, with extensive grounds, contains 20 rooms. There are provided four wards, the dispensary, reception and board rooms, and the operating theatre.



## COMPETITIONS.

**BIRMINGHAM.**—The Birmingham Churches Trustees have commissioned Mr. F. B. Osborn, of that city to act as architect for the second new church to be provided by the fund, in the parish of All Saints. The first church (to be erected in Sparkbrook) was given to Mr. Bidlake, whose design secured the first premium in the recent competition, when Sir Arthur W. Blomfield, A.R.A., was assessor. The second premium was awarded to Mr. Osborn, and the commission for the execution of the work has now followed.

**UNIVERSITY OF CALIFORNIA.**—The jury for the international competition for the Phebe Hearst architectural plan for the University of California, composed of Messrs. J. L. Pascal (president), representing France; Paul Wallot (vice-president), representing Germany; R. Norman Shaw, representing England; Walter Cook, representing the United States; and J. B. Reinstein, representing the University of California, closed its sessions at Antwerp on October 4. The following is a list of the authors of the plans admitted to participate in the final competition:—Messrs. Barbaud and E. Bauhain, Paris; E. Bénard, Paris; Professor F. Bluntschli, Zurich; D. Despradelles and Stephen Codman, Boston; R. Dick, Vienna; J. H. Freedlander, New York; G. Héraud and W. C. Eickmüller, Paris; Howard and Cauldwell, New York; Howells, Stokes, and Hornbostel, New York; Lord, Hewlett, and Hull, New York; and Whitney Warren, New York. The vote of the jury upon each of the plans selected was absolutely unanimous; some of the jury also recommended that four plans, besides those admitted to the final competition, should be purchased for the University of California. The names of the authors of these plans are as follows:—Messrs. Joanny Bernard and Robert, Paris; Charles des Anges, Paris; Ernest Flagg, New York; and Fred. Skjold Neckelmann, Stuttgart. The members of the jury, together with the architects, invited to participate in the final competition, will go to California, and in June, 1899, the jury will there decide the final concours and select the plan, which must be approved by the regents of the University of California, and thereupon the buildings will be erected with the utmost rapidity. It is expected that all the buildings will be completed within the next 25 years.

**WOLVERHAMPTON.**—The board of guardians, sitting in committee on Friday, considered the reports which had been prepared with regard to the erection of a new workhouse at New Cross, Wednesfield. After two hours' deliberation, the board adopted, almost in their entirety, the recommendations of Mr. Thomas W. Aldwinckle, F.R.I.B.A., of London, the assessor, with regard to the plans. It was decided to recommend the board next week to employ Mr. A. Marshall, of Nottingham, whose plans were awarded the first position by Mr. Aldwinckle, as the architect for the new building; and to pay £200 to Messrs. Mangnalls and Littlewood and Mr. M. Johnson, the fees agreed upon for their plans; and £100 to Mr. Doubleday, of Birmingham, for his plans, according to the order of merit. It was also recommended that the present farmhouse on the estate be not retained, and that a separate chapel should be erected.

The memorial-stone of St. Peter's Episcopal Church, Gardner-street, Glasgow, was laid on Saturday by Lord Kelvin. The new church is a mission of St. Mary's Church, and the estimated cost is £6,000.

A Liberal club at Keighley was opened on Friday by Mr. Asquith. It is situated in Devonshire-street. On the ground floor is a reading-room, library, music-room, two smoke-rooms, a bar, dining-room, and billiard-room, containing four tables. The greater part of the second floor is taken up by an assembly hall, capable of accommodating about 600 people. About £6,000 has already been expended on the building, whilst furnishing has cost £200 or £300. The designs were prepared by Messrs. Judson and Moore, architects, of Keighley and Bradford.

On Saturday Mr. George R. Sims laid the memorial-stone of the Regent Theatre and Assembly Rooms at Salford. The theatre has been open for some time, but the block of buildings of which it forms part, and which will include assembly-rooms and a number of shops, is still in the hands of the builders. M. F. Matcham, the architect of the building, presented Mr. Sims with a trowel, and Mr. W. Brown, jun., the builder, added a mallet.

## PROFESSIONAL AND TRADE SOCIETIES.

**ARCHITECTURAL ASSOCIATION OF IRELAND.**—The opening meeting for the session 1898-9 of this association was held on Tuesday evening in the Grosvenor Hotel, Westland-row, Dublin, when the president, Mr. J. Howard Pentland, R.H.A., delivered an inaugural address, as reported elsewhere in this issue. The first meeting of the building construction class will be held on Thursday next, Nov. 3, at 22, Clare-street, Dublin. The class will meet on every alternate Thursday during the winter. The first meeting of the class of design will be held on Wednesday next at 22, Clare-street, at 8 p.m. Subsequent meetings will be held on every alternate Wednesday during the winter months.

**ROYAL INSTITUTE OF BRITISH ARCHITECTS.**—In anticipation of the opening of the sixty-fourth session of the Institute on Monday week, Nov. 7, when the President, Professor Aitchison, R.A., will deliver his inaugural address, the *Kalendar* has just been published. It contains, as usual, particulars as to the council and committees, the voluminous charters, by-laws, and regulations, a register of members, and much information as to the examinations and prizes and membership list of the allied societies. The register shows a total membership of 1,729—viz., 603 Fellows, 8 retired Fellows, 992 Associates, 11 Hon. Fellows, 50 Hon. Associates, and 65 Hon. Corresponding Members. Last year, at the corresponding period, the total roll of members was 1,720—viz., 600 Fellows, 7 retired Fellows, 935 Associates, 11 Hon. Fellows, 57 Hon. Associates, and 60 Hon. Corresponding Members.

The Hon. Mrs. A. H. Smith laid, on Friday, the corner-stone of the new church of St. Ambrose, Bournemouth, which is situated on the West Cliff. The portion of the new edifice which it is now proposed to erect will cost between £8,000 and £9,000, and will seat some 700 people.

The Wesleyan Chapel at Flushing, near Falmouth, was reopened on Sunday after renovation and repair, carried out by Mr. Moyle, builder, of Chacewater.

The Bilton Corporation have just accepted tenders for one of the largest undertakings the town has ever embarked upon, the electric tramways. The scheme is expected to cost in its entirety nearly a quarter of a million sterling. The overhead trolley system has been decided upon, and 70 cars will be utilised, given seven minutes' services on the various routes, which will embrace 30 miles of single track.

The Prestatyn Urban District Council received on Friday a letter from Mr. R. E. Hughes, resigning his position as surveyor and inspector of nuisances. It was resolved to advertise for a successor.

The Bishop of Bristol attended Christ Church, in the city of Bristol, on Sunday, and dedicated a new baptistery, which has been given to the church by the rector, who presents it in memory of T. B. and Anne Cole, his parents, as recorded in a small stained-glass window. The work has been carried out by Messrs. Cowlin, under the architects, Messrs. Milverton Drake and Pizay, all of Bristol.

Mr. Isaac Young, chief sanitary inspector to the Battersea Vestry, applied to Mr. Francis, at the South-Western Police-court, on Monday, for authority to enter the premises of Miss Jenn, Rushiel-road, near Lavender Hill, to remedy a sanitary defect. A workman who had been employed by the lady opposed the application on the ground that the work had been carried out. Mr. Young, however, said it would be necessary for him to make an inspection, and the magistrate made an order authorising forcible entry of the premises, if necessary.

The urban district council of Newmarket, Cambs, have under consideration a report and scheme by Mr. F. Beasley, C.E., for main drainage. The estimated cost, including a refuse destructor and workmen's cottages, is about £37,500.

The fountain erected at Comrie, N.B., to commemorate the Diamond Jubilee, was formally unveiled on Saturday. The fountain, which has been designed and constructed by Mr. J. L. Thomson, sculptor, Perth, consists of Aberdeen granite, with a basin of red Peterhead stone. It occupies a prominent position in the centre of the village.

The foundation-stone of a new drill-hall at Bournemouth, costing some £3,000, to be erected for the local Volunteer Artillery Corps, was laid on Saturday afternoon by the Mayor.

A pipe-organ, which has been presented to Free St. George's Church, Dumfries, was inaugurated on Sunday. The builders are Messrs. Blackett and Howden, Ltd., Newcastle-on-Tyne.

## Engineering Notes.

**AYR AULD BRIG.**—The Auld Brig of Ayr was examined at low water on Friday, by the burgh surveyor, in company with several practical masons. It was found that a large triangular section at the north-east corner of the middle pier, down to the foundation, had become detached from the structure, and was separated from the building by a gap of about 6in. The damage had been caused by undermining by the rush of water. A meeting of the works committee of the town council was held in the afternoon to decide what should be done. After a good deal of deliberation, in the course of which it was proposed that the bridge should be allowed to collapse to make way for a new bridge, it was remitted to the burgh surveyor to execute such temporary repairs as he thought necessary to insure the integrity of the structure till next summer, when repairs of a permanent character would be considered. It was further agreed to reopen the bridge at once for traffic, as it was considered still quite safe for passenger traffic, for which for many years it has been exclusively used.

## CHIPS.

The Bishop of Dover on Saturday attended at Bromley, Kent, and consecrated the new church of St. Mark, erected from designs by Mr. Evelyn Hallicar, of Sergeants'-inn. The church stands close to the station of the London, Chatham, and Dover Railway, and will accommodate 600 persons.

Princess Christian will open the tenth Amateur Art Exhibition of the Artists' Guild at the Imperial Institute on Monday week, Nov. 7.

A new parish room and caretaker's cottage adjoining St. Mark's Parish Church, St. Helens, Lancs, which has been erected at a cost of £1,600 by Sir David Gamble, Bart., as a Jubilee gift to the parish, was opened on Friday night. The work of erection was carried out by Mr. Peter Tickle, builder and contractor, from plans prepared by Mr. James Gandy, architect, both of St. Helens.

A marble chancel screen and brass lectern, given by the Hampstead Lodge of Freemasons, were dedicated at St. Martin's, Gospel Oak, on Sunday.

Colonel A. G. Durnford, R.E., held an inquiry at the Guildhall, Wrexham, on Friday, concerning an application made by the Wrexham Town Council to the Local Government Board for permission to borrow the sum of £3,125 for market purposes, and £400 for certain footpath improvements.

The roof of a church in the Faubourg de Santa Lucia, Verona, which was undergoing repairs, fell in on Sunday morning. The accident was attended by serious consequences, five workmen being killed and sixteen others severely injured.

The contract for rebuilding the Seaborne Coal Wharf at Bermondsey Wall, from the designs of Mr. Henry Adams, M.Inst.C.E., has been let to Messrs. Holliday and Greenwood, of Loughborough Park Works, Brixton.

On Saturday Sir William Broadbent opened a new sanatorium erected at Mill-hill, Dalton, Huddersfield, from designs prepared by Messrs. E. Thomas and Sons, Queen Anne's-gate, Westminster. The first estimate of cost amounted to £24,000; but up to September £24,667 had been spent, and, exclusive of site, &c., the contract amount to £30,000. The main administration block is in the Elizabethan style, and it has accommodation for a staff of 40. There are three pavilions—one for acute scarlet-fever cases, one for convalescents, and a third for typhoid cases. These wards provide room for 90 beds; but there is an isolation ward being erected for ten patients, and a temporary small-pox pavilion for twenty.

The Suffolk joint committee have instructed Mr. A. J. Wood, of Surrey-street, Strand, W.C., to prepare plans for enlarging the lunatic asylum at Melton, near Woodbridge.

Messrs. J. and G. F. Fay and Co. last week launched the large steel pontoon for the Southampton Harbour Board, to be placed at the Royal Pier at the latter town. The pontoon has been built throughout from the designs and under the personal supervision of Mr. E. Cooper Poole, A.M.I.C.E., of Portland-street, Southampton, surveyor to the Harbour Board, and is trapezium shaped in plan, the over-all dimensions being approximately 250ft. by 95ft. The platform is laid with specially imported Australian Karri timber.

Lady Osborne Morgan laid, on Friday, one of the foundation-stones of a new schoolroom in connection with the Bradley-road Baptist Mission Chapel, Wrexham. The schoolroom will cost £800, and the builders are Messrs. Davies Brothers, Wrexham, while the architect is Mr. John G. Owen, Liverpool.



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THE PASSMORE EDWARDS PUBLIC LIBRARY,  
ACTON, W.

THE Right Hon. Lord George Hamilton, M.P., Minister of State for India, will, on Wednesday next, Nov. 2nd, lay the foundation-stone of this building, which is being erected by the District Council of Acton with the liberal aid of Mr. J. Passmore Edwards, who has undertaken to pay the lion's share of the cost of the building contract. The plan printed with the accompanying view shows that all the public rooms are on the ground floor, and that the maximum areas for these departments have been secured, as well as complete supervision from the lending library. Loss of space in corridors and passages is avoided. The public entrance is located in the middle of the main front facing High-street, and leading into a central hall, out of which the various reading-rooms as well as the lending library are reached. Facing the entrance to the left is the newspaper-room, 50ft. by 30ft., having windows to the east, and a tall gable window at the south end of the apartment. Dormers for light and ventilation occur between the arched roof principals, and a ventilating turret in the centre is provided. Slopes will be placed under the windows round the room, and newspaper-stands and tables will, of course, occupy the central area. To the right-hand of the visitor, and also facing the entrance, is placed the lending library, with good space for borrowers, and a counter about 40ft. long. This part of the building is lit by a glazed lantern. The book-store behind the supervision counter is 38ft. long by 27ft. wide, and will be fitted up with book-stacks in parallel lines at right angles with the borrowers' counter, so that all the books will be within immediate access. Additional room for the storing of books will be furnished by means of a gallery extending round this room and reached by a circular staircase. A top-light will be provided in addition to the range of windows at the rear. The librarian's office opens directly on to the assistant's supervision space, and a look-out light to the right hand of his desk will give him complete control of all that is going on. Glazed open screens with the same view divide the lending library from the news-room, and open glazed archways are also put between these departments, and the reference-room and magazine-room in the fore part of the premises. The former is 27ft. by 24ft., and is placed in juxtaposition with the lending library in order that the same officials may work both departments if necessary, and, therefore, the counter is practically arranged in continuation of that for the borrowers. A lift and circular stair-way communicate with the workroom and staff

lavatory on the first floor and with the store-rooms on the top floor, so that the administration is made as compact as possible. Without the bay window the magazine-room on the left of the entrance measures 25ft. by 20ft. The public rooms will be heated by Messrs. Haden and Sons' system of warm air, the heating chamber being situate in the rear of the premises. The librarian's residence is on the first floor, comprising a large living-room, three bedrooms, kitchen, and offices, bath-room, and w.c. In the basement he will have a cellar, while to the rear of his entrance-hall there is an open yard, with separate accommodation for the servant. The exterior will be carried out in Portland stone for all parts exposed to public usage, and Box Ground stone for the remaining ashlar work. Lawrence's No. 4 red facings will be used for the walls, and green slates for the roofs. Mr. Sidney Powell, of Acton, has the work in hand as builder. The architect is Mr. Maurice B. Adams, F.R.I.B.A.

THE LONDON RESIDENCE OF CHARLES DICKENS,  
1, DEVONSHIRE TERRACE, PORTLAND PLACE, W.

TOWARDS the end of 1839 Dickens moved from 48, Doughty-street, to a "handsome house with a considerable garden" in Devonshire-terrace, facing York Gate, Regent's Park, and thenceforth resided here till the year 1851. His residence there covered a very important period of his career, when such works as "Oliver Twist" and "Nicholas Nickleby" were written. The present owner found it necessary recently to carry out extensive alterations, and, as is usually the case with buildings of this interest, there was much speculation and discussion as to his intentions. Internally, all the important features have been preserved most carefully, and the former quiet character of the exterior has not been interfered with. The architect was Mr. George Hornblower, A.R.I.B.A., of 2, Devonshire-terrace, Portland-place, W., and our illustrations are reproduced from the drawings in the Royal Academy Exhibition this year.

PASSMORE EDWARDS PUBLIC LIBRARY,  
ST. GEORGE'S-IN-THE-EAST.

TO-MORROW, the 29th inst., the Right Hon. Lord Russell of Kilowen, G.C.M.G., P.C., Lord Chief Justice of England, will open this building, which has been erected by the Library Commissioners for St. George's-in-the-East mainly at the cost of Mr. J. Passmore Edwards on a site in Cable-street adjoining the Vestry Hall. We published a view of the building from the architect's Royal Academy drawing in the BUILDING NEWS for May 21, 1897, and to-day we illustrate a detailed section of the big reading-room which makes so distinguishing a feature in the planning of this library. It has a steel-constructed octagonal roof rising over a series of arches which spring from piers equally spaced, and giving a diameter of about 50ft. in the clear. On plan the room is square, and has newspaper slopes along the walls on two sides, and grille-fronted bookcases on the others. The idea of this arrangement, with so large a newsroom, belongs to the Bishop of Islington, the Chairman of the Library Commissioners, and who, as rector of St. George's-in-the-East for many years, has an intimate knowledge of the requirements of the neighbourhood. The borrowers' counter is located to the right of the entrance-hall, and an additional counter in connection with it extends into the great reading-room. The reference-room occupies the whole of the first floor, and has three projecting oriel windows overlooking Cable-street. The boys' room and the Commissioners' room are placed on either side of the entrance vestibule. The staff-room and filing-room are in the basement. The caretaker has separate house accommodation, with a distinct staircase of its own, quite apart, and yet, at the same time, in connection with the library, for access on all three floors. Portland stone is used for the façade, and a feature is made of the main entrance, which is boldly treated with monolithic columns flanking the doorway, which is curved on plan, with an arched pediment above. Over the columns and above the cornice are two seated statues representing "Literature" and "Art" sculptured by Mr. Nathaniel Hitch in Portland stone, and given by Mr. Passmore Edwards as an additional contribution towards the completion of the whole undertaking. The elevation is faced with Messrs. Lawrence and Sons' red bricks, and the first floor, between the oak-built oriels, is finished in lime stucco, panelled and moulded in fine stuff to the

more detailed parts. A pent projects above to give emphasis and shadow. The wrought-iron fenceings and gate, with the lamp piers to the entrance, were executed by Messrs. Hart, Son, Peard, and Co., who also made the wrought-iron grille inclosure to the principal staircase. Messrs. Homan and Rodgers did the fireproof flooring and staircase. Messrs. Burt and Potts supplied the metal casements. The gas-fittings have been done also from the architect's designs by Messrs. Hart, Son, Peard, and Co. The lift is by Messrs. Archibald Smith and Stevens. The builders are Messrs. W. Johnson and Co., of Wandsworth. This firm is now executing the contract for the furniture and fittings. Mr. Nathaniel Hitch did all the carving as well as the marble tablet in the porch, which is enhanced by a sculptured figure of St. George and the Dragon. The architect is Mr. Maurice B. Adams, F.R.I.B.A.

NATIONAL SILVER MEDAL DESIGNS FOR CHRISTMAS  
CARDS IN STENCIL.

THESE National Silver Medal designs by Mr. Hugo W. Koch, of Castelnau, Barnes, are distinctly original, and just now when the Christmas cards for 1898 are being brought before the public, these stencils are specially interesting, as something entirely new in the way of comic renderings of New Year's greetings and Christmas tokens of friendship and good will. The author has imparted a very decorative feeling to these really-clever stencils, and his suggestion is, that instead of purchasing cards ready made and sold by the thousand, an individuality could be obtained if stencil-plates of this kind were purchased, and thus enable artistically-minded people to make their own cards. They could then reproduce them in a variety of colours in an almost endless way. Mr. Koch will no doubt have many imitators; but few can hope to excel his effects, obtained, as they are, with so little detail and so much suggestiveness.

NEW BREWERY, FOR ISHERWOOD, FOSTER, AND  
STACEY, LTD., MAIDSTONE.

THE building of which we give illustrations to-day is now approaching completion at Maidstone, for Isherwood, Foster, and Stacey, Ltd., and has been designed and carried out under the supervision of Messrs. Harrap, A.M.I.C.E., and Duffield, A.R.I.B.A., of 34, Queen-street, Cannon-street, London, E.C., consulting engineers and architects. The new building is erected upon the site of the old brewery. As the building is erected immediately over the River Len, difficulties were encountered at the outset as to foundations, which proved totally unfitted to carry the superstructure; a system of concrete arching in between piers has been adopted, and the piers themselves carried down to secure a solid foundation—a depth of 20ft. being reached in one part. The buildings are designed to accommodate a 50-quarter plant, the total cost of which will be about £18,000, the contractors being Messrs. Wallis and Sons, of Maidstone.

The shop premises known as 46 and 48, Westgate-street, Ipswich, have been refronted and modernised from plans by Messrs. Eade and Johns, of that town.

A faculty has been granted in the Chester Consistory Court for the removal of the monuments, tablets, and fittings in the old church at Handforth, Chester, to a new church which is in course of erection on an adjoining site. The old church will be demolished, and the building materials sold immediately after the completion of the new edifice.

A report of Messrs. W. Meek and Sons, engineers to the Workington Town Council, shows that the building of a new dock on the north side of Workington would cost £350,000. This sum is in excess of the estimate for a dock scheme on the south side, which was abandoned. The report shows, however, that a lock and channel could be built for the present Lonsdale Dock at a cost of £220,000, which would give Workington greater shipping facilities.

For some years past the Harbour Commissioners of Cork have been engaged in deepening and improving the river channel from Hopehead to Cork, a distance of 5½ miles, and in providing deep water quay accommodation at Cork. There is now a depth of 14ft. at low water spring tide, with a rise of 13ft. at spring and 10ft. at neaps. The dredging now in progress will give 2ft. more over a width of 350ft. In 1824 there was practically no water in the channel at low water. The dredging works since 1897 have been under the direction of Mr. James Price, the present engineer to the commissioners.



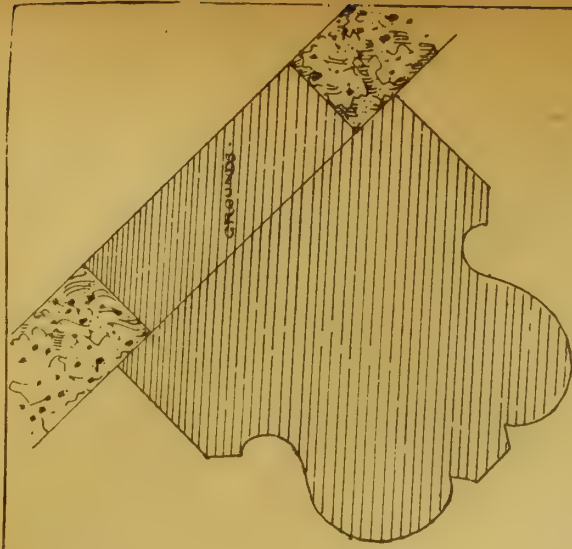
PASSMORE EDWARDS' PUBLIC LIBRARY

ST GEORGES IN THE EAST

TO BE OPENED TOMORROW BY THE RIGHT HONOURABLE

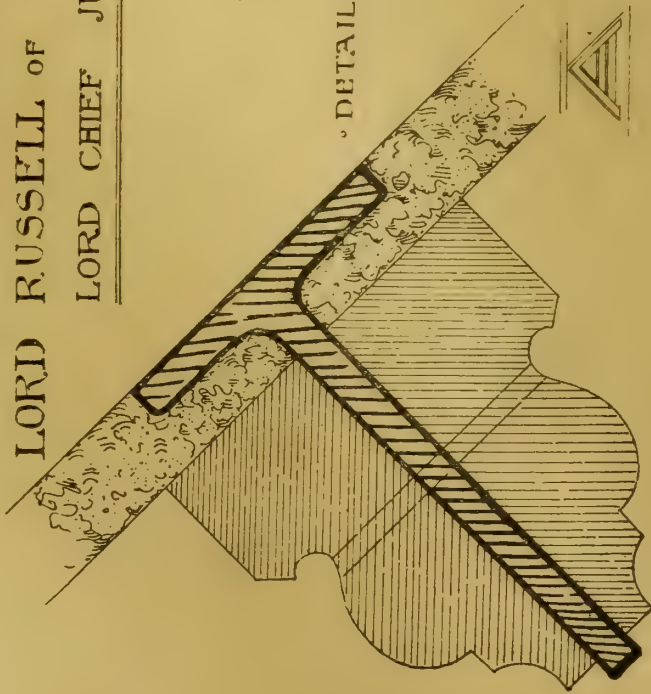
LORD RUSSELL OF KILLOWEN G.C.M.G. P.C.

LORD CHIEF OF JUSTICE OF ENGLAND

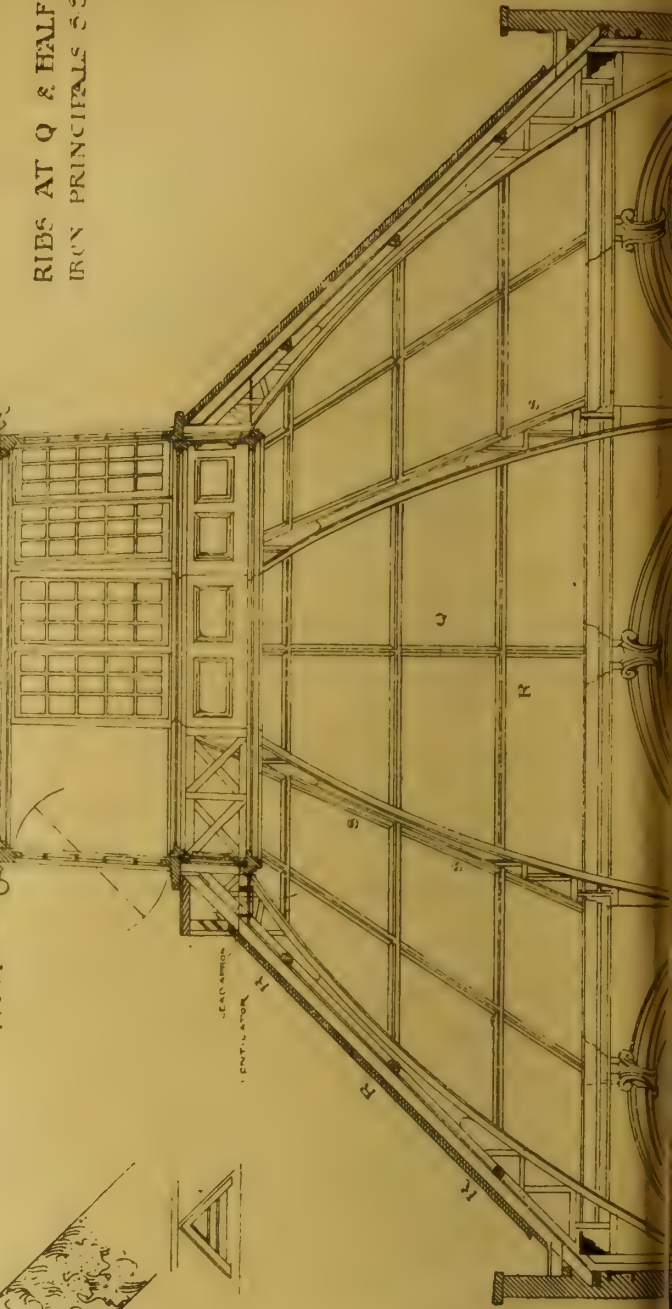


RIBS AT Q & HALF NEAT  
IRON PRINCIPALS 553.

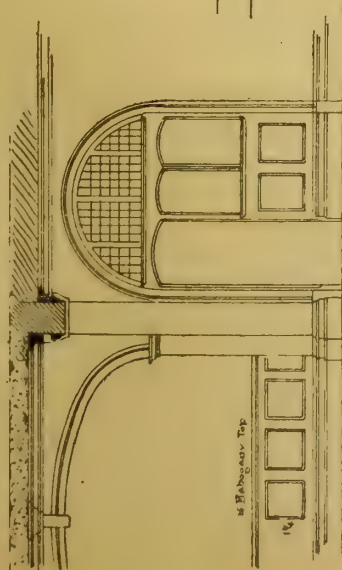
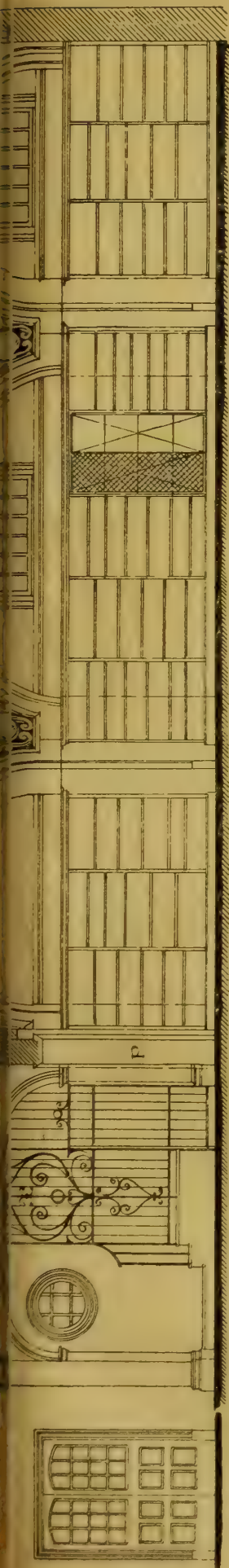
DETAIL OF BIG ROOM  
ROOF.



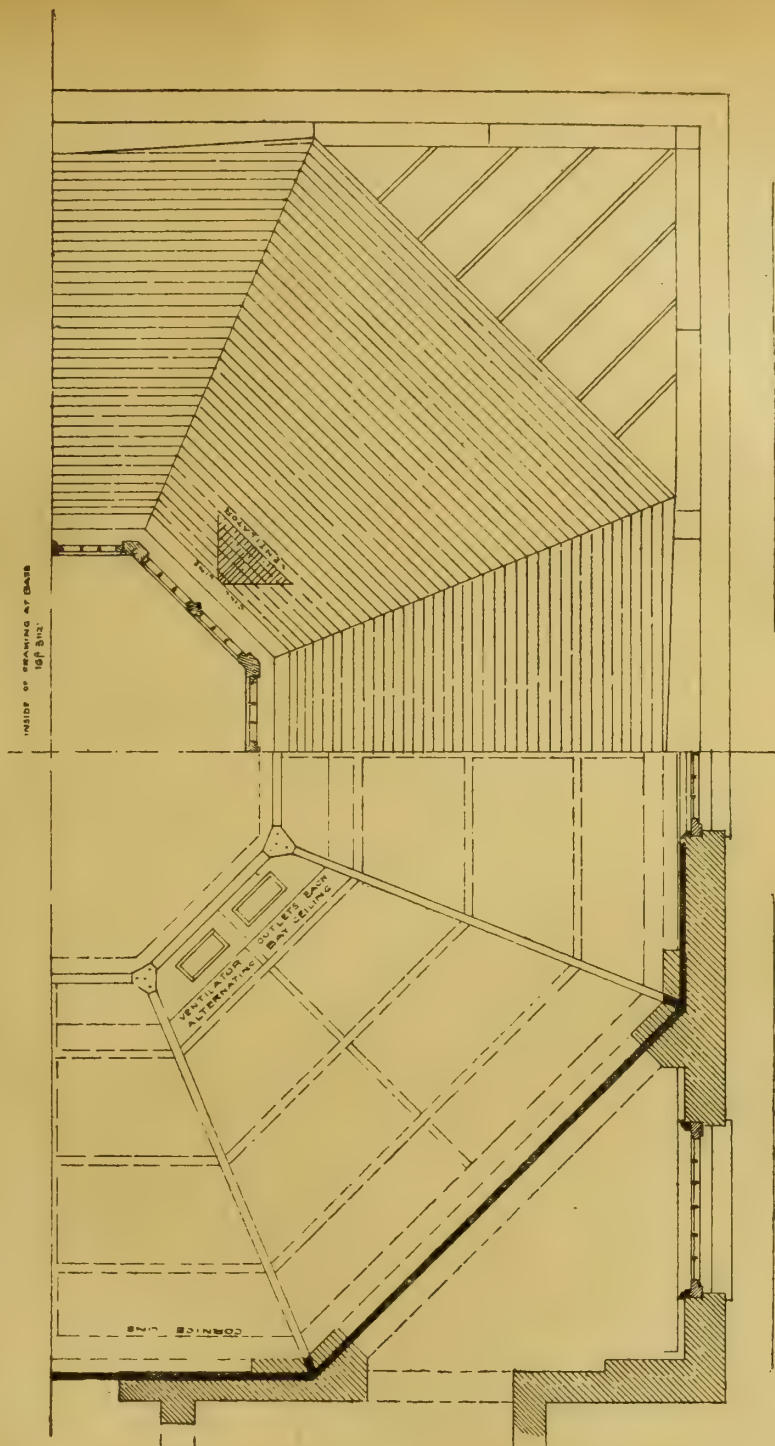
RIBS AS PURLINS R. K. R.







• WORKING DRAWING OF  
LARGE READING ROOM •





## LEGAL INTELLIGENCE.

**RE ARTHUR BURE.**—A first meeting of creditors was held on Tuesday before Mr. G. W. Chapman, the debtor being described as a land agent, of 37, Walbrook, City, and also of Bellagio, East Grinstead. The accounts were not filed, but proofs amounting to £15,243 were tendered. It was stated on the debtor's behalf that he had presented his petition with a view to obtaining an adjustment of his accounts with a certain creditor. The debtor asserted that he had during a period of seven years subsequent to a previous failure paid over £100,000 in cash to creditors under these proceedings, leaving a balance of only a few hundred pounds outstanding. He consented to an adjudication, as he was desirous of having his affairs properly settled by a trustee, and he hoped that ultimately both bankruptcies would be annulled. Mr. W. H. Pannel, chartered accountant, was appointed trustee of the estate.

**THE TOTTENHAM COURT-ROAD IMPROVEMENT.**—The resumed inquiry as to the value of the properties affected by the Tottenham Court-road Improvement Scheme of the London County Council, which scheme will be subject to "betterment," was held on Tuesday before Mr. James Green, the arbitrator appointed by the Local Government Board. The cases dealt with comprised the Oxford Music Hall, and the freehold and leasehold interests therein, and in Nos. 4, 14, and 16, Oxford-street, 1 and 1A, Tottenham Court-road, and part of 11, 12, and 13, Boziers-court. Professional evidence on both sides was given before the arbitrator, whose award will be published simultaneously with that of the Strand Improvement Scheme.

**BUILDER IMPRISONED FOR RECEIVING STOLEN GOODS.**—James Wright, 36, a builder, of Bruce-road, Bromley; Walter Wright, 32, a foreman; and George Smith, 21, labourer, were charged on remand at the Thames Court, on Friday, with stealing and receiving nine bags of cement and other things, the property of the Self-Lock Tile Company, Limited, of Gracechurch-street, City. Walter Wright, who was not related to James Wright, had been employed as foreman at the prosecutors' works in Hancock-road, Bromley, while James Wright was engaged in building two houses close by. In consequence of a communication, Detective-sergeants Burden and White, K Division, kept watch, and saw Smith go to prosecutors' works and take four bags of cement away on a truck to where James Wright was building the houses. The officers afterwards saw him take five other bags of cement to the same place. When James Wright was arrested he stated that he had borrowed the cement from Walter Wright, and had lent the latter some. On the roofs of the two houses being examined, about 500ft. of battens belonging to the prosecutors were found. Two cans, containing black oil, were also discovered there. Walter Wright went to the City office and admitted to the secretary that he had given James Wright cement and timber. He also said it was not true that they had borrowed cement from the prisoner. Mr. Dickinson discharged Smith, and said there was a vast difference between the other two prisoners. He could not do less than sentence James Wright to two months' hard labour. Walter Wright would be sentenced to fourteen days' hard labour.

**SERIOUS CHARGE AGAINST A BUILDER.**—At the Hanley Borough Police-court, on Tuesday, Cornelius Cornes, a builder and contractor, Hanley, was charged with receiving a quantity of stone setts, knowing them to have been stolen. Complainant's solicitor, in applying for a remand, stated that four men were before the Court the previous day charged with stealing a quantity of stone setts, and were formally remanded for a week, and the allegation against the present accused was that he received those setts, or some of them, knowing them to have been stolen. In consequence of information received, a search warrant was issued, and Detective-sergeant Higgins visited accused's place of business in Lichfield-street, and found there 10 tons 7cwt. 2qr. of setts which were alleged to belong to Messrs. Dick, Kerr, and Co. (Ltd.), who were engaged in relaying the tramways in the district, and 6 tons 3cwt. which were alleged to be the property of the Hanley Corporation. Mr. Gardner, an employé of Messrs. Dick, Kerr, and Co., estimated their setts at 32s. per ton, and accused was alleged to have given 3s. per load of about 21cwt. or 22cwt. for them. He was remanded until Monday next, bail being allowed in £200.

**AN UNPROTECTED SCAFFOLD.**—At the parish offices, Putney, on Friday, Mr. Braxton Hicks resumed his inquiry with reference to the death of John Bernard Winch, aged fourteen, a bricklayer's apprentice, of 43, Ram-square, Wandsworth, who was killed on the 12th inst. through falling from a scaffold 52ft. high. Mr. Jaspar Redgrave, H.M. inspector of factories, represented the Home Office. The deceased's father, himself a workman on the same building, said the scaffold was unprotected. It was usual for such lofty scaffolding to be protected. The deceased was pointing the brickwork.

John Coker, a general labourer, of 23, Lifford-street, Putney, said he and two other men erected the scaffolding. He did not know who was responsible, but supposed Peach, the general foreman, was. It was not intended to be used for pointing brickwork. He told the deceased's father so. Winch emphatically denied this. The coroner and jury at this juncture having inspected the scaffold, Coker admitted that he removed a plank to enable the deceased lad to work on the scaffold. Henry Rofey, of Guildford Works, Putney, the contractor for the work, stated that he was on the scaffold on the morning of the accident, but he did not notice that the north side was unprotected. James Peach, the foreman, admitted that if he had seen that the scaffold was unprotected, he would have had a guard put on it. Witness did not consider himself responsible after he had given orders for the erection. The jury returned a verdict of accidental death, and added a rider to the effect that Mr. Rofey was greatly to blame for not employing practical scaffolders, and for not himself seeing that the scaffolding was safe.

## CHIPS.

Lord Rosebery opened on Saturday the new Sandeman Free Library in Kinnoul-street, Perth.

A new Wesleyan chapel was opened at High Brooms, Tunbridge Wells, on Tuesday week. It has cost £1,400, and has been built by Mr. Jarvis, contractor, of Tunbridge Wells.

In consequence of their offices at No. 17, Great George-street, being required by the Government, under the Public Offices (Westminster) Act, 1896, Messrs. Horne, Son, and Eversfield have temporarily removed to No. 19, Great George-street, at the corner of King-street.

Mr. Henry Allnutt, the founder and hon. secretary of the National Footpath Preservation Society, and formerly manager of the *Estates Gazette*, died at his residence in Rowan-road, Hammersmith, on Thursday, the 21st inst., at the advanced age of 85 years.

The Bishop of Bath and Wells attended at the parish church of St. Mary Magdalene, Chewton Mendip, on Sunday, to dedicate a new memorial west window to the memory of late Lord Carlingford and Vermont, K.P., who was interred in the family vault at the church in February, 1897. The window consists of four lights, and the subject of two is the "Resurrection Morn." The other subject is the "Journey to Emmaus." The smaller lights above contain the Carlingford arms.

Owing to the recent heavy and continuous rains an alarming landslip was reported on Friday on the County Antrim coast road between Glenarm and Carnlough. The cliffs along the route where the subsidence took place are very steep and overhang the road. About one and a half mile of roadway has been rendered impassable, the embankment being carried away.

The Light Railway Commissioners held a public inquiry on Tuesday in regard to the scheme for the establishment of a light railway between Kelvedon, Tiptree, and Tollesbury, all in East Essex.

The presentation of the portrait of Sir Arthur Arnold to the late chairman of the County Council will take place in the County Hall, Spring Gardens, on Tuesday next. Following the precedent set by Lord Rosebery and other chairmen, the portrait will remain in the custody of the Council.

A Local Government Board inquiry was held at Bexhill on Wednesday week, by Mr. Frederick H. Tulloch, M.I.C.E., into an application of the urban district council for loans of £14,719 for works of private street improvement and £910 for works of public street improvement.

The executive committee of the Gladstone Liberal Memorial Fund received, on Tuesday, the report of the sub-committee entrusted with the duty of recommending the name of a sculptor to whom the commission for executing the statue of Mr. Gladstone, to be placed in the Houses of Parliament, should be given. The executive committee decided to intrust the work to Mr. F. W. Pomeroy, who is best known by his Burns commemorative statue, unveiled at Paisley two years ago by Lord Rosebery. The report was adopted.

The new hospital, Bucknall, Staffs, is being warmed and ventilated by means of Shorland's patent double-fronted Manchester stoves with descending smoke flues and Shorland's patent Manchester grates, the same being supplied by Messrs. E. H. Shorland and Brother, of Manchester.

Mr. Samuel Ingram, of Cannington, Bridgwater, has been appointed by the Devon County Council surveyor for the northern division of Devonshire, in succession to the late Mr. Masterson. Mr. Ingram, who was next on the list of candidates when Mr. Masterson was elected in June, 1897, has since continued to hold the office he then occupied—that of surveyor to the rural district council of Bridgwater.

## WATER SUPPLY AND SANITARY MATTERS.

**ABERDEEN.**—The Water Committee of Aberdeen Town Council discussed on Saturday the proposal to employ an engineer to assist in taking a survey with a view to ascertaining the probable cost and the route of a water supply from the Avon. Mr. Bain, the convener, moved, and Dean of Guild Walker seconded, that Mr. Jenkins, C.E., should be appointed to assist Mr. Dyack, burgh surveyor, in taking a survey and other observations in connection with bringing the water supply from Inchroy, and that in the mean time the question of laying iron pipes and removing the present aqueduct from the Dee be delayed until the report is obtained. As an amendment it was moved and seconded, that the council should go to Parliament for powers to lay iron pipes to Invercannie, the "in-take" of the Dee supply. The motion was carried by the casting vote of the convener. At a meeting of the sewerage committee of the town council on Friday it was resolved to apply to Parliament for the necessary powers to carry out the following works:—High-level sewer, £11,000; Girdleness outfall, £47,750; low-level sewer, £7,670; Ferryhill storm-water culvert, £8,200; Tile Burn storm-water culvert, £5,500; other storm-water overflows, £1,025; connecting sewers at Hutcheon-street, Millburn-street, and Torry, £8,100; Don Valley outfall, £10,500; total, £99,765. An amendment by Bailie Taylor anent a scheme costing £187,105 was defeated by six votes to two.

**LEEDS.**—An interesting report was presented to the Streets and Sewerage Committee at its last meeting, with reference to the result of the experiment with the Dibdin system at Kinstrop, which was recently adopted by the council. The treatment of the sewage had, it was stated, given every indication of the possible solution of the difficulty of dealing with so large an accumulation as 20,000,000 gallons per day, including sewerage created by the city and its trade effluents.

**THE ROYAL COMMISSION ON SEWAGE DISPOSAL.**—The Earl of Idlesleigh writes:—"It has been brought to the notice of the Royal Commission on Sewage Disposal that there is a tendency on the part of some manufacturers and local authorities to postpone the carrying out of works for the purification of trade refuse and sewage until the Commission have issued their report, and I think it desirable, therefore, to state that a considerable time—perhaps even some years—must elapse before the Commission can arrive at any final conclusions on a subject which necessarily involves detailed and prolonged scientific investigation. Any such postponement would be viewed by the Commission with the gravest concern."

**THE LONDON COUNTY COUNCIL AND THE WATER COMPANIES.**—The Water Committee of the London County Council have prepared a report containing proposals for legislation in 1899 on the subject of the Metropolitan Water Supply, which will be considered at the meeting on Tuesday next. They recommend that a Bill be promoted in the coming Session of Parliament for the purchase, by the Council, of the undertakings of the eight Metropolitan Water Companies, the purchase to be effected by agreement, or, failing agreement, by compulsion. Subject to such provisions as may be made by Parliament as to the ultimate relationship between London and the outside authorities, the Bill is to provide that the undertakings of the Companies shall vest in the council at a date not later than six months after the passing of the Act. It is further proposed that the Bill shall authorise the Council to proceed forthwith with the connecting and laying of mains and other works necessary in order to enable it to protect any part of the Metropolis from want of water. It is advised that the Arbitration Clause in the Bill should be so framed that in the case of each company the arbitrator shall have regard to all such circumstances as may be brought before him, and that no allowance be made in respect of compulsory sale. Subject to further negotiations with the local authorities, it is proposed that the clauses in the Bill with respect to the supply of outside areas shall follow the principle of the Bills promoted by the Council in 1895. The understanding with the Corporation of the City, with regard to their representation on the Water Committee, is to be adhered to, if they so desire. On the subject of a contemplated supply of water from a new source, the Committee recommend that a Bill (or Bills) be promoted in the coming session for the purpose of empowering the Council to bring an additional supply of water to London from the watersheds of the Wye and Towry, on the general lines of the report of the Water Committee approved by the Council on April 21, 1896, so far as it applies to the Wye section of the engineer's scheme. The estimate of cost in the Committee's former report has been slightly reduced, the total amount necessary for providing a daily supply of 200,000,000 gal. being £16,546,000, and it is stated that this will probably be expended in three instalments.









NEW BREWERY, MAIDSTONE, KENT

W. H. DUFFIELD & CO. LONDON





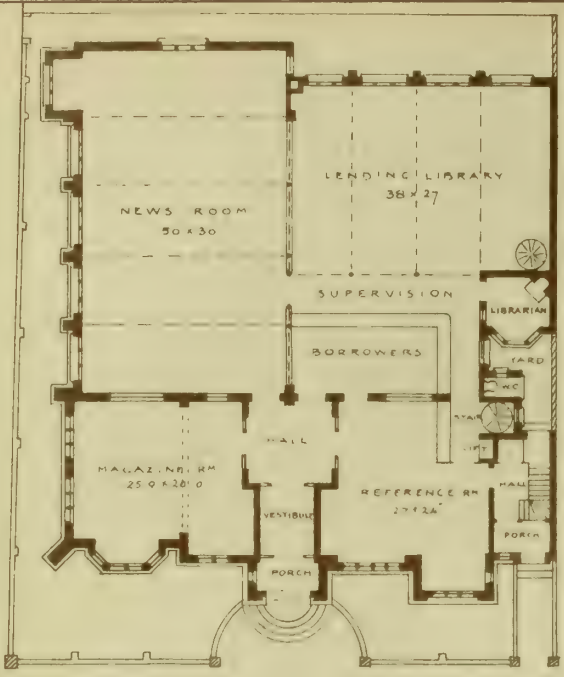












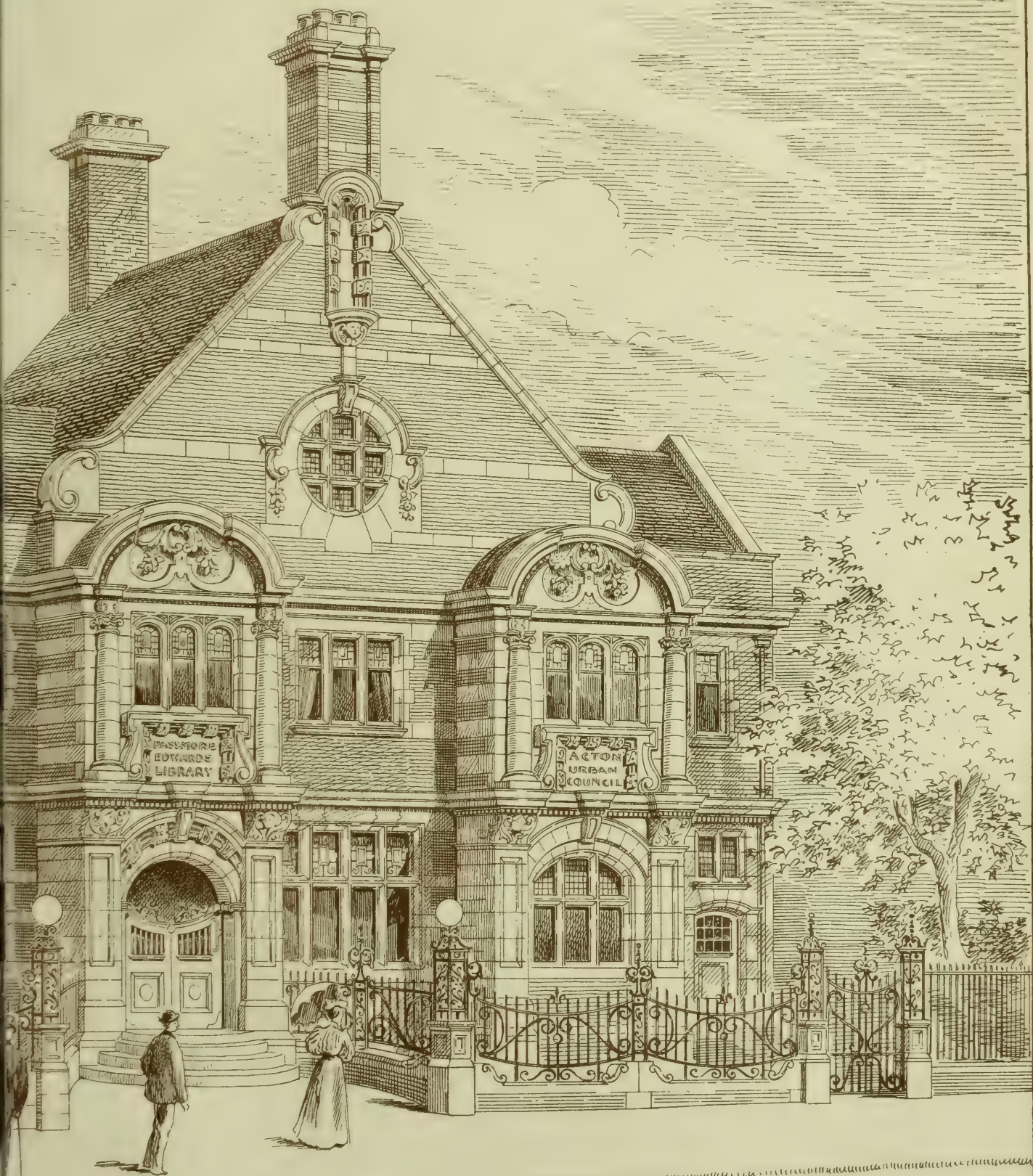
GROUND PLAN



MAURICE B ADAMS DEL 1898



OCT. 28, 1898.



LONDON W. MAURICE B. ADAMS F.R.I.B.A. ARCHITECT

Photo Lithographed & Printed by James Akerman, 11, Queen's Square, W.

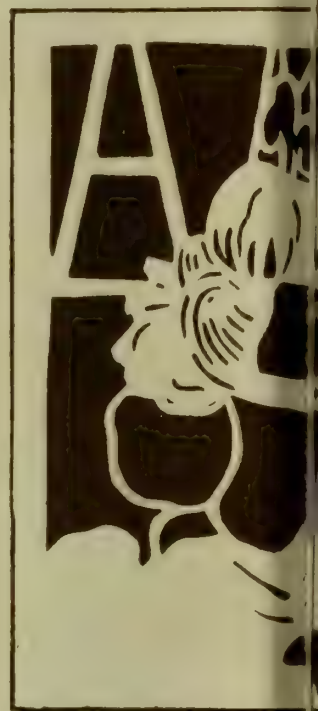










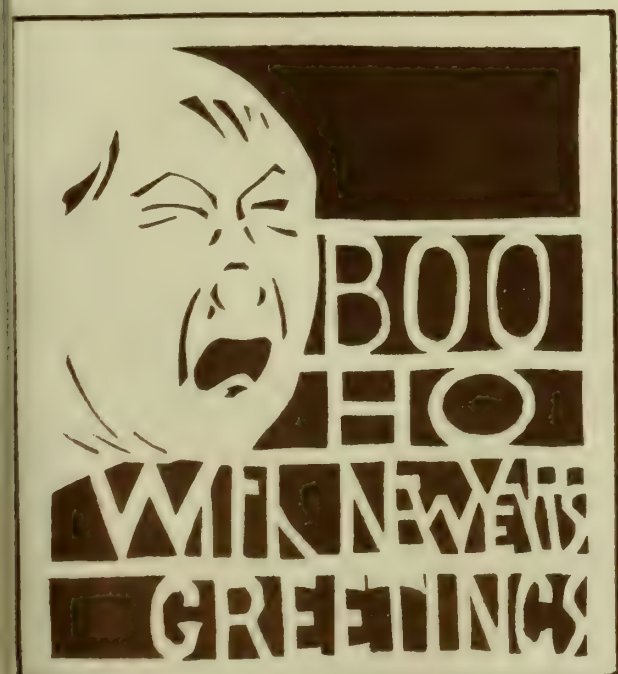






DESIGNS FOR CHRISTMAS CARDS IN STENCIL

BY HUGO W. KOCH.





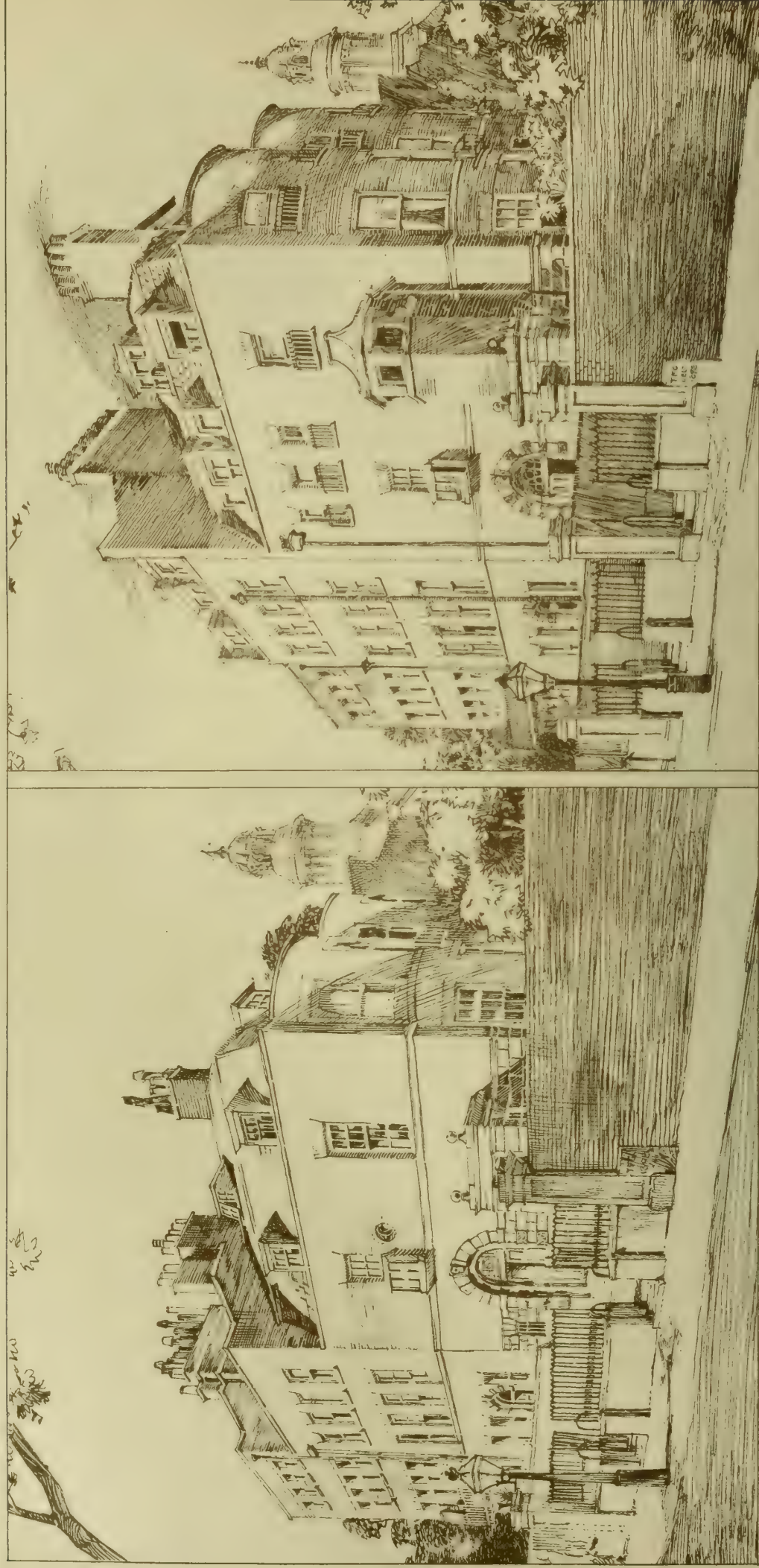








THE BUILDING JEWEL, OCT 28, 1897.

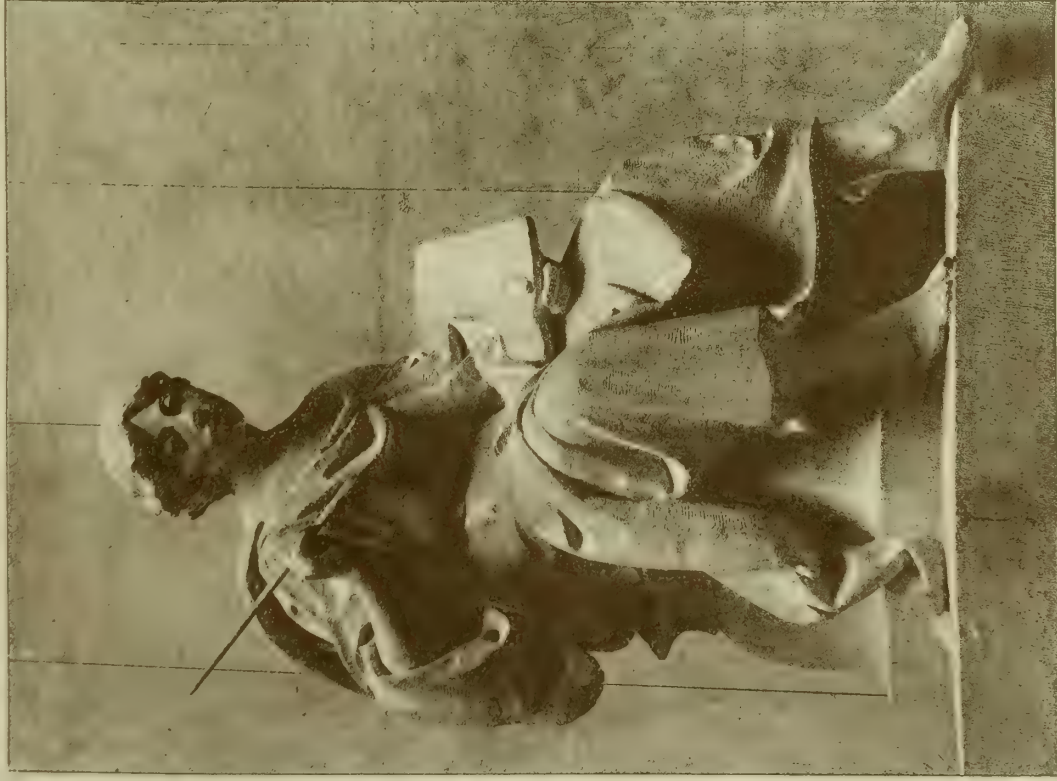


THE LONDON RESIDENCE OF CHARLES DICKENS, NO. 1 DEVONSHIRE TERRACE, PORTLAND PLACE, W.

BEFORE AND AFTER ALTERATION IN 1897. GEORGE MORNBLOWER, A.R.I.B.A. ARCHITECT.



ART

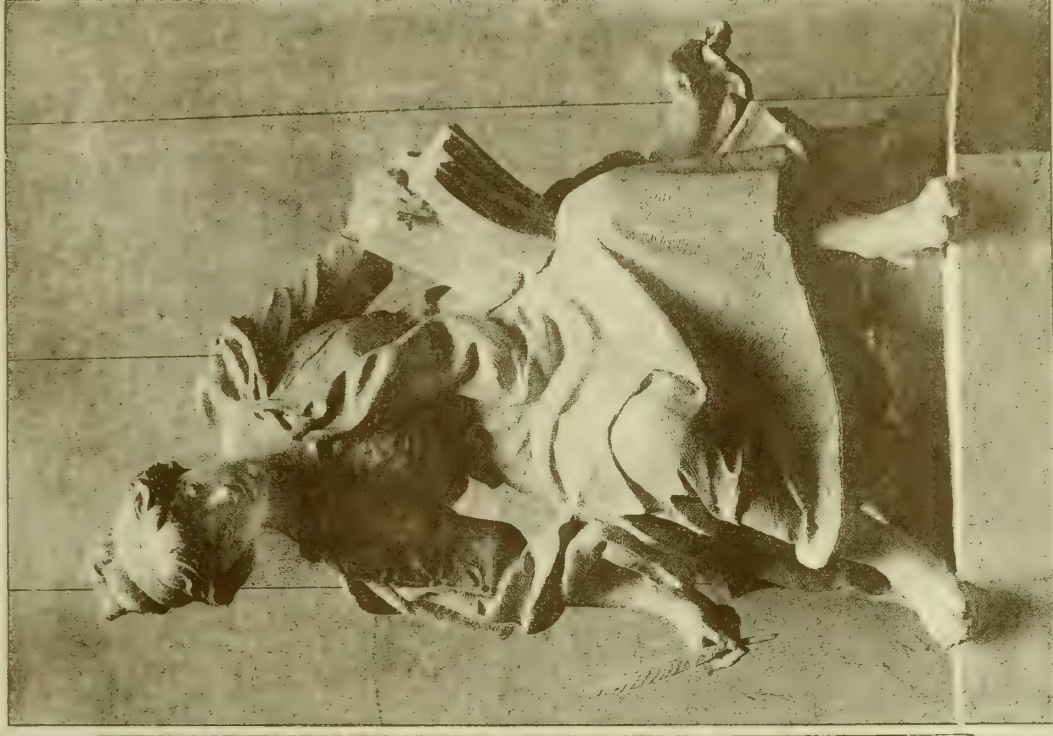


ST. GEORGE & THE DRAGON.



FROM MARBLE TABLET IN PORCH

LITERATURE.

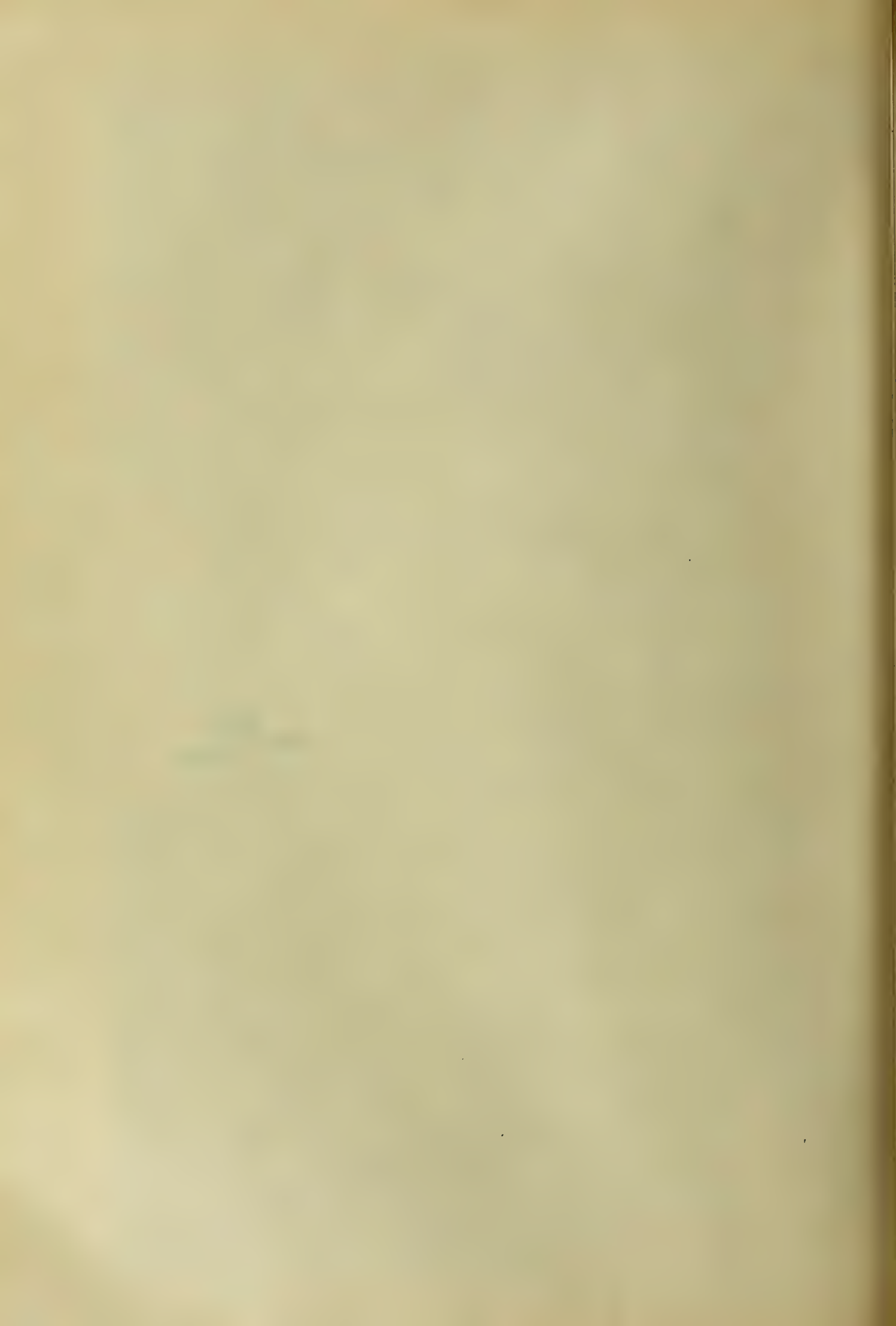


PASSMORE EDWARDS PUBLIC LIBRARY, ST GEORGES IN THE EAST,

STATUES, LITERATURE &amp; ART OVER THE ENTRANCE.

MAURICE B ADAMS, F.R.I.B.A. ARCHITECT. NATHANIEL HITCH, SCULPTOR.







## Correspondence.

## GATESHEAD COTTAGE HOMES.

To the Editor of the BUILDING NEWS.

SIR,—My attention has been drawn to the correspondence relating to the above competition. I had the "honour," very much to my regret, to be the successful competitor, therefore the brief statement of the circumstances from the chairman of the Gateshead Board of Guardians showing "the mistake in making statements and charges without a knowledge of the facts" somewhat interests me. I wish, therefore, to add "further brief statements," with a knowledge of the facts.

The chairman is quite correct in saying that a distinct clause stating no payment would be made for plans unless a reliable tender could be obtained within the specified amount of the estimate; but he does not say the "local architect" appointed to carry out the work has not complied with this condition, neither does he state what this specified amount was. It was £6,500. The tender of the contractor accepted to carry out the work is, I am informed, £15,095, and the "local architect," the chairman states, is well within his original estimate.

My original estimate was £11,307. The guardians proceeded to reduce the cost by the reverse process to that considered common sense; they immediately add extra buildings and additions to those that are already designed; they then choose as the building material one of the most expensive stones in the county, although in the conditions of competition they make a special clause, and lay stress upon the fact that there is a quarry upon the site from which the contractor would be allowed to win his stone, and competing architects may reduce their estimates accordingly. In my original estimate there is not included, and the guardians were well aware of it through my reports to them, the following items in addition to the before-mentioned extra buildings:—(1) Gas and water-mains, (2) drainage, (3) extra foundations due to the redistribution of the several buildings, (4) plastering the buildings internally, (5) professional fees, (6) contingencies.

The guardians then hit upon a good idea to reduce the cost again, their idea being to obtain a shilling article for 8d. I had, in other words, to produce a tender for the same scheme not exceeding £14,000. Architects, it appears to me, are called upon to produce most remarkable effects; but this I thought far from ingenious. However, I undertook to do what I could in a small way, the result being the same scheme revised, but containing the same number of buildings and accommodation, resulted in a tender of £12,392. I thought my task had been successful, and I should reap the reward, which I did, but not in the way I anticipated. My services were dispensed with, and to borrow from the letter of the Chairman of the Gateshead Board of Guardians, "they could not, in justice to themselves and the other competitors, go on with the scheme, and arrangements were made with the architect, and terms mutually agreed upon in settlement for his services up to date." With regard to this settlement, I "did" agree to terms.

The scheme was complete, contract drawings prepared, quantities and specifications lithographed and printed, for all which I had been made responsible. Tenders were received, three of them being within the stipulated amount as the maximum—viz., £14,000. My work was finished, my labours o'er.

I will encroach no further upon your valuable space, except by concluding that competitions are the most curious problems I have undertaken to solve. It may be I am inexperienced in such matters; but the old adage "Ignorance is bliss" (?) is here exemplified.—I am, &c.,

Cecil A. Sharp.

59, Fenchurch-street, E.C., Oct. 25.

The late Mr. J. J. Colman by his will has bequeathed to the Norwich Castle Museum, free of duty, oil paintings, water-colour drawings, maps, drawings, &c., by Norfolk and Norwich artists, to be hereafter selected, to the value of £5,000.

The urban district council of Felixstowe and Walton have decided to seek Parliamentary powers next session to carry out extensive works of sea defence, including the reconstruction of a sea wall and promenade, in accordance with plans prepared by Mr. Henry Miller, C.E., of Ipswich, the county surveyor for East Suffolk.

## Intercommunication.

## QUESTIONS.

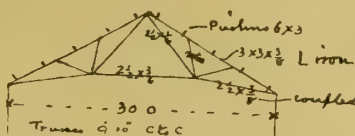
[12084].—**Bricks.**—Do bricks made from clay obtained from under the sea, or when the tide is out, contain any saline matter, or as much as will attract moisture and cause dampness?—WM. BROWN.

## REPLIES.

[12084].—**Steel Roof-Truss.**—In reply to above query, I have used a steel truss of similar form, 30ft. span,



over a cow-house, sketch of which I enclose. It is covered with lock-jaw tiles on 1½ boarding and tile-battens, weight a little over 10wt. to the square. It is in all respects a very satisfactory roof, and was supplied by Jas. Kean, of Alnwick. Each truss was delivered in two sections, and



easily put together by carpenters. I also inclose a small photo. of erection.—H. G. QUARTERMAIN.

[12059].—**Artificial Stone.**—The answer to this question will depend on circumstances. In many situations the method of forming *in situ* has advantages, the centring being arranged to the space more correctly than if the steps were moulded separately and brought to the building. If there should be winders, and the staircase is of some width, the cast steps may be the more desirable.—A. G.

[12079].—**Rent and Repairs.**—The only thing you can do is to give notice; then perhaps your repairs may receive the necessary attention. I believe the landlord can demand the rent even if the roof was off.—L. E.

[12079].—**Rent and Repairs.**—A landlord can claim his rent, even if the rain comes in, if the tenant has signed a repairing lease. The question, of course, entirely rests with the terms of the lease. A tenant cannot compel his landlord to do anything, if he has signed a contract which makes him responsible for repairs of a substantial kind. See what you can do by asking.—G. H.

[12080].—**Details of Carpentry and Joinery.**—The best work on this subject is undoubtedly Newland's "Carpenters' and Joiners' Assistant." Other works on the subject are Tredgold's "Principles of Carpentry" (Hurst's edition), Wilson's "Carpentry and Joinery," and Webber's "Carpentry and Joinery," prepared to suit the City and Guilds of London Institute's Exam. Professor Banister Fletcher's "Carpentry and Joinery" is more suitable for very advanced students than for those just beginning. Also any work on building construction contains details of carpentry. Among the plates on building construction designed by Mitchell are several fine ones dealing with the subjects required, and also Busbridge's set of plates contains similar details. I believe that Laxton some time ago published some examples of construction, which were sheets of large size details.—LOUIS ERWOLD.

[12080].—**Details of Carpentry and Joinery.**—There are Rivington's "Building Notes," Mitchell's "Building Construction," Tredgold's "Carpentry," Newland's, &c., which give large-scale details. Some of these give the details to lin. and jin. scales.—A STUDENT.

[12081].—**Bedding Girders.**—Lead is preferable to felt for this purpose, and the girders can be fixed in the usual way by "rag-bolts"; or, where there is no chance of them overturning, they are sometimes merely kept in their place by the superimposed weight.—L. E.

[12081].—**Bedding Girders.**—Place a sheet of 8lb.

lead over the templates. The weight of girder will keep it in its place.—ALLEN T. HUSSELL, Ilfracombe.

[12081].—**Bedding Girder.**—Inodorous bitumen felt 3in. thick, in rolls 32in. wide, and up to 35yds. long, or so, is a suitable material. See Engert and Rolfe's lists, or those of Callender and Montgomery. The above is said to be better than cast or milled lead. The same thickness of lead would be 8lb. per foot super.—REGENT'S PARK.

[12082].—**Canterbury Free Library.**—Mr. A. H. Campbell, the city surveyor, is the architect of this new building, which is locally known as "The Beany Institute for Working Men."—W. J. J.

[12083].—**Lift Pump.**—Consult Molesworth's "Pocket-Book," p. 547.—L. E.

## [12083].—Pump.—

Q = Quantity of water in cubic feet per hour.  
D = Diameter of pump-barrel in inches.  
L = Length of stroke in inches.  
M = Modulus of pump in most cases 3/4 or .66.  
N = Number of strokes per minute.  
P = Quantity of fresh water in tons.  
S = Quantity of sea water in tons.

$$Q = \frac{7854 D^2 L N M \times 60}{1728}$$

$$D = \sqrt[3]{\frac{1728 Q}{7854 L N M \times 60}}$$

$$L = \frac{1728 Q}{7854 D^2 L N M \times 60}$$

$$N = \frac{1728 Q}{7854 D^2 L M \times 60}$$

$$M = \frac{1728 Q}{7854 D^2 L N \times 60}$$

$$P = \frac{7854 D^2 L N M \times 60}{1728 \times 35.9}$$

$$S = \frac{7854 D^2 L N M \times 60}{1728 \times 35}$$

See Hutton's handbook "Engineers."—REGENT'S PARK.

At a meeting of the governors of the Rhyl County School, on Friday, the chairman produced alternate plans prepared by Mr. Shaylor, of Welshpool, for the proposed new school premises. The plans showed accommodation for 80 boys and 80 girls. After considerable discussion, it was resolved to engage Mr. Shaylor's services as architect, and to adopt one of the plans subject to the architect conferring with the governors as to details.

On Friday afternoon the foundation-stone of the new Whitefield Tabernacle, in Tottenham Court-road, was laid by the Rev. Dr. Parker, and was the identical stone which Whitfield himself laid in 1756. The new Tabernacle is designed to accommodate 1,150, and underneath it a large hall, capable of seating 800, is to be built. This is to be named Toplady Hall, after the famous hymn-writer, whose remains are buried under the site of the Tabernacle, and who will be always remembered as the author of "Rock of Ages." The architect is Mr. Rowland Plunbe, F.R.I.B.A., and the estimated cost £12,000, of which £5,000 is in hand.

The Burton-on-Trent Co-operative Society, Ltd., are about to build a range of stables, caretaker's house, and boundary wall at Shobnall-street, on land recently purchased by them from the L.N.W.R. Co. Mr. W. A. Stevenson, builder, of Horninglow-street, has secured the contract for £2,355, and Mr. R. Stevenson, Imperial Chambers, High-street, Burton-on-Trent, is the architect. Plans are also in course of preparation for a range of shops, offices, store-rooms, and concert-hall to be erected in Byrkley-street.



## Our Office Table.

THE annual conversazione of the Architectural Association was given at the King's Hall, Holborn Restaurant, on Friday evening, and passed off very successfully. About 500 guests, members of the Association and ladies, attended, and were received by the President, Mr. G. H. Fellowes Prynne, F.R.I.B.A. (who was accompanied by Mrs. Fellowes Prynne) and the Council. Lieut. Dan Godfrey's band was in attendance, and discoursed an excellent selection of music, and glees and part songs were rendered in good style by Messrs. May, Ellis, Dixey, and Chatterton. A small but choice collection of water drawings by Sir Wyke Bayliss, and Messrs. Abel Haig, H. W. Brewer, and A. W. Weedon, were hung on the walls, together with the premiated drawings and designs in the A.A. Competitions, and a selection of work done in the Studio and Class of Design. A variety of decorative pottery and faience, including vases, plaques, and panels, was lent for the evening by Messrs. Doulton and Co., Mr. W. De Morgan, and Messrs. Martin Brothers. The refreshment and cloakroom arrangements were well managed.

At Tuesday's meeting of the London County Council it was resolved to appoint a head of the new Tramways Department, at a salary of £1,500 a year. The Water Committee was instructed to consider and report as to the best means of compelling the water companies to bear the cost of conveying the water from their mains to the houses of the consumers. The recommendation of the Housing of the Working Classes Committee, that the estimate of £118,740 for the purchase of land in Drury-lane and Herbrand-street be approved, in connection with the scheme of rehousing in Clare Market, was approved. One of the terms of the agreement for the sale of this land is that the Council shall sell to the Duke of Bedford the freehold of a strip of land which will form part of the frontage to the western horn of the proposed new street from Holborn to the Strand. The duke will, under the agreement, give up land required to widen Catherine-street, and improve its approach to the proposed new street.

AN art exhibition at Perth, the first ever held in that city, was opened on Friday in the New Sanderson Public Library. It is very limited in number, only 140 canvases being hung; but comprises a representative, if select, display of work, including a masterpiece by Rembrandt (a portrait), characteristic works by his countrymen Van Ostade, Mieris, James Maris, and Israels, by Van Dyck, an interesting group by Velasquez, typical landscapes by Corot, and some charming works by British artists—to wit, Reynolds, Gainsborough, Romney, Hoppner, Constable, Millais; while works by Raeburn, Wilkie, Duncan, Harvey, Alexander Fraser, Sam Bough, Chalmers, M'Taggart, David Farquharson, and others well maintain the credit of the Scottish school.

A MEETING with a comprehensive agenda is about to be convened in London by the City Corporation and the vestries and district boards, in order to deal with various matters relating to streets and street traffic. The topics to be discussed will include police regulations for the disuse of vans and carts so constructed with blind hoods as to prevent drivers from seeing passing vehicles, to the common danger of traffic; the further suppression of street cries, railway whistles, and other objectionable and unnecessary noises within the Metropolitan area; the best method of indicating the names of thoroughfares, not only at the ends, but at the intersection of streets; the removal of house-refuse, and the cleansing and sprinkling of roads; and the prevention of serious hindrance to traffic caused by prolonged and unnecessary stoppage of vehicles at the sides of crowded thoroughfares.

At the last meeting of the town council of Widnes, Councillor Davies called attention to the inscription on the memorial-stone at the entrance to the cemetery, "J. S. Sinclair, Borough Surveyor, A.M.I.C.E., architect." He wished to know whether the surveyor was the architect for the entrance or not. Alderman Williamson replied that undoubtedly the borough surveyor was the architect for the gates, but whether they were copied or not, Mr. Sinclair ought to be able to answer that question himself. Councillor Davies asked if the gates were a copy of those at

Rochdale Cemetery? Alderman Williamson: Yes, sir. Councillor Davies said if that was so, how could the borough surveyor be the architect, when it was simply a copy of another man's production? He thought that the cemetery committee ought, for the surveyor's sake, to remove the statement. Alderman Williamson said he thought the idea of the committee was that Mr. Sinclair was the architect for the whole of the work, and not simply that he was the architect for the gates. He thought it applied to the whole of the work in connection with the cemetery. Councillor Davies: The laying-out as well. The matter then dropped, no action being taken.

AN effort is being made to create a new interest in the granite and building industry of Aberdeen. Already a class for granite cutting has been formed at Gordon's College, and good progress is being made by those attending it in the production of skilled work. This is to be followed by a series of lectures, under the auspices of the Masons' and Granite-Cutters' Union, upon "Granites," "Architecture," and kindred subjects. The first of the series was given on "Granites," by Mr. Nicholson, professor of natural history, in the Natural History Classroom, Marischal College, on Tuesday evening last. Lectures on "Architecture" are also to be given by Mr. James Souttar and Mr. William Kelly, both well-known Aberdeen architects. The Right Hon. James Bryce, M.P., has also consented to lecture upon some topic cognate to architecture and the treatment of stone (if a suitable date can be fixed) during his stay in the city. The object of these lectures is to stimulate the desire for the better treatment of granite for architectural purposes.

SOME tests of framing in hard-pine timber have recently been made in the engineering laboratory of the Massachusetts Institute of Technology, which have, the *American Architect* remarks, a considerable interest to architects and builders. In one set of tests, framed floors, consisting of hard-pine headers, 6in. by 12in., and 7ft. to 10ft. long, framed at each end into trimmers of the same scantling, and carrying tail-beams, three by twelve, 16in. from centres, framed-in with tenon and tusk, and pinned, were strained to the breaking-point by loads equally distributed on the tail-beams. As the object was to test the headers, rather than the tail-beams or trimmers, the latter were made short, the clear span being only 3ft. In the first division of the tests the headers were framed into the trimmers with double tenon and joint-bolts; in the second division the headers were hung to the trimmers with stirrup-irons. Failure, in every case, took place by the splitting of the header through the line of the mortises for the tail-beams, and it is remarkable that the headers hung in stirrup-irons showed no more resistance than those framed into the trimmers. In fact, in two cases the headers hung in stirrups failed under a load considerably less than timbers of the same size mortised into the trimmers, and in one case only did the stirrup-hung header resist a little longer than that framed with tenons. Tests of heavy timbers notoriously show great variations in their results, but these experiments indicate that the mortised framing, which is much to be preferred in regard to the effect of shrinkage upon it, is little, if at all, inferior in strength to that put together with stirrup-irons.

BESIDES the tests of floor-framing, a number of hard-pine trusses, consisting simply of a pair of rafters and a tie-beam, but made with heavy timbers, and put together with joints of various kinds, were tested to breaking. The timbers were too large, and too short, to suffer from bending; but the tension on the tie-beams, under a load of 25 to 50 tons, was sufficient, in some cases, to tear it asunder. In most instances, however, failure took place by the bending and rupture of the bolts or straps used to hold the foot of the rafters to the tie-beams. The usual notching of the rafter into the tie was of little practical use, as the strain soon bent the bolts, allowing the rafters to spread, and shear off the portion of the tie-beam beyond their feet, thus leaving the joint wholly dependent on the bolts. Iron shoes, notched slightly into the tie-beams, and bolted independently, were more useful, but were soon dragged out of their notches, and the broad straps, which were once regarded as affording the best framing for rafter-feet, readily yielded to the strain caused by the wedging of the rafter-feet under them. On the whole, the plain, bolted

joint seems to have been the most satisfactory. The element which, in practice, is introduced in the study of the strains on wooden trusses, by the shrinkage of the timbers, and the consequent loosening of the bolts, does not seem to have been considered in these tests.

THE cantonal authorities of Argovie have completed the restoration of the Schloss Habsburg (*lit.*, Habichtsburg, the Castle of the Hawk), near Schinznach, on the Aare. The castle was built by Werner, Bishop of Strasburg, of the Hapsburg family, in 1027. This was in the 13th century the seat of the first Rudolph von Hapsburg, Count of Argovie, the favourite of the Emperor Frederick II., and Governor of Lucerne, Zug, Glarus, &c. He was the founder of the Hapsburg dynasty. The building, which had descended to the low estate of a farmhouse, has now been restored to some resemblance of its historic past. Windows have been filled in with stained glass bearing the arms of Austria, the fine oak carving on wall and ceilings freed from its ancient coatings of plaster and whitewash, and the exterior wood-work of the house painted with the Austrian and Swiss national emblems and colours. It is intended henceforth to preserve the building and grounds as a national monument.

At the statutory meeting of the British Clay-workers' Mutual Insurance Corporation, held at the offices, 43, Essex-street, Strand, on Thursday last, Mr. John C. Hill, the chairman, stated that the result of their mutual insurance scheme, which was started in June last, as a protest against the excessive charges of the tariff insurance offices, had proved an amazing success. They had a capital of something over £16,000, and up to that time had paid in claims only £100. The corporation was formed for the insurance of brick, tile, and pottery makers in this country, under the management of Mr. H. Greville Montgomery, 43, Essex-street, Strand.

## CHIPS.

The Annual Exhibition of Students' Work at the Royal Female School of Art takes place at 43, Queen's-square, Bloomsbury, to-day (Friday) and to-morrow.

The foundation-stone of St. Peter's Mission Church, Gardner-street, Cowcadden, Glasgow, was laid on Saturday by Lord Kelvin. The building is Early English in style, and will cost about £6,000.

The ceremony of laying the foundation-stones of the new Calvinistic Methodist Chapel at Carmel, near Holywell, took place on Monday. The new chapel will cost about £700, and is being built by Mr. Edwin Hughes, contractor, Holywell.

A service was conducted in King's College Chapel, Aberdeen, on Monday, in connection with the dedication of a table for Holy Communion, of Communion plate, and of a lectern, in memory of the late Very Rev. Professor Milligan, D.D. The table is from a design by Mr. A. Marshall Mackenzie, A.R.S.A., the figures being executed by Messrs. A. and W. Clow, Edinburgh. The lectern is a brass eagle, standing on a globe.

The foundation-stone of St. Cuthbert's new parish hall, Durham, was laid on Tuesday. The site is at Framwellgate Head, at the junction of Framwellgate and Sidegate. The hall will be used in the dual capacity of mission-hall and Sunday-schools. The main room will be 52ft. by 25ft. The architects are Messrs. Plummer and Burrell, of Newcastle and Durham, and the sole contractor is Mr. C. W. Gibson, of Durham. The entire cost will be about £700.

Mr. Veall, of the firm of Veall and Sant, architects, was on Monday last returned unopposed for the Riverside Ward to the Cardiff Town Council. Councillor Veall won the seat three years ago, after a hard contest. On the same day Mr. W. H. Allen, sanitary engineer, was also returned unopposed for the Park Ward in the same town, he likewise having been first elected after a contest three years ago.

At Saturday's meeting of the Metropolitan Asylums Board, the clerk presented a statement with reference to the inquiry held by Mr. E. Knollys, C.B., on behalf of the Local Government Board, into the expenditure upon the Brook Hospital, and reported in our last issue, p. 563. The final statement of the cost of the hospital showed a total expenditure of £318,465 14s. 4d. The amount still unpaid was £1,204 1s. 8d. Orders had been issued by the Local Government Board in respect of an expenditure of £216,635, leaving £101,830 14s. 4d., for which a further order was required. After discussion, it was resolved to make application to the Local Government Board for a further order for the exact sum now ascertained to be required.



## MEETINGS FOR THE ENSUING WEEK.

**TUESDAY.**—Institution of Civil Engineers. Address by W. H. Preece, C.B., F.R.S., President, and Presentation of Prizes. 8 p.m.

**WEDNESDAY.**—Royal Archaeological Institute. "Amber," by Professor T. McKenny Hughes, M.A., F.R.S., F.S.A.; and "The Superstition that when a Murderer touches the Body of his Victim it will Bleed again," by Edward Peacock, F.S.A. 4 p.m.  
Edinburgh Architectural Society. "Municipal Buildings," by J. A. Williamson, A.R.I.B.A. 8 p.m.

**THURSDAY.**—Carpenters' Hall Free Lectures. "Sanitary Construction, Warming, and Ventilation," No. 2, by Professor Banister Fletcher, F.R.I.B.A. 8 p.m.

**FRIDAY.**—Glasgow Architectural Craftsman's Society. "Decorative Stonework," by Wm. Vicars, Sculptor. 8 p.m.

## CHIPS.

The *Readers' Monthly*, a new penny record and review of art, science, biography, music, and belles-lettres, promises well. Mr. Edward Fokett, the editor, is ably seconded by some excellent contributors. Sir Wyke Bayliss begins an interesting series of papers in the first number on Art.

Lessons commenced on Monday in the new board schools which have just been completed at Johnston-terrace, Devonport. They are situate near the Naval Barracks, and provide for nearly 700 girls and infants. The total cost of the buildings is about £8,000.

The partnership heretofore subsisting between P. Kerley and E. E. Ellis, of Exmouth, described as "architects and builders," under the style of Kerley and Ellis, has been dissolved.

The peal of six bells in the tower of Redgrave Church, Suffolk, was reopened on Tuesday week, having been rehung and restored by Messrs. George Day and Son, of Eye.

The Leamington Town Council intend to build a free library and technical institute on the Perkins's Gardens site, at a cost of £12,000, exclusive of land.

The new church of St. Stephen, Woodgate Park, Bexhill, of which the foundation-stone was recently laid in the presence of the Bishop of Chichester, is being built at a cost of £10,000, from plans by Mr. Ward. Mr. H. E. Cruttenden, of St. Leonard's, is the contractor.

The directors of the Colston Hall at Bristol (which was recently destroyed by fire), after some correspondence with the town clerk of that city as to the sale of the site to the corporation for the erection thereon of a town-hall, have decided to rebuild on the present lines, and to invite competitive designs from architects.

The Ruthin Rural District Council adopted on Friday plans and a scheme by Mr. John E. Thomas, C.E., of Wrexham, of a proposed new water supply for the parishes of Llangwyfan, Llandyrnog, Llanfychan, Llanynys, and Llangynhafal, in the Vale of Clwyd. The source of supply will be Nant y Ne, on the western slopes of Moel Famau, the gathering ground being 307 acres on the open mountain, formed of upper silurian rocks.

The proceedings at the Auction Mart last week were characterised by unusual activity. The investments offered were much above the average in quality, and in most cases commanded brisk competition, freehold ground-rents in particular being eagerly sought for. The sales, as registered at the Estate Exchange amounted to £185,521, a high figure in a week of the early autumn. Last year the returns for the corresponding period were considerably higher, the aggregate recorded being £272,989; but this was owing to the sale of two large country breweries with numerous tied houses.

St. Godric's Roman Catholic schools in Framwellgate, Durham city, were opened last week. They have been built from designs by Mr. Charles Walker, of Eldon-square, Newcastle-on-Tyne. The schools are built of red pressed brick, and slated. The rooms are floored with wood blocks or thick boarding, felted and rendered sound-proof. They are ceiled on the ground floor with plaster, and elsewhere with pitch-pine boarding, unvarnished, and are heated throughout with hot water. The schools are built in two stories. The accommodation is for about 600, and includes cookery-room and scullery, entrance and cloak-rooms. The total cost of the new schools has been about £4,000, whilst the site cost £1,000.

At the Shoreditch County Court on Saturday, before his Honour, Judge French, Q.C., an action was brought under the Employers' Liability Act by Harry Chesterman, against Messrs. Perry Brothers, builders, to recover damages for the loss of the sight of one eye from the effects of lime flying into it. After hearing evidence, his Honour, in addressing the jury, said it seemed very much as if the man was in defendant's employ. The jury found for the plaintiff, with £75 damages and costs.

## Trade News.

## WAGES MOVEMENTS.

**PETERBOROUGH BRICK TRADE.**—The brick industry around Peterborough was perhaps never, says the *Peterborough Advertiser*, in a more prosperous condition than at the present time, the output never greater, and the demand never keener. Ever since the real discovery of the "shale," or valuable "knot" clay, some twenty years ago, there has been a steady increase in the manufacture of bricks, which operations were principally started by private individuals on a moderate scale. However, the financiers were not long in recognising that the neighbourhood was a veritable K'ondyke of valuable clay—a clay admirably adapted to the making of bricks, inasmuch as the minimum amount of labour was necessary for its conversion into a splendid marketable article. It is a non-plastic substance, nearly dry, easy to dig, easy to powder, yet with just sufficient inherent moisture to allow of its being compressed into a solid mass of admirable resistance. The speculative, as we have said, stepped in, and the small areas were banded together and formed into companies, limited, and during the past three years or so the progress has been "terrible," as one gentleman holding a responsible official position in connection with one of the largest companies, aptly put it! It would appear that bricks can be made and delivered to their English market at 10s. per thousand, including every conjurable expense connected therewith, without any pecuniary loss or gain to the manufacturers, who confess that the marketable value is from 23s. to 26s. per thousand—a clear profit of from 13s. to 16s. per thousand. The output of one of the Fletton brickyards is 2,000,000 per week, which, put at the low estimate of 10s. per thousand profit, would show a weekly profit of £1,000—after all wages and other expenses had been paid! Among the leading firms represented at a general meeting of brickmakers served by the G.E. Railway system, held to consider the question of railway rates, were Beeby's Brick Co., Peterborough; Bray and Co., Peterborough; F. Jewson, Earith; T. and M. Plowman, Peterborough and Edmonton; and Thoday and Co., Cambridge. Mr. F. Jewson, J.P., was voted to the chair, and detailed the result of the interviews that had taken place with Sir Wm. Birt, at Liverpool-street Station, on three different occasions, and which culminated in a proposal to pay an additional cwt. per thousand upon the rates quoted. This proposal the Chairman considered to be a just and equitable one, and said it only remained for brickmakers generally to accept the terms offered to be carried into effect. On the other hand, the rate was not compulsory, and brickmakers could continue to pay actual weight if they so preferred. The proposals met with the general acceptance of the meeting.

The foundation-stone of a new church for St. Luke's, Gloucester, the most rapidly-increasing parish in the city, was laid on Monday. The church is to cost about £7,500; it will accommodate nearly 1,000 people. The sum of £3,400 has been raised.

Friday was a red-letter day at Matlock, the occasion being the celebration of the handsome gift of a cable tramway by Sir George Newnes, Bart., to his native district, valued at nearly £20,000. The tramway is half a mile in length, and has a total rise of 300ft., the steepest gradient being 1 in 5½.

On Saturday the foundation-stone of a new Congregational church which is to be erected, at a cost of £8,500, at the corner of Tetherdown and Queen's-avenue, Muswell Hill, London, was laid.

Messrs. Charles Chadwell, C.E., James Diggle, C.E., and the Devonport borough surveyor have inspected Vauxhall Bridge, London (now being demolished by Messrs. Pethick Brothers, of Plymouth), with a view to acquiring a portion of it for use in reconstructing the Camel's Head Bridge. They advise the corporation not to purchase either of the spans, and recommend a steel bridge for the purposes required.

An addition of 28 acres has been made to Epping Forest through the munificence of Mr. E. N. Buxton, who has presented the property known as Yardley Hill, near Chingford, to be added to the forest.

At the Paddington Coroner's court on Friday Dr. G. Danford Thomas held an inquest with reference to the death of Mr. Henry Lee, aged 50 years, road and sewer contractor, who died in St. Mary's Hospital from injuries he had received on the Great Western Railway. The evidence showed that on the previous Monday the deceased went to Southall Station to inquire about a truckload of tiles, and whilst walking in the four-foot way he was knocked down and run over by a goods train that was being shunted behind him, receiving fatal injuries. The jury returned a verdict of Accidental Death.

## LATEST PRICES.

IRON, &c.		Per ton.	Per ton.
Rolled-Iron Joists, Belgian.....	£6 0 0	to	£6 10 0
Rolled-Steel Joists, English.....	6 10 0		7 0 0
Wrought-Iron Girder Plates.....	5 15 0		6 10 0
Bar Iron, good Staffs.....	7 0 0		8 0 0
Do., Lowmoor, Flat, Round, or Square.....	17 0 0		17 5 0
Do., Welsh.....	5 15 0		5 17 6
Boiler Plates, Iron—			
South Staffs.....	7 17 6		8 5 0
Best Sneathill.....	10 0 0		10 10 0
Angles 10s., Tees 20s. per ton extra.			
Builders' Hoop Iron, for bonding, &c., £6 15s.			
Builders' Hoop Iron, galvanised, £15 10s. 0d. per ton.			
Galvanised Corrugated Sheet Iron—			

No. 18 to 20.		No. 22 to 24.
6ft. to 8ft. long, inclusive	Per ton.	Per ton.
gauge.....	£10 15 0	£11 0 0
Best ditto.....	11 5 0	11 10 0
Cast-Iron Columns.....	£8 5 0	to £8 15 0
Cast-Iron Stanchions.....	6 5 0	8 15 0
Rolled-Iron Fencing Wire.....	7 0 0	8 0 0
Rolled-Steel Fencing Wire.....	7 0 0	7 10 0
Galvanised.....	10 10 0	11 10 0
Cast-Iron Sash Weights.....	4 2 6	4 5 0
Cut Clasp Nails, 3in. to 6in.....	8 15 0	9 15 0
Cut Floor Brads.....	8 10 0	9 10 0

Wire Nails (Points de Paris) —		Per cwt.
0 to 7 8/8	9/0 10 11 12 13 14 15	B.W.G.
8/8 9/0 9/6 10/3 11/0 12/0 13/0 14/9 16/9		per cwt.
Cast-Iron Socket Pipes—		
3in. diameter.....	£5 10 0	to £5 15 0
4in. to 6in.....	5 5 0	5 10 0
7in. to 24in. (all sizes).....	4 15 0	5 0 0
[Coated with composition, 2s. 6d. per ton extra; turned and bored joints, 5s. per ton extra.]		

Pig Iron—		Per ton.
Cold Blast, Lilleshall.....		105s. to 110s.
Hot Blast, ditto.....		57s. 6d. to 62s. 6d.
Wrought-Iron Tubes and Fittings—Discount off Standard Lists f.o.b. —		
Gas-Tubes.....		75p.c.
Water-Tubes.....		70
Steam-Tubes.....		62½
Galvanised Gas-Tubes.....		60
Galvanised Water-Tubes.....		55
Galvanised Steam-Tubes.....		45

10cwt. casks. 5cwt. casks.		Per ton.	Per ton.
Sheet Zinc, for roofing and work- ing up.....	£24 0 0	to	£25 0 0
Sheet Lead, 8lb. per sq. ft. super.....	14 17 6		15 17 6
Pig Lead, in 1cwt. pigs.....	14 2 6		15 2 6
Lead Shot, in 28lb. bags.....	17 10 0		18 10 0
Copper Sheets, sheathing and rods.....	63 0 0		64 0 0
Copper, British Cast and Ingot.....	55 10 0		56 0 0
Tin, Straits.....	82 0 0		83 0 0
Do., English Ingots.....	84 0 0		85 0 0
Spelter, Silesian.....	23 5 0		23 7 6

## TIMBER.

Teak, Burmah.....per load	£13 0 0	to	£15 10 0
" Bangkok.....	10 10 0		14 10 0
" Quebec Pine, yellow.....	4 2 6		6 0 0
" Oak.....	4 2 6		6 0 0
" Birch.....	3 10 0		5 10 0
" Elm.....	4 10 0		5 10 0
" Ash.....	3 15 0		5 0 0
Dantsic and Memel Oak.....	2 2 6		4 2 6
Fir.....	2 15 0		4 15 0
Wainscot, Riga p. log.....	4 15 0		6 5 0
Lath, Dantsic, p.f.....	4 10 0		6 10 0
St. Petersburg.....	4 0 0		6 10 0
Greenheart.....	3 0 0		6 10 0
Box.....	4 5 0		15 0 0
Sequoia, U.S.A. ....per cube foot	0 1 8		0 1 10
Mahogany, Cuba, per super foot			

lin. thick.....	0 0 5		0 0 6½
" Honduras.....	0 0 4½		0 0 6½
" Mexican.....	0 0 4		0 0 5
Cedar, Cuba.....	0 0 4		0 0 4½
" Honduras.....	0 0 3½		0 0 4½
Satinwood.....	0 0 5		0 1 0
Walnut, Italian.....	0 0 5		0 0 7
Deals, per St. Petersburg Standard, 120—12½ft. by 1½in. by 1½in. —			

Quebec, Pine, 1st.....	£18 0 0	to	£24 10 0
" 2nd.....	13 0 0		16 10 0
" 3rd.....	6 0 0		9 10 0
Canada Spruce, 1st.....	8 10 0		10 10 0
" 2nd and 3rd.....	7 0 0		8 10 0
New Brunswick.....	7 15 0		8 15 0
Riga.....	9 5 0		13 15 0
St. Petersburg.....	9 5 0		16 5 0
Swedish.....	9 5 0		9 15 0
Finland.....	9 5 0		17 10 0
White Sea.....	10 5 0		17 10 0
Battens, all sorts.....	5 0 0		16 0 0
Flooring Boards, per square of lin. —			
1st prepared.....	£0 9 9		£0 16 3
2nd ditto.....	0 8 3		0 13 3
Other qualities.....	0 6 6		0 7 6

Staves, per standard M:—			
Quebec pipe.....			
U.S. ditto.....	£35 0 0		£42 10 0
Memel, cr. pipe.....	210 0 0		220 0 0
Memel, brack.....	180 0 0		190 0 0

## OILS.

Linseed.....per ton.	£17 5 0	to	£17 15 0
Rapeseed, English pale.....	23 10 0		23 15 0
Do., brown.....	21 15 0		22 5 0
Cottonseed, refined.....	15 0 0		15 10 0
Olive, Spanish.....	28 15 0		29 0 0
Seal, pale.....	21 5 0		21 10 0
Cocoonut, Coch.....	27 10 0		28 0 0
Do., Ceylon.....	24 5 0		24 10 0
Palm, Lagos.....	22 10 0		22 15 0
Oleine.....	18 15 0		19 15 0
Lubricating U.S. ....per gal.	0 6 3		0 7 6
Petroleum, refined.....	0 5 0		0 5½
Tar, Stockholm.....per barrel	1 0 0		1 5 0
Do., Archangel.....	0 12 6		0 15 0
Turpentine, American...per ton	23 15 0		24 0 0



## LIST OF COMPETITIONS OPEN.

Shrewsbury—School	School Board	Borough Surveyor, The Square, Shrewsbury	Oct. 29
Goole—Swimming Bath, Alexandra-street Schools		H. Lindley, Clerk, School Board Offices, Goole	31
Sheffield—Board School		J. Moss, School Board Offices, Sheffield	Nov. 18
Brightwell, near Wallingford—Isolation Hospital at Hadden Hill (16 beds)		Francis E. Hedges, Clerk to Urban District Council, Wallingford	24
Aberavon—Market Extension (£5,000 limit)	20gns.	The Borough Surveyor, Aberavon	Dec. 1
Morley—Schools, Victoria-road and Gildersome-road		The Clerk, School Board Offices, Morley	12
Chertsey—Sewerage Schemes	£50, £30, and £20	Arthur W. Smith, Surveyor U.D.C., Eastworth-road, Chertsey	23
Stockholm—New Stations, &c.		Secretary, Royal Administration Swedish State Railways	31
Harrogate—New Royal Pump Room (£8,000 limit)	£50, £30, and £20	Samuel Stead, Boro' Surveyor, Municipal Offices, Harrogate (1899)	Jan. 2
Bradford—Central Fire Brigade Station	£100, £50, £30	The City Surveyor's Office, Bradford	2
Harrogate—Alterations to Old Pump Room	£30, £20, and £10	Samuel Stead, Boro' Surveyor, Municipal Offices, Harrogate	2
Burnley—Higher Grade School, &c., Ormerod-road (limited to Architects within 60 miles of Burnley)		The School Board Office, Burnley	14
Maidstone—Electricity Supply Works and Refuse Destructor (Assessor)	£100	Herbert Monckton, Town Clerk, Maidstone	—
Hull—Central Free Library (Sidney R. J. Smith, F.R.I.B.A., Assessor)	Corporation	Edwin Laverock, Town Clerk, Town Hall, Hull	—
Bristol—Restoration of Colston Hall (Assessor)	£100, £50, £25	Arthur E. Risley, Secretary, 33, Corn Exchange, Bristol	—

## LIST OF TENDERS OPEN.

## BUILDINGS.

Consett—Foreman's House, Store-Houses, Cart-Sheds, &c., and Fence-Walls to Stoneyard, Hartington-street	Urban District Council	William S. Shell, M.S.A., Surveyor, Consett, Durham	Oct. 29
Sunderland—Havelock House, Fawcett-street	United District School Board	John Eltringham, 62, John-street, Sunderland	29
Longtown—Master's House	School Board	E. A. Johnson, M.S.A., Architect, Abergavenny	29
Portmadoc—Alterations, Snowdon-street Boys' School		Owen Morris Roberts and Son, Architects, Portmadoc	29
Castleford—Station Hotel	Urban District Council	J. Holmes, Greaves, and Co., Architects, Carlton-street, Castleford	29
Newquay—Council Buildings and Public Conveniences	Governors	The Surveyor's Office, Commercial-square, Newquay	29
Buxton—Schoolroom, &c., at College		W. R. Bryden, Architect, 1, George-street, Buxton	29
Darfield—Mixed School	Urban District Council	A. B. Linford, A.S.I., Architect, Kelvin Cottage, Wombwell	29
Kirkby-in-Ashfield—Cottage, Sewage Outfall Works, Park-lane	Urban District Council	H. Walker, A.M.I.C.E., Newcastle Chmbrs., Angel-row, Nottingham	29
Trowbridge—Alterations to Carpenters' Arms Inn, Hilperton-rd.	W. R. Harding	W. H. Stanley, A.M.I.C.E., Market House Chambers, Trowbridge	29
Low Valley—Infants' School		A. B. Linford, A.S.I., Architect, Kelvin Cottage, Wombwell	29
Morecambe—Alterations to Emmanuel Church & New Sunday-School, East End		Albert Gorton, Architect, 24, The Crescent, Morecambe	31
Chapelfield—Butcher's Shop	Radcliffe & Pilkington Co-op. Soc.	Office of the Society, Sion-street, Radcliffe	31
Morley—Alterations at Town Hall, Queen-street	Corporation	W. E. Putman, A.M.I.C.E., Borough Engineer, Town Hall, Morley	31
Spilaby—New Headquarters, F Comp. 1st Vol. Batt. Lincs. Regt.	Captain G. B. Walker	J. E. Butcher, Architect and Surveyor, Spilaby	31
Rothes—New Free Church	Wirral Joint Hospital Board	Geo. Sutherland, A.R.I.B.A., 51, High-street, Roches	31
Clatterbridge—Hospital Additions, &c.	Tees Conservancy Commissioners	C. O. Francis, Architect, 5, Richmond-street, Liverpool	31
Middlesbrough—Offices, Queen's-square	William Crawford, Executive Sanitary Officer, Limavady	J. Mitchell Bottomly, 23, Albert-road, Middlesbrough	31
Drumavally—Two Cottages		William Crawford, Executive Sanitary Officer, Limavady	31
Wealdstone—Stables, &c.	Corporation	James Hayea, Spencer-road, Wealdstone	31
Hull—Crematorium at the Hedon-road Cemetery	H. M'Alcer	A. E. White, City Engineer, Town Hall, Hull	31
Workington—Dwelling Houses	Corporation	Charles W. Eaglesfield, Architect, Falcon-street, Workington	31
Morley—Levelling Land at Stables	J. H. Shepherd	W. E. Putman, A.M.I.C.E., Borough Engineer, Town Hall, Morley	31
Purston—Ten Houses	Limavady Union Guardians	Garside and Keyworth, Architects, Pontefract	31
Carrowmuddle—Two Cottages	W. H. Hudleston	William Crawford, Executive Sanitary Officer, Limavady	31
East Stoke—Dwelling-House		W. Watts Fooke, Architect, North-street, Wareham	31
Dartford—Twenty-Six Cottages, Gordon-road	York Union Banking Company	Ernest J. Hammond, Architect, 111, High-street, New Brompton	Nov. 1
Bridlington—Alterations to Premises	Trustees	B. S. Jacobs, Archt., Lincoln's Inn Buildings, Bowdley-lane, Hull	1
Knappill—Alterations, Wesleyan Chapel and Premises	Leathem, Tew, and Co., Bankers	J. J. Bell, Bootmaker, Knappill	1
Udny—Two Cottar Houses at Orchardstown	Urban District Council	Jenkins and Marr, Architects, 16, Bridge-street, Aberdeen	1
Featherstone—Bank Buildings, Caretaker's House, &c.	Corporation	Garside and Keyworth, Architects, Pontefract	1
Foulksyke—Wesleyan Chapel		T. Hurst, High Laws, Abbey Town, Carlisle	1
Acton, W.—Free Public Library		The Surveyor, 242, High-street, Acton	1
Ludgvan—Restoration of Church Tower		William R. Jones, Ludgvan Church Town, Cornwall	1
Tynemouth—Stairs adjoining the Tiger Inn		John F. Smilie, Borough Surveyor, Tynemouth	1
Tooting, S.W.—Alterations, &c., to Wards, Home for Aged and Infirm, Church-lane	Wandsworth & Clapham Guardians	J. Gale, Clerk of Works, Church-lane, Tooting	2
Alnwick—Enlargement of Vestry at Parish Church	School Board	M. Temple Wilson, A.S.I., Architect, Alnwick	2
Glyntawe—School Building, Boundary Walls, Cloakrooms, &c.	Corporation	Howell Watkins, Ddery Farm, Glyntawe, Ystradgynlais, R.S.O.	2
Harrogate—Twelve Dwelling-Houses, Walker-road		H. E. and A. Bown, Architects, James-street, Harrogate	2
St. Alban's—Repairs, Painting, &c., Corn Exchange	Bradford Prov. Industrial Soc., Ltd.	The City Surveyor's Office, 96, Victoria-street, Westminster, S.W.	2
Bridlington Quay—Pair of Semi-Detached Villas, St. John's-av.	Electricity Committee	J. Earnshaw, Architect, Bridlington Quay	3
Dudley Hill—Bakery, Stabling, &c., Cutler Heights-lane		Ryeroft and Firth, Archts., Bank Bldgs., Manchester-rd., Bradford	3
Lindley—Works at Zion M.N.C. Sunday-Schools		John Kirk and Sons, Architects, Huddersfield	3
Belfast—Block of Buildings, Stranmillis-road	Urban District Council	J. G. Lindsay, Architect, 10, Chichester-street, Belfast	3
Nottingham—Electricity Station	Committee	Arthur Brown, M.I.C.E., City Engineer, Guildhall, Nottingham	4
Widnes—Extension of Hospital	Trustees of the late John Birkett	P. W. Holme, F.R.I.B.A., Dale-street, Liverpool	4
Downpatrick—Press and Weigh Rooms, Steeplechase Course	J. W. Reader	P. C. Cowan, M.I.C.E., Court House, Downpatrick	4
Barry—Fire-Engine Station, &c.	Corporation	J. C. Pardee, Surveyor, Council Offices, Holton-rd., Barry, Glam.	4
Sowerby Bridge—Football Pavilion at the Beech		H. Hatton, Town Hall Chambers, Sowerby Bridge	4
Dublin—Public Library, North William-street		The City Architect's Office, Municipal Bldgs., Cork Hill, Dublin	5
Widmermere—Beech Hill Hotel		John Banks, Surveyor, Kendal	5
Roundhay—Detached House, Lidgett Park Estate		E. Barton Johnson, Architect, 6, The Grove, Ilkley	5
Macclesfield—Police Station, Church Side		Edward E. Adashead, Borough Engineer, Town Hall, Macclesfield	5
Buckie—Attics for Two Dwelling-Houses		James Parry, Architect, Buckie	5
Edinburgh—New Hotel, Princes-street Station		Peddie and Brown, Architects, 3, Albany-place, Edinburgh	7
Haltwhistle—Mechanics' Institute		Oliver and Dodgson, Architects, Carlisle	7
Walsall—Caretaker's House at Wolverhampton-road Schools		Bailey and McConnell, Architects, Bridge-street, Walsall	7
Presthope—Cottages		The Engineer, Wolverhampton Station	8
Aynho—Cottages		The Engineer, Wolverhampton Station	8
Hitchin—Town-Hall and Offices, Brand-street and Grammar School Walk		E. W. Mountford, F.R.I.B.A., 17, Buckingham-st., Strand, W.C.	8
Kingswood—Cottages		The Engineer, Wolverhampton Station	8
Chatham—Alterations to Casual Wards		G. E. Bond, Architect, High-street, Rochester	9
Cardiff—Iron Sheep and Cattle Troughs and Wood Troughs in Cattle Stalls and Pens in Roath Market		W. Harpur, M.I.C.E., Borough Engineer, Town Hall, Cardiff	9
Chatham—Infirmary Ward, Lavatories, &c.		G. E. Bond, Architect, High-street, Rochester	9
Launceston—Cattle, Sheep, and Pig Market		Otho B. Peter, F.R.I.B.A., Architect, Launceston	12
Coventry—Two New Pumping Stations		James Mansergh, 5, Victoria-street, Westminster	12
Bromley—Additions to Hospital, Skym Corner		John Ladds, Architect, 7, Doughty-street, London, W.C.	12
Arbroath—Post Office		H.M. Office of Works, Edinburgh	14
Cork—Offices, Albert-street		Robert Walker, P.P.S.A., Architect, 17, South Mall, Cork	14
Birkenhead—Public Baths		Charles Brownridge, A.M.I.C.E., Town Hall, Birkenhead	14
Wigan—County Court and Inland Revenue Offices		Hon. Reginald B. Brett, Sec., H.M. Office of Works, Storey's Gate	14
Paddington, W.—Coroner's Court Building, Manor-place		Architect's Department, General Branch, 13, Spring Gardens, S.W.	15
Barrasford—Alterations, &c., Parochial Schools		Armstrong and Knowles, 39, Grainger-st., W., Newcastle-on-Tyne	15
Sophia—Eight Public Offices		Department of Public Works, Sophia, Bulgaria	21
Pontliff—Infants' School		James and Morgam, Architects, Charles-street Chambers, Cardiff	21
Bridgend—New Chapel at Parc Gwyllt Asylum		Giles Gough, & Trollope, Archts., 28, Craven-st., Charing Cross, W.C.	24
Pontyberem—New Infant School and Additions		J. B. Morgan, M.S.A., Architect, Llanelly	31
Sedburgh—Hotel		John Hutton, M.S.I., Architect, Kendal	—
Llangonoyd—Forty Workmen's Cottages at Llynvi Valley Colliery		The Manager of the Colliery, Llangonoyd, near Bridgend	—
Arnside—Detached Dwelling-House		John Hutton, M.S.I., Architect, Kendal	—
Warsaw—Market Halls (cost about £100,000)		Administrative Department, Town Hall, Warsaw	—
Mansfield—Conditioning Stores, St. John's-place		Vallance and Westwick, Architects Mansfield	—
Walton-on-Thames—Four Cottages and Pair of Semi-Detached Houses		T. M. Garrod, Architect, 172, Fenchurch-street, E.C.	—
Morecambe—New Wing to Elms Hotel		Lawson, Roper, and Proctor, Lancaster	—
Calverley—Alteration of Detached Residence		James Young and Co., Architects, 62, Market-street, Bradford	—



# THE BUILDING NEWS

## AND ENGINEERING JOURNAL.

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### SKILFUL PLANNING.

THE subject of planning is not a very popular one for architectural audiences, and it is certainly not often that we bear any dissertation on the question. Good planners are few, and those only who have shown very great ingenuity or skill on their buildings have any real claim to speak. The fact is, everybody thinks he can plan a building, and we have known men, and women too, who often have the effrontery to dictate to their architects. Perhaps in a few cases amateur attempts are more successful than a plan prepared rapidly with but little time for thought. The man who lives in a house knows better what he wants than his architect, and it is the occupant or user of a building who ought to be studied, if anybody is. Mr. Aston Webb's address on "Planning" at the discussion section of the Architectural Association was an exception to many discourses on the subject. Mr. Aston Webb is a skilful planner, and what he had to say on the subject was listened to with the attention it deserved. Several points were discussed. The first was the placing of the building—a point much neglected; but Mr. Webb was careful to say that in London and most cities the architect was much limited and hampered by local authorities. We hardly think it would be possible for him to do as was suggested: to place his building at right angles to the line of approach. Much dignity and effectiveness is given to a building by so doing, and the examples Mr. Webb gave were to the point. The main façade of the Houses of Parliament could at least be seen across the river as we approached it from Westminster Bridge; but if it had been placed like the Law Courts, at the side of a thoroughfare, its effect would have been lost. No doubt, this is why Mr. Street, in his Strand frontage, broke it up into prominent and receding parts, set back the end of his great hall, and placed massive octagonal turrets at salient angles. The Whitechapel Church (St. Mary) is a very good example of a building standing boldly out or athwart the line of street or approach. Its being placed at an angle with the street gave it a very imposing and Continental look. Any arrest of the eye or the perspective in a street is desirable; but unfortunately such situations could seldom be found, and few created.

It would be a great advantage if the architect had a central idea to start with. Architects seldom gave themselves time to think out a plan before rushing to paper; they were too fond of planning in detail one part at a time instead of having a general grasp of the whole—some central idea that would form the principle of the whole composition. No doubt this finical way of working out a plan is easier; but when followed in a large building, the result is extremely disappointing. The plan has a higgledy-piggledy look—a want of coherence and unity about it, that so often may be seen in competition plans. And very much the same result is observed in the planning of those who drag in a piece of one building and a piece of another, that appear to suit their purpose;—there is no central idea or backbone apparent. After obtaining a good idea, simplicity of plan in the parts is essential. The means of communication, as Mr. Webb said, should be as simple and direct as possible. In how many public and domestic buildings did the visitor not find himself bewildered by a

number of corridors and corners, crooked and confused lines of access to main rooms and offices! Straight corridors, well lighted, are essential to all public buildings, but how few of them answered to this description. In the ordinary private house we should say the fewer and the shorter the corridors the better, and we think a hall giving access to the principal apartments is the better arrangement, especially in town residences. Long, rambling corridors and passages, often dark, may lend a certain kind of mystery to a house; but it is not good planning. Rambling and tortuous arrangements are more adapted to large country residences, where the desire is to cover a large area of ground without more than two stories. In the matter of lighting corridors, the plan adopted by the architects of the new Admiralty Office is certainly a good one—viz., two corridors with rooms along the sides, with courts in the centre of good width between the corridors. We agree with Mr. Webb in saying that it was better in public buildings that the halls should be entered from the side rather than from the end, as it gave a certain mystery to the building, and this element of mystery to a certain extent lent an artistic charm to the interior. If we see every part of a large hall or room at a glance, the effect is disappointing; but if one part after another is disclosed, a much greater interest is imparted to the design—not unlike the unravelling of a plot or a story step by step. Real artistic planning is slowly disclosed, as in a play or a work of fiction. The staircase is a great feature in public and private buildings, but is seldom treated properly. Mr. Webb said it should be placed at the end of main approach. In this position it always looks stately and imposing; but we have seen it arranged in a right-angled recess to the approach with much effect, and as a surprise or *coup*. When we can see everything at once half the effect is gone. The position of doors and windows is another important part of planning; but we cannot enter now into the question. It may suffice to say there is also such a thing as artistic planning, the arrangement of parts to produce the best and most pleasing effect, though artistic arrangement may chiefly depend on a proper structural and convenient plan. The two things need never be antagonistic; but the architect who chiefly confines himself to exteriors is seldom able to bring himself to the task, and the consequence is that architectural planning is neglected. Art in plan is only understood by a few of our leading architects who have made it a study.

### SOCIETY OF OIL PAINTERS.

THE very unequal merit of the works of the Society (formerly the Institute of Painters) in Piccadilly shows that a wide borderland is tolerated between what is permissible or good enough to be exhibited and what is not. A strict line cannot be drawn too narrowly between painters who set before them some definite idea of art and those who simply paint for the mere sake of making a living out of it. Beginning in the West Gallery we see Charles W. Wyllie in "Moonrise" (1) and Arthur Burrington in "Sunrise" (2), two aspects of nature in a manner that cannot be questioned. The latter is broad in colour and handling. There is also a charming breadth and feeling in James S. Hill's "Near Whitby" (7), and in Frank Spenlove-Spenlove's canal view in Holland (5). The light and colour are excellent. "On the Essex Marshes" (35), by the first named, is solidly painted landscape, the ploughing teams natural and vigorous. A piece of delightful and harmonious colour is A. D. Peppercorn's "The River" (14), the grey sky and shimmering light very

charming; so, too, we must admire J. Aumonier's "In the Meadows, Sussex"; and A. D. McCormick's naturalistic landscape "Gossips" (12), two chatterboxes walking through a common. The wet road and dim light of the sky are truthful. The late president, Sir James D. Linton (who, by the way, gives places to Mr. Frank Walton), has one subject "Summertime," a well-drawn and elegant maiden, dark and sallow in complexion, but unimpassioned, with clasped hands, her left arm thrust through the handle of a basket of red poppies. A pale green satin bodice, low-cut dress, and a graceful hanging white skirt, together with her wide-brimmed straw hat and white feathers, make up a neat and elegant toilette. The figure is standing against a bank or hedge with sloping meadow beyond. There is grace and simplicity in the treatment, and the workmanship is unexceptional—perhaps a little hard. Fred Morgan is at home among juveniles and children. His "Fairy World" (3), a young lady in a well-kept garden near a stone flight of steps, amusing a child with soap-bubbles. A dog is looking at the quivering bauble of colour;—careful, but without any of the higher qualities. The Hon. John Collier's "When Music was Young" is quite idyllic and brilliant in tone; and Sir George Hare's "The Line of the Heart" (15) is a cleverly handled group of faces. One girl is holding out the palm of her hand to a dark well-featured young man. A pretty and daintily-drawn face of a young girl examining a pair of eyeglasses, by Geo. Morton, called "A Critic," may be noticed; also Henry J. Stocks' happily composed "Orion," a man holding back the curtain of a window to show someone in the room the constellation. The deep red colour of curtain against the black sky and the well-chiselled features of the face make an effective composition. Fred Roe's "The Ghost Story" (34), three gentlemen in Hanoverian attire drinking their wine and smoking, is careful. Other figure subjects are John R. Reid's "A Dangerous Playmate" (56); Harry Fidler's "Down Love Lane," an elderly couple in a cart chatting merrily; J. Sanderson Wells' tender and pensive figure of a young lady in a hall, "Twilight Memories"; Miss Flora Reid's "Old Lace Maker" (69)—harmonious in tone. Charles E. Johnson's "Village Smithy" (53) exhibits a bright bit of colour landscape and coast scenery. Iso Rae "In Solitudes—Through the Whispering Woods" (51), has good qualities. E. M. Wimperis, Vice-President, sends one of his broad and fresh moorlands "Driving Sheep" (66); a large picture by Joseph Farquharson (73), cows under the shade of trees, and chequered sunlight, is conscientious; and we have Claude Hayes (79) "The Mill on the Marsh," R. Wheelwright's "On the Towing Path" (78), J. L. Pickering's coast view, "Sheldrake Point, Holy Island" (86), Archibald D. Reid's rugged and rocky view on the Banffshire coast (91), John White's subtle and quiet village scene, "Our Alley" (93); Ernest Parton's "Through the Trees"; a fine and correctly-drawn view of "The Acropolis" (132), by John Fulleylove.

The Central Gallery is strong in landscape. Jas. Orrock sends two or three riverscapes, "On the Trent" and "On the Soar" (149), and B. W. Leader's vigorous sketches, "A Surrey Oak Wood" and "Morning, Streathley-on-Thames" (150), are examples of two different interpretations of nature, both truthful—one massive and broad, the other delicate and full of light. W. Llewellyn paints in excellent colour, and Fred Whitehead's "The River Frome" (157) is pleasing in the foliage. Freshness and sunlight always greet us in Mr. John R. Reid's works, as in his "Gleaners" (153). T. Austen Brown, A.R.S.A.'s, "On a Potato Field" (158), is full of rich autumnal colour;



there is an "Old Masters" look of depth. W. Lee Hankey, whose sketches at the Modern Gallery are so interesting, sends "The Evening Glow" (157), a charming work. A brilliant piece of chequered light and shade is "Sunbeams" (163) by Gwilt Jolley—an Italian terrace overlooking the sea, with a young couple and child. Vincent P. Yglesias' "Amberley, Sussex," charms by its breadth and colour, an old church in a rugged and hilly landscape. "Homewards," by Chas. Western (169); "The Pond," by Walton Thomson (174); R. Thorne Waite's "Home" (179), and J. Sanderson Wells' "Grazing" (186) are among the lesser works of interest. For vigorous handling and strong colour. E. M. Wimperis's "Footbridge on the Moor" (192) occupies a deserved place, and we must also praise the fresh and luminous seascape, "Waiting the Tide" (205), by Robert W. Allen. Frank Walton's "Spring in the Surrey Hills" (251) is his chief work, a woodland of leafless trees, rather more autumn-like than representative of spring. No one can paint so dexterously the network of branches and intertwined stems of trees; and yet there is unity and tone in the work which places the President's work in the forefront. The purplish-brown of the wood and the hilly landscape beyond are all in subtle harmony and tone. His "King Cups" (255) is also a harmonious study of a field brilliant with the bright flower. Arthur Ilacker, A.R.A.'s, "Orchard" (257) is too green. There is a pastoral idea in the subject, and the maidens in white, making melody in the brilliant meadow overshadowed with trees, is ideal in treatment, and more classical than true to nature. Amongst these we place F. Marriott's study of cottages in "Moonrise" (256); E. F. Brewtnall's "The Last Load," a vessel unloading her cargo, admirable in the tone and reflection of sunset; George Wetherbee's "Crown of Coral" (263); Yeend King's bright landscape (223), a farmyard with children coming through a gate. Among works of *genre* in this gallery are W. A. Breakspeare's romantic subject, "Rest" (112), a young knight asleep, his head resting on the lap of his lady, and "A Long Score" (193), both subtly painted; Madame Henriette Ronner's small study of kittens, "Deux Amis" (256); G. G. Kilburne's girl and cat at a cottage door (213); A. Chevallier Taylor's "Jack Ashore," and his lass in a cottage (219); Miss Eleanor Ramsay's "St. George's, Canterbury," a street view; H. Fantin-Latour's "Le Lever," a half-draped figure (248); Otto Scholderer's "Little Red Riding Hood," a child study in a wood, exquisite in colour; Julius Olsson's "Bather," a melody in orange and grey; Geo. William Joy's "Pamela's Birthday" (282); Miss Anna Nordgren's "Les Misérables," a nice figure-study of a girl at window, by Miss Janet Archer (288), and Oscar Wilson's café sketch, "Lemon-squash" (290).

Walter Langley's very pleasing picture, "The End of the Story," tells its tale cleverly, and with a touch of pathos. A neatly-clad housewife sits pondering as she lays down a book on her lap. There is an intensity of expression on the face, as if she were reflecting upon the end of the tale. The interior of the cottage, like the mistress herself, is neat and simple. The few nasturtiums on the table, and the cup and teapot, and the pale pink dress give a note of colour to the interior. The light and subtle tones and shades of white and grey are delicately and truthfully painted in Mr. Langley's best manner.

G. F. Watts's "In the Land of Weiss-Nicht-Wo" gives us another of his favourite themes—a couple of little cherubs, or chubby baby-boys, standing close together in a garden of flowers and fruit. One, by his wings, suggests a cupid, the other is sucking the juice of the grapes. Very rich colour is the

chief charm, and we might almost imagine we are looking at a Giorgione or a Titian. J. C. Dollman has left the half-humorous incidents of horse-dealing and highwaymen for work of another kind more serious and dramatic. His small, well-painted picture of "The Crown" (295) is an incident of the Roman amphitheatre. Prostrate at full length on the arena, one arm extended, lies the body of a martyr sacrificed for his faith. Night has closed in; one sees only the well-modelled figure of the victim to Roman amusement, and beyond dimly the outlines of the arena. Above, a halo of light appears over the head of the dead, betokening the crown which awaits the martyr's death. There is dramatic power in the scene, told with much simplicity. Edgar Bundy, whose work is always more or less humorous, has a large picture entitled "The Word" (339), full of character. It is a group of Puritans round a table in a comfortable room, dimly lighted from a large mullion window, the green blinds of which are pulled down to exclude the inquisitive. A gaunt-looking divine (apparently, by his garb) is expostulating or commenting on some text from the large folio Bible on the table. One of the group is leaning with his arm on the chair, his hand over his eyes; another opposite is eagerly listening to the exposition; while a third appears rather wearied. It is needless to say the work is complete in its way; the slim figure of the preacher bent over the table is quaint and picturesque, his manner vehement as he gesticulates before his audience. The sombre black of the dress harmonises with the green light from the window. Henriette Ronner's "Majesté Maternelle" (338), cat and kittens at play round an old armchair in a well-furnished room, is cleverly handled. No one can paint the feline tribe and their frolics better than Madame Ronner. Robert Noble, A.R.S.A., sends a large interior, in which a young well-dressed lady is arranging lilacs in a bowl. The Chippendale furniture and accessories are well painted, and the light through the curtain of window is very realistic—perhaps too much so. There is also much feeling and subtle gradation of light and shade in Iso Roe's "Motherless" (384)—three children seated at their scanty meal in a poor, dimly-lighted room. Some solid work is seen in J. L. Pickering's "The Abbey Farm, Southill." There is a graceful study of a girl bending down a sunflower, by Sidney Moore (341); Lawrence T. Ashwell has a nice sketch of a "Surrey Common" (342), and Anderson Hague's "Evening" is a fine harmony of deep red autumnal colour. We must also praise H. Fantin-Latour's charming "Larkspurs" and "Pluie d'Or" (391). J. Aumonier sends a large landscape "Sunrise View from Primrose Hill" (386)—an imposing prospect under a hazy light of varied hues. "A Summer Day, River Wye" (327) is a brilliant piece of sunlit foliage and river, and we must note also E. H. Fahey's softly-limned harmony, "A Pool" (437), the fine moorland and cloud painting of E. M. Wimperis (460), fresh and strong in colour, works by Edwin Hayes, especially his "Spanish Felucca off Tarifa, Coast of Spain" (432), a fine composition full of rich colour—one of the best coast views. One amusing figure composition is G. C. Hindley's love-making interview. A gallant in 16th-century costume is chatting to the mother of a charming girl, who sits at one end of the table, rather amused at the tact of her wooer—"He that would the daughter win, must with the mother first begin"—a picture in the West Gallery; and we also must mention a few dextrous works showing much executive skill, by Frank Dobbs (385), Hugh Carter's fish-tall (393), Sir George Hare (455), Miss Georgina Waddington (459), W. Shackleton's luminous subject "Bianca," ivory-like in its tone.

A few other pleasing works may be men-

tioned, such as Bernhard Sickert's "Steep Hill, Lincoln" (297); a simple study of a child in a large hat with toy bucket, by Horace Mann Livens; Montague Smyth's grey-toned "Road to Finchley" (301), the lights and shadows of which are perfect; T. Austen Brown's subject "Ploughing," a silhouette in light and shadow. Atmosphere and light are also well rendered in Claude Hayes' "Early Morning" (316).

## MODEL SPECIFICATIONS.—XXXVII.

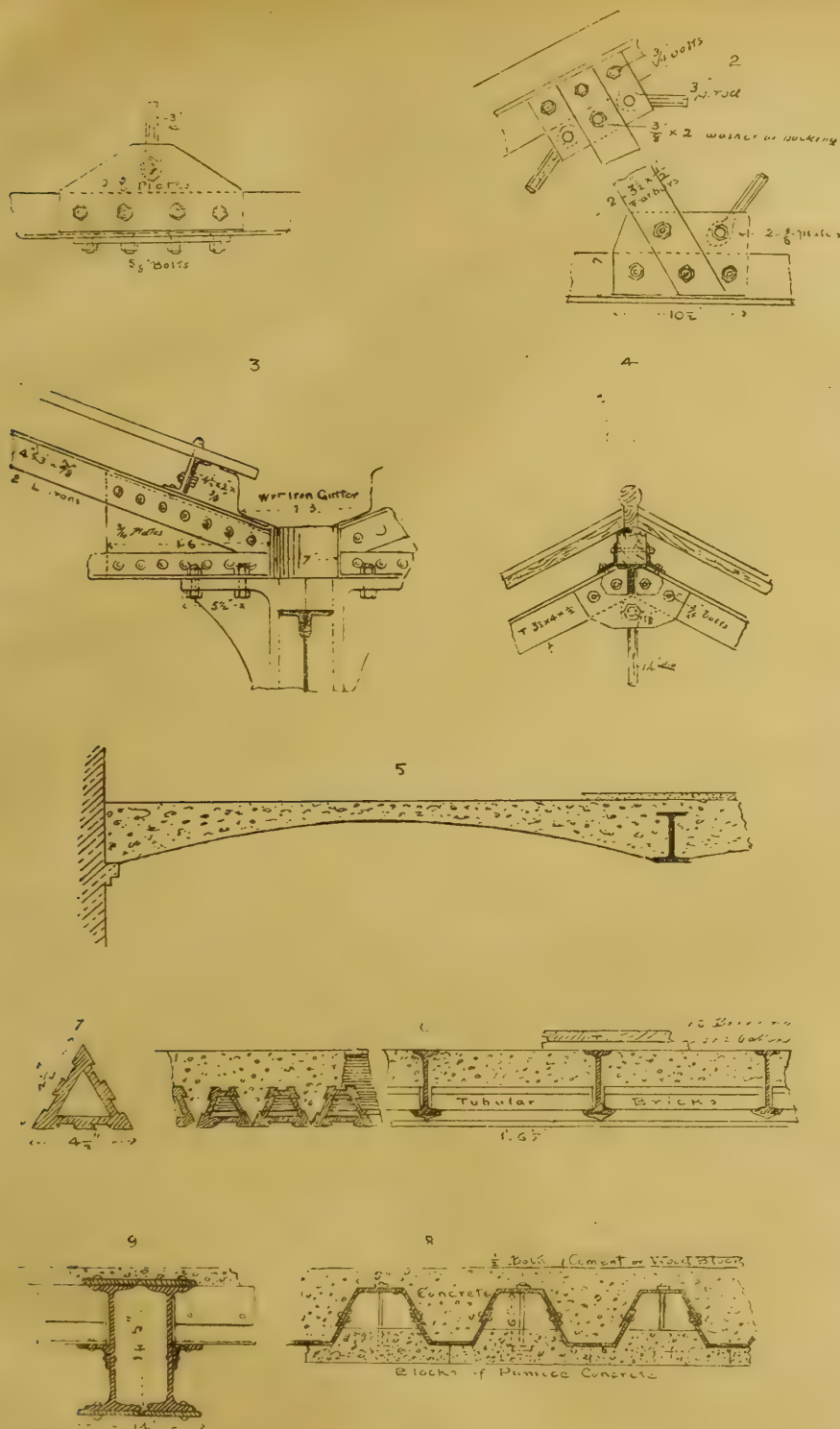
FOUNDER AND SMITH—ROOFS—FIRE-PROOF FLOORS.

WE here show a few details of joints to iron roof trusses. Sketches 1 and 2 are joints formed each with two plates. The first, a tie, is a  $\perp$ -iron or flat bar, and the second a connection of rafter with flat bar strut and tie formed of two flat bars  $3\frac{1}{2}$  in. by  $\frac{1}{2}$  in. and  $\frac{3}{4}$  in. tension rods, with packing on either side.

Sketch 3 shows a shoe to principal rafter formed with a flat iron plate placed between two angle irons, to which the rafter is riveted; or two plates, one on each side, may be used as before if the rafter is of T-section. Fig. 4 is a similar plate connection at ridge. The wooden ridge is secured to cleats.

We also show three or four sections of fire-proof floors, in which iron girders are used to support arches of brick or concrete, or the latter as a filling between and round the girders. Sketch 5 is the Dennett fireproof floor of concrete arches, supported on projecting course in wall, and by rolled or riveted girders between. It is necessary to specify the rise of arch, about 1 in. to a foot of span. The span is 6 ft. to 10 ft. The concrete is composed with a matrix of sulphate of lime (gypsum) which can stand a white heat. For a wooden floor, fillets laid on the concrete are used for fixing the joists, and ceiling joists are fixed to flanges of girders if a flat ceiling is required. Sketch 6 shows the Homan and Rodgers system, which consists of hard-burnt tubular bricks, which rest on the lower flanges of girders, and are filled in with concrete. The rolled iron joists are placed about 1 ft. 6 in. centre to centre. On the lower flanges purpose-made hollow bricks or lintels, of triangular or trapezoidal section, are laid transversely. These lintels form a centring for concrete, and are notched at ends so as to incase the lower flange. They are also grooved to form a key to plaster (see 7). The system has been largely used; it is fire-resisting and non-transmissive of sound, as the concrete, brick-and-plaster and air space are of varying densities. Section 8 and 9 illustrate Messrs. Lindsay's system, which consists of a number of steel troughs or riveted channels, fixed close to each other, with sides at an angle of about 30°. These channels are riveted together at the sides (see section 8), and are alternately placed. They make a rigid and continuous girder, or layer of iron, or decking, which is covered by pumice concrete, on which the cement or wood-block floor is laid. Below, the channel irons are protected by concrete slabs of pumice concrete, hung up by bolts upon which the plaster ceiling is formed, or simply wood battens can be attached. The open cellular spaces are useful for gas, water pipes, or electric wires. It has been extensively used for heavy floors. The same firm has another system suitable for residences and offices; the rolled joists, about 2 ft. apart, are connected by light iron rods  $\frac{3}{4}$  in. diameter, resembling herringbone strutting, fixing the girders rigidly, and this interlacing is placed about 18 in. apart, and secured tightly to the joists and ends. Concrete is then filled in, imbedding the ironwork. The load is distributed by the rod bracing, and the rods also assist to keep up the coke concrete if fire attacks the floor. Those who require particulars as to cost, &c.,





about these floors may obtain them by writing to the firms named. Other good systems are in the market, like the Doulton system, the Fawcett, the Hornblower, but space precludes us from describing them here. Many of these consist of terracotta or earthenware hollow tubes resting on light rolled joists 2ft. or 3ft. apart. Some of these tubular lintels are placed at an angle for greater strength. Most of these lintels cover the lower flange, and the underside is grooved to form a key to the plaster, as in section above. The slab system consists of a solid block of concrete, in which a series of iron joists or steel bars are imbedded. Sometimes corrugated sheets of iron are placed between girders on flanges to form a centre for concrete arch, but it entails condensation of moisture. Concrete of coke-breeze and cement is to be preferred, and the wood flooring can be nailed to this.

In specifying segmental arching such as Dennett's, state span 5 to 10ft., thickness of

crown 4 $\frac{1}{2}$ in., 7 $\frac{1}{2}$ in. at opening rise of soffit 1in. in every foot of span, if the upper surface is to be left rough or made level; if with fine trowelled face to form floor surface, and soffit hacked for plastering. Or the arching—as shown in our section—may be laid horizontally between iron joists in spans of from 3 $\frac{1}{2}$  to 6 $\frac{1}{2}$ ft., and from 6in. to 10in. thick. Specify if rods are necessary for end abutments.

Homan and Rodgers' system is well adapted for residential chambers and offices, and dwellings in flats.

Sometimes a separate contract for iron joists is entered into to supply and fix in position, and of certain sizes and weights, rolled iron (or steel) joists of the best manufacture, the contractor taking the responsibility for the accuracy of lengths. A detail plan ought to be made of each floor, every girder and joist being marked with a letter referring to a table of length, size, and weight, &c.

31. *Details.*—All iron trusses to be executed according to details, with all necessary angle-irons 3 $\frac{1}{2}$ in. by 3 $\frac{1}{2}$ in. struts, and rods varying from  $\frac{1}{2}$ in. to 1 $\frac{1}{2}$ in. diameter. The ends of bolt to be forged as eyes, and perforated for 1in. or  $\frac{3}{4}$ in. bolts, those of 1in. for  $\frac{3}{4}$ in. bolts; the ends of rods to be forged as forks or eyes. Provide all screw ends, nuts, unions for bolts of required diameters, 1in. lewis bolts 7in. long, with nuts and screws to ends, cleats and rivets, cast-iron shoes, &c.

32. *Fireproof Floors.*—The fire-resisting floors to be constructed with 1 steel joists 20ft. in length, 8in. by 4in., to weigh 18lb. per foot., and the depth of floor not to exceed 10 $\frac{1}{2}$ in. The joists to be placed 2ft. apart centres, and upon the lower flanges well-burnt tubular lintel bricks of  $\Delta$  section are to be laid (or made by Messrs. Doulton). Fill in the spaces over and between the brick lintels and steel joists with cement concrete made of coke-breeze ballast and cement in proper proportions. The floor to be of wood blocks, properly laid in cement, and bedded in tar (or specify Lowe's, or the "Acme," or Duffy's "Immovable Acme System"). Or—

Form floors, landings, and passages with half-brick arches in cement on centres, springing from rolled joists, wall-courses, or springing pieces, and fill in with concrete composed of 1 part Portland cement, 4 parts ballast, 1 part sand, 1 part coke-breeze, mixed dry, water being added. Rods  $\frac{1}{2}$ in. (or 1in.) diameter to be inserted through the rolled or other joists 3ft. apart. Or—

The floors of the offices or warehouse to be constructed on the Dennett fireproof system, according to the drawings furnished, the execution of the same to be intrusted to the firm of Messrs. Dennett and Ingle, Whitehall (see section 5). Or the clause may run thus:—

The fireproof floors to be constructed in accordance with the plans and drawings, and to be carried out in compliance with the specification and special directions and under the supervision of Messrs. Dennett and Ingle (or Messrs. Homan and Rodgers, Measures Brothers, or other approved firm). Or—

33. *Roller Iron or Steel Joist Floor.*—The warehouse (or other floors) to be constructed of steel joists 8in. by 5in. (or 10in. by 5in.), placed 2ft. or 2ft. 6in. centres, and bearing on walls 6in. or 9in. on York stone templates. Upon the lower flanges tubular bricks or purpose-made, hard, well-burnt tubular lintels are to be placed from joist to joist, shaped so as to protect the lower flanges at least 2in. The lintels are to be placed close together, and are to have ribs on the lower surface to form a key to plaster. Fill between and over the lintels to the level of joists with specially-prepared cement and coke-breeze concrete, to be approved by the architect, and lay on the top of concrete dovetailed-shape battens for flooring. Or bed 4 $\frac{1}{2}$ in. by 2 $\frac{1}{2}$ in. fir joists in the concrete, 1 $\frac{1}{2}$ in. below surface, for floor. Or, render the concrete over  $\frac{1}{2}$ in. thick, so as to form even surface for asphalt or wood-blocks. State what load the floor is to carry, or what distributed load in tons 1ft. of joist is to carry. Or—

34. *Steel Joists and Concrete Floor.*—Form all floors as shown on drawings with iron or steel joists, 9in. by 7in. by 10in. by 5in., cut to the length shown, and having a bearing on the walls or template of 9in., placed not more than 1ft. 6in. (or 2ft.) apart. Erect below joists a staging for the cement concrete, ease, and afterwards remove planking and props. The planking to be kept  $\frac{1}{2}$  below the iron joists, and the concrete to be worked in between the joists (to be 2in. thicker than the depth of joists) with shovel, and to be composed of 1 part Portland cement, 3 broken brick, 2 of river ballast to pass a 1in. diameter ring, 1 part clean sand, mixed dry, and water added. Finish on the top with fine concrete. Render surface with  $\frac{1}{2}$ in. cement to lay wood-blocks.

35. *Steel Deck and Concrete Floors.*—The floors of warehouse to be constructed according to the plans and sections prepared on Messrs. Lindsay and Co.'s system and under their supervision, with girders in pairs riveted together, 1ft. 5in. deep and 14in. wide (placed 7ft. or 10ft. apart), with steel decking or trough-shaped irons riveted together over the whole surface, and supported on angle-irons 4in. by 4in. on sides of girders. The steel channels or troughs to be as shown in detail, 6in. deep, and to be covered to a depth of 2in. above upper flange of girders with pumice concrete, made as directed or prescribed by the manufacturers, and to be rendered with 1in. of cement, and prepared for wood-block floor or sleepers. The lower surface of steel troughs to have slabs of pumice concrete hung to soffit by bolts through centres of troughs, and finished with plaster; or to have battens bolted to troughs, and finished with lath and plaster (see section 8). Or—

The floors to have Fawcett's (Queen Anne's-gate) fireproof floors, constructed according to manufacturer's specification.

36. *Fireproof Stairs.*—The stairs from ground to third or upper floor and landings to be constructed



on two (or more) rolled steel joist carriages bent at angles of flights, or mitred at joints and secured with  $\frac{1}{2}$  in. wrought-iron fishplates, 6 in. each way from angle of joint and bolted together with four  $\frac{1}{2}$  in. bolts, heads, and nuts, the ends built into walls 9 in. on York stone template, with 4 lb. lead (or felt) seatings. The joints at angles to be planned and mitred. The concrete to be laid *in situ* on planks suspended from lower flange of carriages, and  $\frac{1}{2}$  in. below the bottom flanges (or supported on staging of timber), and to be carefully worked round iron carriages (or to be laid on planks above the iron carriages), and to be composed of 1 part Portland cement, 4 parts granite chippings to pass a  $\frac{1}{2}$  in. ring, 1 part coke-breeze, and the surfaces to be worked fair with trowel. Make all holes for balusters, and render soffit in cement.

37. *Iron Staircase*.—Provide and fix in the position shown from ground to second floor an iron staircase, including iron landings, straight (or spiral)—if the latter, state diameter (3 ft. 6 in., 4 ft., 4 ft. 6 in., or 5 ft.)—with cast-iron staircase bars and newels per design, and provide a concrete fixing block for the strings to be secured to. The strings, carriages, balusters, handrails, &c., to be of wrought iron. Or—

Erect on the position shown a spiral iron staircase from ground floor to first (or other) floor, 4 ft. or 5 ft. diameter, including iron landings with cast-iron bars, newels, &c., according to design, or to be manufactured by the St. Pancras Ironwork Co. (and of pattern shown in catalogue No. 640). Or—

Provide one of Hayward's improved-pattern iron spiral staircases, 4 ft. 6 in. (or 5 ft.) diameter, tread, riser, and spandrel in one, including top landing, and three ornamented bars on landing, with one bar to each step. Half-round handrail fitted for fixing, handrail to well-hole at top, and provide the necessary concrete base and fixing for same.

38. *Party-Wall Doors*.—The doors to openings in party-wall to be in accordance with the requirements of the London Building Act, section 77, sub-section (b), and to be constructed of wrought-iron doors with panels  $\frac{1}{2}$  in. (or  $\frac{3}{4}$  in.) thick placed on each side of thickness of wall fitted to rebated iron frames, hung on strong wrought-iron butt hinges (or they are to be wrought-iron sliding-doors or shutters fitted to grooved or rebated iron frames). Or—

Provide and fix to openings in party-walls, 7 ft. wide and 8 ft. high, wrought-iron sliding-doors to run on each face of wall, upon running flat bar or rails planed for grooved wheels, with the necessary suspending bars, bolts, nuts, and screws, and with all handles. Or specify—

Provide to openings in party-walls Hayward's wrought-iron doors (state size and thickness) with all suspending pieces, grooved wheels, &c., complete, in compliance with the London Building Act; or provide Hobbs and Co.'s party-wall doors.

39. *Cellar Flaps*.—Provide and securely fix Hayward Bros. and Eckstein's (Ltd.) patent cellar flaps, with grooved frame all round, fitted with patent gearing for opening (as per pattern marked in catalogue), to the architect's satisfaction.

40. *Guard Bars*.—Fit to basement windows wrought-iron framed bars of  $\frac{1}{2}$  in. diameter, fixed at 4 in. (or 5 in.) centre, pointed at top, and framed to 1  $\frac{1}{2}$  in. by  $\frac{1}{2}$  in. top and bottom rail, fixed securely to reveals, or let into mortises in window-sill, or curb and run with lead.

41. *Bostwick Gate*.—The front shop (or door) to have the patent Bostwick gates to fold back. (State space, or allow a sum for same.) Or—

42. *Grilles*.—Allow for ornamental wrought-iron grilles to ground-floor windows, the sum of — pounds to be executed according to architect's design, and fixing to sills and reveals. Or, provide movable and folding grilles, to shop lobby of wrought iron, riveted and welded together with 1  $\frac{1}{2}$  in. by  $\frac{1}{2}$  in. meeting and hanging stiles; 1  $\frac{1}{2}$  in. by  $\frac{1}{2}$  in. braces, rails, &c., with rebates. The bars to be  $\frac{1}{2}$  in. round iron, 5 ft. or 6 ft. high, with forged heads and small twisted bars, square or round, according to design.

Stoves and ranges are generally selected from some well-known firm of makers.

43. *Stoves and Ranges*.—Provide the sum of — net p.c. for all stoves and ranges, exclusive of packing, carriage, profit, and fixing, the cost of which is to be added to the account for "fixing" or "bricklayer." Or, allow the p.c. sum of £— for Shorland's (Manchester) register and slow-combustion stoves, with tile cheeks; allow p.c. sum of £10 or £12 for open range, with iron backs and sides, register and boiler, with all improved fittings, iron skirting, firebrick back and sides. Or—

The kitchen to have an open-fire range, (p.c. £10) 3 ft. 6 in. or 4 ft. long, with 12 in. or 14 in. fire, one oven, open boiler, and brass tap, bright mount-

ings, iron skirting; or select from Young and Marten's catalogue.

44. *Close-Fire Range*.—Supply kitchen with a close-fire range (p.c. £16) 5 ft. 6 in. long, 14 in. fire, with oven, and roaster at sides, with bright mountings, skirting, tile back and covings, round top, ash pan, dish-rest, plate-rack, draw-fret, dampers and frames, soot-doors, &c., complete, with  $\frac{1}{2}$  in. plate wrought-iron "boot" boiler, manhole and flue, with inlet and outlet for circulating pipes, and form flues in a proper manner, or quote name and pattern of manufacturers, Steven Bros.

#### THE SOCIETY OF ARCHITECTS.

THE fifteenth anniversary meeting of the Society of Architects took place on Thursday evening in last week, at St. James's Hall, Piccadilly, W., Mr. T. Walter L. Emden, J.P., L.C.C., the President, occupying the chair. Various donations to the library and nominations for membership having been announced by Mr. C. McARTHUR BUTLER, the newly-appointed secretary,

#### THE ANNUAL REPORT OF COUNCIL

was read by Mr. ELLIS MARSLAND, Hon. Secretary. During the past year, the report stated, there have been nine candidates for election as members, of whom five were approved by the Council. Four were duly elected, though one of these failed to take up his membership, and the remaining candidate awaits election at the beginning of the new session. M. Eugene Soil, of Tournai, has been added to the list of honorary members. Against this, six members have died since the last report, six have resigned, and 19 have been removed under Rule 44, with the result that there is now a total of 532 on the roll of the Society, a decrease of 27 since October 31st, 1897. With respect to the small number of elected candidates, members were reminded that, on and after November 1st, 1896, membership was not open to candidates under 35 years of age without examination. The effect of this rule was, as anticipated, to restrict for a time the number of applicants for membership; but its effect was greater than was considered desirable by the present Council. They therefore modified it with the consent of the general meetings held on May 26th and June 17th, by reducing the age of candidates who would not be required to pass the examination from 35 to 28. Although the effect of this modification (owing to the new rule having been so recently in force), is not yet apparent, it is hoped that it will shortly have the desired effect of increasing the membership. The Council also regret that they have been unable, until quite recently, to make the necessary arrangements for holding the examination for membership. They had endeavoured to obtain the assistance of the Council of King's College in this matter, and made a request to them that they would undertake the Society's examination; but after prolonged negotiations the college council eventually found that they were unable to comply with the request. So soon as the decision of the Council of King's College was received, the Council of the Society immediately proceeded to carry through the examination themselves, and made all the necessary arrangements for the first, which was held on October 5th, 6th, and 7th. A syllabus of the examination was drawn up, advertisements were inserted in the technical journals, and a large number of applications were received for the particulars, though only three candidates sat at the examination. The institution of the examination will forward objects for which the Society was established, and cannot but be to the advantage and advancement of the profession of architecture. The Council have made considerable progress in the Registration movement, and are creating a growing interest in the provinces in its favour. This year, as in former years, they have held provincial meetings. The meetings at Leeds on March 25th, and at Newcastle-on-Tyne on March 28th, were very successful. The keen interest and unanimity of feeling shown on these occasions by our provincial brethren, not only of this Society, but of other architectural societies, has encouraged the Council to persevere in their efforts to bring about this much-needed reform. It is, however, to be regretted that the second reading of the Architects' Registration Bill, which was down for second reading on March 23rd last was not reached, and it has gone over till next session. The Council feel that it is only by persistent effort that this question can be brought to a

successful issue. The longer it is delayed, the present evils will increase, and they rely upon each individual member doing his share of the work by discussing it with his brother architects, and bringing the matter before members of Parliament and others who will interest themselves in its behalf. The Council are quite convinced that the passing of a Registration Bill is the only means of raising the profession of architecture to the level and dignity of the other learned professions, and thus obtaining public confidence. At the ordinary meetings held during the session, papers were read by the President, Mr. T. Walter L. Emden, and by Messrs. Ellis Marsland, H. Calder Marshall, G. A. T. Middleton, A. A. Hudson, L. Schlentheim, and Cecil Tudor Davis. A field meeting was also held on July 23rd, when a party of members and friends journeyed to Ely and visited the cathedral. The Council cannot help again regretting that members content themselves with reading reports of the Society's proceedings, without making more effort to attend the sessional meetings, and they are reminded that membership of a society carries with it duties as well as privileges. Every new member, in particular, should, upon his admission, seek to become acquainted with other members and the officers of the society, thus enlarging a fellowship which may benefit the whole society. On April 21st, 1898, the Society's Dinner took place at the St. James's Restaurant, when a considerable number of members and their friends were present. At the various meetings of the Council and committees many important subjects have been considered affecting the interests of architects, and advice given, in cases submitted to the Council, which has proved of material assistance. The number of cases submitted to the Council during the past year has been larger than in preceding years, and members are strongly recommended to avail themselves of this resource in cases where consultation may be useful. The Council has started a register of employment whereby members requiring assistants, and assistants requiring employment, may be brought into contact to their mutual advantage. The Council have under consideration the advisability of conducting a series of tests of materials on behalf of architects and manufacturers, the results of such tests to be published from time to time, and issued in pamphlet form at the end of each year. The Council regret to have to record the death, on August 5th last, of the Secretary of the Society, Mr. Montagu Baldwin, M.A. He was appointed secretary in May, 1896, and by reason of his literary ability contributed greatly to the success of the *Journal*, which he edited up to the time of his death. The Society suffers the loss of a scholar and a gentleman who interested himself up to the last for its benefit. The Council again remind members that the reading-room is open daily, and, at the same time, desire to say that promptness in replying to communications received from the society will save much time and trouble, and promote the efficiency of the society's work in the Secretary's department.

The PRESIDENT moved that the report be received and adopted, remarking that it was a record of hard work by the Council, who had laid the foundations of future success in the examination movement. Such a report deserved to be carried unanimously. He expressed the regret he felt at the death of their late secretary, Mr. Baldwin. The adoption of the report was seconded by Mr. G. GARD PYE, and carried unanimously.

#### ELECTION OF OFFICERS AND COUNCIL.

The PRESIDENT then read the report of the scrutineers, which stated that 72 voting-papers had been received, all of which were in order. The result had been the election of the gentlemen nominated in the "house-list" as follows (an asterisk signifies re-election):—President, \*T. Walter L. Emden, J.P., London; Vice-Presidents, \*Lieut.-Col. F. Seymour Leslie, R.E., London, and \*Silvanus Trevel, F.R.I.B.A., Truro; Honorary Secretary, \*Ellis Marsland, London; Honorary Corresponding Secretary, \*Edgar Farman, London; Honorary Treasurer, \*H. G. Quartermain, Merton; Honorary Auditor, \*W. R. Mallett, London. Council: James Bartlett, London; \*C. A. Bassett-Smith, London; \*George Edward Bond, Rochester; \*William Cooper, Hastings; \*R. W. Coventry Dick, London; \*Herbert J. Jones, Bristol; \*J. R. Manning, London; \*R. Lano Pearce, London; \*George Henry Phillott, M.A., Cheltenham;



\*George Gard Pye, London; \*Thomas R. Richards, London; \*R. Frank Vallance, F.R.I.B.A., Mansfield.

The President thanked the members for having unanimously re-elected him to the chair, remarking that while there were many members who could serve the Society as well and faithfully, no one could give their services more cheerfully. He should have much pleasure in devoting such time as he could spare to the society, which deserved to grow, and, he believed, would grow, both in number and influence, and be of great benefit to its members and to the profession at large.

Mr. ELLIS MARSLAND proposed a vote of thanks to the past Vice-Presidents, Lieut.-Col. Leslie and Mr. Trevail, who, he was glad to hear, had been unanimously re-elected, remarking that Col. Leslie had been indefatigable as Chairman of the Examinations Committee; while Mr. Trevail had been as frequently at the Council meetings as his distance from town would allow, and specially journeyed from Truro to Newcastle-on-Tyne to attend the conference on the Registration question.

Mr. R. W. COVENTRY DICK seconded the motion, which was carried by acclamation.

A vote of thanks to the scrutineers, Messrs. Sydney Marsland and E. W. H. Piper, was agreed to, on the motion of the President, and was acknowledged by Mr. PIPER.

A vote of thanks was heartily accorded to Mr. Marsland for his services as Hon. Secretary, especially during the illness and since the death of Mr. Baldwin, on the motion of Mr. W. COOPER, seconded by Mr. T. R. RICHARDS, and was duly acknowledged by Mr. MARSLAND, who took the opportunity to acknowledge the able aid given by Mr. R. T. Symonds, the Secretary's assistant.

A cordial vote of thanks to the President was passed with applause, on the motion of Messrs. GARD PYE and COVENTRY DICK, and a similar acknowledgment of services freely rendered the society was also passed to Mr. H. Goodall Quartermain, the Hon. Treasurer, who suitably replied.

#### THE ARCHITECTURAL ASSOCIATION.

THE second fortnightly meeting for the present season of the Association was held on Friday evening, at 9, Conduit-street, W., the President, Mr. Geo. H. Fellowes - Prynne, F.R.I.B.A., in the chair.

On the motion of Mr. E. HOWLEY SIM, hon. sec., a vote of thanks was accorded to those who assisted to render the *conversazione*, held a week previously at the King's Hall, Holborn, a success, especial mention being made of the services of Mr. G. B. Carvill, the hon. sec. of the Entertainment Sub-Committee.

Mr. SIM also proposed a cordial vote of thanks to Mr. Arthur Cates, their senior member, who had generously presented the Association with a chairman's hammer, many office fittings, and a great number of architectural books, including the "Vitruvius Britannica" in three volumes, and an illustrated folio on the Erechtheion at Athens. The motion was seconded by the President, and was carried by acclamation.

The following 35 new members were duly elected: David Good, H. R. Bird, E. W. Ford, H. J. Gravenor, R. Knott, J. Mansell, H. J. C. Marshall, E. J. Martin, A. R. Brown, E. A. Agutter, Leonard Judge, P. J. Turner, F. G. Allsopp, T. B. Ball, G. J. Morris, C. J. Moss, J. Myers, S. V. North, W. Paice, jun., A. G. A. Quibell, R. M. Reeves, F. V. Rider, W. H. Rogers, G. L. T. Sharp, G. S. Simpson, M. Skinner, C. T. Skipper, W. Thornton, J. E. Tindall, C. Braidwood-Muff, A. Durst, C. E. Simmons, C. H. Smith, and H. M. Widdington.

The President announced, amid applause, that Mr. Alfred H. Hart and Mr. Herbert A. Satchell, who had, in accordance with the by-laws, retired from the committee, having accepted paid offices under the Association as lecturers, had been unanimously re-elected, no other nominations having been received.

#### EXCAVATIONS AT THEBES.

A paper on this subject, illustrated by means of lantern slides from photographs, and also by large scale maps, sections, and plans, was read by Mr. JOHN E. NEWBERRY, A.R.I.B.A. The author remarked that he proposed only to treat upon the excavations that he personally assisted in making during two seasons' work for the Egypt Exploration Fund, whilst they were unearthing the Temple of Hatshepsut, now known as Deir-el-Bahari, or the Convent of the North.

The result of this excavation, to quote an article in the *Edinburgh Review*, "had been to give back to the world a temple which, though ruined in some parts, unfinished in others, was, perhaps, the most beautiful, certainly the most original, in Egypt, and the earliest of those now standing on the plain of Thebes." He proposed to give a description of the site and surroundings of their work, and then a brief sketch of the vicissitudes that this temple had passed through, and finally would endeavour to describe their mode of work, the architecture of the building, and its details. The site of

#### THE ANCIENT CITY OF THEBES

in Upper Egypt, Mr. Newberry continued, is now marked by Arab villages, the principal being Luxor, Karnak, and Gournah, some 450 miles from Cairo by the river. When the author returned from there in 1894, the railway alongside the Nile from Cairo only extended to Sohag; but now it passes through Luxor and Assuan, on the way to Khartoum. In this Theban district, on each side of the Nile stretches a belt of fertile land; it is much wider on the east side, extending for perhaps four miles from the river to the mountainous desert of the Arabian hills beyond. Here by the river are the remains of the mighty temples of Karnak and Luxor, created for the worship of Amon, and the work of many generations. On this side stood the ancient city of Thebes. The cultivated land on the west side is only a narrow strip, which ends as abruptly at the foot of the barren limestone cliffs as a lawn adjoining the gravel walk in a garden. Egyptian tombs were always placed in the desert, partly that they might be beyond the reach of the Nile, and partly because every inch of cultivated ground was, and is, so valuable. The hills here are regularly honeycombed with tombs, and this western side is simply one vast necropolis, the biggest in the world. The northernmost cliffs, known as the "Drah abu'l Neggah," contain the earliest tombs. To the south-west is the entrance—a narrow gorge—to the natural amphitheatre of cliffs in which the temple of Deir-el-Bahari is situated. Beyond in the desert is the wonderful valley of the Tombs of the Kings, approached either by a ravine north of the "Drah abu'l Neggah" or by a steep mountain path over the cliffs. On this side of the river are also the Ramesseum, the temples of Seti I., Medinet Habu, Der el Medineh, as well as the famous Colossi. Lepsius believes that the temple of Deir-el-Bahari was formerly connected with Karnak, since the axis of the prolonged dromos would lead straight to the great temple of Amon. The remains of the Sphinx-avenue, from Karnak to Luxor, can be traced, and in places the ram-headed monsters are still to be seen. The ancient Egyptian name of the city is read as Uas, and its Scriptural name was No, or No Amon, the city of Amon; no satisfactory explanation has been given as to why the Greeks called it Thebes, a name borne by cities in Boeotia, Attica, Thessaly, Cilicia, Asia Minor, &c. One may remark here that

#### EGYPTIAN HISTORY IS DIVIDED INTO DYNASTIES.

These are grouped into the Ancient kingdom, including the I. to VI. dynasties; the Middle kingdom, XII. to XVI.; and the New empire, XVII. to XX., which is dated at 1600 B.C. to 950 B.C. Following this is the period of foreign domination, XXI. to XXV., or 950 B.C. to 663 B.C.—the Late Egyptian period, XXVI. to XXX., or 663 B.C. to 332 B.C., and the Græco-Roman time which includes the Ptolemies, the Romans, and the Byzantines, from 332 B.C. to 640 A.D. The history of Thebes under the early empire is veiled in uncertainty; but it is known to have been the capital of a province and was ruled by princes of its own. A VIth dynasty tomb has lately been discovered in the Drah abu'l Neggah by the lecturer's brother, Mr. Percy Newberry. In the Middle kingdom, Thebes rose to a more commanding position, but its greatness dates only from the beginning of the New Empire, or, say, 1600 B.C. The liberation of the country from the Hyksos and the reunion of the kingdoms of Upper and Lower Egypt was directed from Thebes, and for centuries it continued to be the favourite seat of the Pharaohs. Historically, the interest of Thebes centres in one of the most fascinating periods of Egyptian history—the XVIIIth and XIXth dynasties, being the time of the Amenhoteps, Hatasu, or, more correctly, Hatshepsut, the Thothmes, Seti, the Rameses, and Merenptah, of Israelitish fame. But the sun of Thebes began to set when the Royal residence

was transferred to Lower Egypt in the XXIst dynasty. Alexander the Great and the Ptolemies probably found Thebes still a great, though decadent city, but they assisted to embellish it, as some buildings of this period attest. After many rebellions, the great city revolted for the last time in 30-29 B.C., taking part in the insurrection of Upper Egypt against the oppressive taxation of the Romans. Cornelius Gallus, the prefect, overthrew the rebels, and is said to have utterly destroyed the ancient town. From this time Thebes is only mentioned as a goal for inquisitive travellers, who, under the Roman emperors, were attracted to the Nile by two monuments in particular, the Pyramids, and the musical Colossus of Memnon. The introduction of Christianity and the edicts of Theodosius were followed by the destruction of many Pagan statues, and the obliteration of countless inscriptions. Later the rock-cut tombs, at first occupied by Christian hermits, were converted into peasants' dwellings; Christian churches were erected in the temple halls, and mud-brick houses built between the columns of the Temple of Luxor. Carefully-worked blocks and slabs were removed from the monuments, which were used as quarries, and much beautifully carved limestone has been burnt for making lime. In considering the

#### HISTORY OF THE TEMPLE OF DEIR-EL-BAHARI

we must first glance at what we know of the reign of its great founder, Queen Hatasu, or Hatshepsut. In the first excavation of the temple it was not at once discovered that she was its founder, as in nearly all the inscriptions the name of her successor, Thothmes III., has been substituted for that of hers. But further observation has shown that, although she is always depicted on the reliefs in male attire, the personal pronouns in the inscriptions are feminine, and the names of the king were incised deeper than the surrounding hieroglyphic signs. Such usurpation is not uncommon among the Egyptian kings; but the persistence with which every trace of the queen's reign has been erased seems to point to something more than the mere desire for fame. This destruction is attributed to the queen's nephew, Thothmes III., and the reason may be found in the history of the succession. Professor Petrie says that the father of Hatshepsut, Thothmes I., died before he had a son old enough to succeed him on the throne; some five or six months before his death, and whilst he was probably in failing health, he associated his daughter with him, as she was the heiress in the female line, in which royal descent was specially traced. She was then about twenty-four years of age, and of great capacity and power. Two or three months later the king married her to his eldest son, Thothmes II., who would otherwise have had no claim to the throne, being the son of Mutnefert, who was not a royal princess. Ten weeks later Thothmes I. died. His son, who was now king in name, was but 17 years old, appears to have shown no abilities, for he did no great work of any kind, and at 30 he died. During his life his sister probably entirely organised public business, and at his death she was left sole legitimate ruler at about 37 years of age, the only person who could challenge her power being her little nephew, Thothmes III., then perhaps nine years old. He had no claim to the throne, being the son of a woman named Isis or Aset, who was not of royal blood. But his aunt did all she reasonably could be expected to, for she associated him with her in the kingdom; public dating of documents was carried on in his name, and she married him to her second daughter, Meryt-ra, as soon as might be, and thus gave him the position of heir. Egypt developed greatly during this 20 years of peace and progress, and at the queen's death, Thothmes III., now 31 years old, succeeded to the full power. Queen Hatshepsut is, as far as we know, the only woman in the great historical period that overcame the prejudices of a changeless people and broke the male line of succession. But Hatshepsut's temple suffered at other hands than Thothmes III. Amenophis IV., Khuenaten, or Akhenaten, the so-called heretic king, hacked out here, as everywhere, the figures and names of Amon-Ra, and the inscriptions and reliefs were left thus mutilated until the time of Rameses II., who restored them, though in a style unworthy of the first hand. For centuries after the temple remained practically unaltered, though there are evidences that the unfinished northern colonnade was used by a colony of



embalmers as early as the XXII<sup>nd</sup> dynasty, and many burials have been discovered in this part of the XXV<sup>th</sup> dynasty. Under Ptolemy Euergetes II. a few minor restorations and some important additions were made. On the introduction of Christianity a community of monks established themselves, and founded a Coptic convent, known to the Arabs as Deir-el-Bahari, which was built with bricks brought from an edifice of the XXV<sup>th</sup> dynasty at the Assasif. The chambers of the temple were converted into chapels, and the representations on the walls barbarously defaced. The earliest detailed description of the place is given in the account of the French expedition of 1798, and later on we read it in the works of Wilkinson, Lepsius, and Mariette, the latter of whom undertook important excavations in 1853, and published a monograph on the temple. But it was reserved for the Egypt Exploration Fund, under the able guidance of M. Naville, to bring to light one of the most interesting temples of Egypt, of which up to 1892 two-thirds were covered by mounds of rubbish that reached to a height of 50ft. in places.

#### THE GROUND PLAN

is very remarkable, quite different from all other temples in Egypt. It consists of three great terraces or platforms cut out of the east slope of the mountain, and rising one above the other from the level ground, the upper platform being backed against the vertical cliffs, which here rise to a height of 384ft. Centrally-placed sloping ways lead from terrace to terrace, and along the front of each terrace the ceiling stones of the one above were carried over on the top of a double colonnade, thus forming a cloister underneath. The upper and part of the middle platforms are terminated by a series of chambers, excavated and then built into the solid rock. The sphinx avenue, some 24ft. wide, with trees planted at intervals, led from the plain, or perhaps the river, to the gateway of the lower court, or entrance to the temple precincts, and formed a continuation of the axis of the temple, running approximately east and west. Only the scantiest traces remain, but these are enough to show that the gateway was flanked with great granite obelisks, which stood on pedestals. This first court, or lower platform, measures about 325ft. by 263ft. wide; and the excavations have proved that it was treated as the garden or orchard of the temple. The western colonnades are in ruins, but they each consisted of twenty-two pillars, arranged in double rows. The back row were sixteen-sided and the front row seven-sided at the back and square in front. The top of the stone ceiling of this colonnade formed the floor of the court above, the middle platform, which is at a level of 21ft. higher up. It measures roughly 279ft. by 250ft. wide. On the west it is bounded by a double colonnade, each side consisting of eleven pairs of square pillars. Two steps at the north end of the colonnade descend to a hypostyle hall, in which are twelve sixteen-sided columns arranged in three rows, which support massive architraves and a flat stone ceiling. Three steps lead up to the shrine of Anubis, consisting of three small chambers, with elliptical vaulted ceilings. On the north side of the court is a colonnade of fifteen sixteen-sided columns, and in the wall behind are four small vaulted chambers. The south side of this middle platform is supported by a retaining-wall ornamented with wide, flat pilasters, surmounted by alternating hawks and urasi of colossal size. To the south-west of this court, and at the same level, is the little shrine dedicated to Hathor, goddess of the dead. It has since been found that this was reached only from below, by a flight of steps, of which a few traces still remain. The innermost chambers are hewn out of the rock, and are preceded by two covered vestibules, which are now in ruins. The first had sixteen-sided columns and four square pillars with semicircular attached shafts, terminating in Hathor-headed capitals, the remains of which are now lying shattered on the ground. The second vestibule, at a slightly higher level, has four central columns with round shafts and sixteen-sided columns on either side. The shrine proper is raised two steps, and consists of three chambers, each with several niches surrounding it. Here we find conformity with the same law which prevails in hypæthral temples, and which M. Perrot has named

"THE LAW OF DECREASING DIMENSIONS."

Thus from portico to sanctuary the dimensions of

the building decrease in every way, and the floor itself rises. The innermost room contained the sacred emblem of the goddess, perhaps a golden cow, inclosed in a tabernacle or shrine. The sacred boat which bore the tabernacle was probably kept in the room immediately preceding. The various lateral niches were used as store-chambers, to serve for offerings, the divine vestments, and all the sacred furniture. We now ascend to the level of the upper platform, which is, again, 21ft. higher up. The terrace in front of the central court had a row each of square pillars and sixteen-sided columns, as remains show on the north side. A granite doorway leads to this central court, 83ft. by 121ft. wide, which it is now considered had a double row of columns around it. The ruins of the porch to the sanctuary are of Ptolemaic date, and lead to a hall with semicircular vaulted roof and two chambers beyond. The westernmost chamber is a restoration by Euergetes II., in which the reliefs and inscriptions compare very unfavourably with the masterly sculptures of Queen Hatshepsut. The western wall of this central court is built against the steep cliff of the mountain, and pierced with niches. In the northern wall is a doorway leading to a vestibule which had three sixteen-sided columns in it. Opposite the door is a small niche, the upper part and ceiling of which had been displaced by falls from the cliffs above, and which the author rebuilt. To the west of vestibule is an open court in which is found the only altar that has come down to us from Egyptian antiquity. A door in the north wall of this court admits to the funerary chapel of Thothmes I., consisting of two chambers built into the cliff. The Hall of Amon, to the west, is approached only from the upper court, and part of its flat ceiling still remains in position. On the south side of the central court are several chambers, now in ruins, and a well-preserved sacrificial hall with a portion of the semicircular vaulted roof still standing. All the excavations in Egypt are regulated by the Governmental Department of Antiquities. The permit granted to M. Naville on behalf of the Egypt Exploration Fund stipulated that the society should undertake to

#### COMPLETELY UNCOVER THE WHOLE TEMPLE,

and also do any building work that might be necessary for maintaining or re-erecting the old walls. A series of trenches is often all that is required to explore an ancient site and discover all the antiquities that may be buried upon it. But in our case it was necessary to remove the rubbish and dust, accumulations of centuries, to a considerable distance from the temple; and it was also found that when the support of the surrounding earth was taken away from some of the walls that they required strengthening. Owing to the kindness of M. de Morgan, the then Director of the Department of Antiquities, we had all facilities granted us for carrying on the work; and he placed at M. Naville's disposal a quantity of Decauville trucks, and quite half a mile of tram lines, with all the necessary curves and points for making a complete railway. Before the excavations were begun the mounds rose considerably towards the west; it was, therefore, necessary to arrange a system of tram lines on three different levels, each of them having only a slight gradient, and some 20ft. above one another. The rubbish was taken in trucks from the highest mounds and tipped on to the next level; from thence it was loaded up again, and tipped down to a lower level, where another system of trucks carried it some quarter of a mile away from the temple to a natural hollow or lake. During the two seasons the author was in Thebes, a matter of 60,000 cubic metres of rubbish and stones were thus carried away from the temple—a feat that would have been impossible without the aid of a tramway. Here, at Deir-el-Bahari, the diggers, drawn from Theban villages, have many of them been tomb-robbers from their infancy, and consequently have lynx eyes for small antiquities. The actual digging is done by men with an implement like a short hoe or adze, with which they scoop the dust and rubbish into their palm-leaf baskets. Boys then carry these baskets to the trucks, which are drawn up close by, and bring them back to be filled again. Three or four men were in charge of each truck, and pointsmen were stationed at various places. We employed on an average 250 men and boys a day, with eight reises or overseers, one head reis to manage the railway—a clever Pyramid Arab, and a Coptic scribe who entered the names each

morning and kept the accounts. The wages were, for a day lasting from sunrise to sunset: boys, 1½ piastres (3½d.) per day; men, 2 piastres (5d.), and 3 piastres (7½d.) for the reises. Occasionally the order was given to search each man before he left the works, as a preventive against their stealing small antiquities, but we did not succeed in finding anything concealed upon them. The great tomb cave in which the celebrated find of royal mummies was made is always spoken of as being at Deir-el-Bahari, but it is nearly half a mile to the south, between the hills of Sheikh Abd-el-Gournah and the cliffs of the Libyan mountains. In considering some of the details of the temple, we may begin with the

#### LOWER TERRACE,

on a part of which are a few stones depicting the transportation of two great granite obelisks. Various fragments belonging to this scene have been discovered in the Coptic buildings which had to be removed, and it is now possible to piece them together sufficiently to show that the obelisks were placed on a great boat-like barge. This was towed by thirty large rowing-boats, arranged three abreast and in lines of ten. There were thirty-two oarsmen in each boat, so that adding officers and steersmen, the crew which towed these obelisks from Assuan to Thebes numbered quite 1,000 men. One of Hatshepsut's obelisks at Karnak is still standing; it weighs about 300 tons, and the inscriptions mention that these two monoliths were quarried and erected complete in seven months. Professor Petrie believes the pair at Deir-el-Bahari to have been put up by Thothmes III., and identifies the top of one of them at Constantinople. He calculates the weight of each obelisk at the enormous figure of 800 tons. We now ascend to the

#### MIDDLE PLATFORM

and examine first the sculptures on the southern half of the terrace. The twenty-two square pillars which supported the ceiling are of a slightly tapering form with delicately-rounded arrises. The scenes on the walls commemorate an expedition to the Land of Punt, which is supposed to lie on the west coast of the Red Sea, corresponding with the modern Somali coast. Incense, panther skins, ivory, and ebony were among its chief exports to Egypt. A village in Punt is shown, the houses of which are built on piles over water, amongst palms and incense trees, and ladders lead up to the doorways. We see the Egyptian fleet setting sail, and above, its arrival in Punt. Farther on, the Queen, followed by her guardian spirit, dedicates to Amon the spoils of the expedition. Cattle are shown feeding beneath delightfully conventional trees. Gold and electrum is weighed, and incense is measured in the presence of the gods. On the corresponding northern half of the same terrace, the scenes refer to the birth of the Queen: but unfortunately in every case the figure of Hatshepsut has been defaced, though that of her mother Ahmes has been respected. Her admirable portrait is probably the finest piece of work remaining in the whole temple. Though, like all the sculpture, it is in very low relief, the admirable modelling of the delicate and refined features, and the smiling expression, give to the face a beauty which bears witness to the skill of the Egyptian artist, and makes one regret that so little has been left of the original work. A great feature in this temple are the so-called Proto-Doric columns. Those in the Hypostyle Hall are sixteen-sided, measuring 2ft. 7in. in diameter just above their shallow circular bases, and they are 15ft. 9in. in height, tapering to an upper diameter of 2ft. 4in. The abacus is square and flush with the shaft, and a simple band of hieroglyphics appear on one face. Prototypes of this form are to be found in the rock-cut tombs of Beni Hassan, which differ only in having fifteen of their sides fluted like a Greek Doric column, and one left flat to receive the dedication inscription. This Hypostyle Hall, which forms a vestibule to the shrine of Anubis, is in a very perfect state; the flat stone ceiling, resting on massive architraves, and the supporting columns are all intact. The ceiling is painted blue, and powdered with yellow stars. The spacing of the columns is wider in the centre, so as to form a better approach to the chambers beyond. The granite doorway leading to the central court is one of the most striking features of the

#### UPPER PLATFORM.

It shows clearly the erasures around the cartouches which bore the Queen's names, "Ma-ka-ra, Hatshepsut," but which now read



"Ra-men-Kheper, Tehutimes," the names of Thothmes III. Where these alterations occur one can see plainly that the surface of the granite has been rubbed down to admit of new signs being inscribed. But, irrespective of erasures, Egyptologists are able to prove that the Queen's cartouches must have been there by the fact that the surrounding inscriptions are in the feminine gender. That great doors were once hung here is shown by the pivot and bolt holes on the inside. A somewhat similar granite portal on the further side of the central court leads to the Sanctuary, a narrow hall with a semicircular stone roof. These curved vaults occur in several parts of the building, and are not true arches, but built with horizontal joints, forming really a series of corbels curved on the inside. Nevertheless, it appears quite certain that the Egyptians understood the principle of the arch, and used it in brick buildings. The great stone altar which stands in the middle of the Altar Court is one of our most interesting finds. It is a rectangular structure of fine white limestone, measuring about 16ft. by 13ft. At the western end is a flight of ten steps leading to its upper surface, 5ft. 2in. above the floor. It is crowned with the usual bold cornice so common in Egyptian architecture, consisting of a large bead and cavetto moulding, and a similar bead to that on the cornice is worked on each angle of the altar mitring with the cornice bead. The proportions of the steps leading up to the altar are worth mentioning, having a rise of 6.2in. and a tread of 19 lin.; but the treads are not level, being inclined as much as 1.85in. The height of each riser is thus only 4.25in. The altar court was evidently always open to the air, and its walls are consequently uninscribed and quite plain. They are built to a batter, as are most walls in the temple, and were finished with an overhanging cornice. I carried out some considerable repairs here, consisting of rebuilding portions of the walls and altar, and forming rough retaining-walls against the loose and friable cliffs on the north. In the middle of the north wall of the Altar Court is the doorway leading to the

#### FUNERARY CHAPEL OF THOTHMES I.,

a chamber at right angles to the court, and measuring 17ft. 3in. by 5ft. 2in. wide, and roofed with a curved ceiling of elliptical form, with horizontal joints. At the north end is a stone seat, and above it is a much mutilated scene. It represented on the left a shrine, in which stood the symbol of the god Anubis, a skin on a pole. Before the shrine stood the queen, now completely defaced, and behind her Thothmes I., her father, whose cartouche reads "Aa-kheper-ka-ra." In the upper part of the scene were two jackals, also emblems of Anubis, each *couchant* on a shrine. In the centre is the cartouche of the queen. At the north end of the chapel and on the western side is a niche for the reception of offerings. In the passage between the southern inclosure-wall and the retaining-wall of the middle platform, not far from the Hathor shrine, an inclined plane cut in the rock was discovered, leading to the entrance of a large tomb. The rubbish was here quite untouched, and when the doorway was cleared, disclosed a large shaft, well cut in the rock, and opening into a larger chamber. In the middle was a square space for a stone sarcophagus; but, instead of the surroundings of an important burial, there was only a poor wooden coffin with bones in it, which seemed to have been disturbed. No inscription or ornament of any kind were to be seen except a few hieratic signs. M. Naville thinks it probable that this tomb was prepared by Hatshepsut for herself, but was never used, owing to the hatred of her nephew, Thothmes III. In this same passage a large foundation deposit was discovered in a rock-cut pit, about 3ft. deep. It was covered with mats, under which lay first a few pots of common earthenware, then about fifty wooden objects, models of winnowers, or sledges used for threshing corn. Each bears the cartouche of the queen. Lower down were fifty wooden hoes, four bronze plaques, a hatchet, a knife, eight wooden models of adzes, and eight larger adzes with bronze blades; at the bottom were ten little pots of alabaster and ten baskets, stands for the pots. All these objects were, as usual, buried in fine sand. In every Egyptian temple the sanctuary contained a shrine or naos, in which were hidden the emblems of the god to whom the temple was dedicated. They were generally made of wood, so that they could be moved and either placed on sacred boats, or carried by

means of staves, as was the ark of the Israelites. All the wooden shrines have perished, except a very small one, but a foot high, which is now in the Turin Museum. During our first season we found one side of a large ebony shrine, the panel measuring 5ft. 7in. high, 3ft. 7in. wide, and 1in. thick; also one leaf of the doors of the shrine, which is 2ft. 5in. high, 12½in. wide, and ¾in. thick. On the inside of the shrine one can see the mortises and part of the adjoining panels. As ebony can only be obtained in small sizes, the whole is pieced together of little bits, and held by pegs of the same wood. The angles or stiles are cut out of solid pieces, 2½in. square, to which are framed the top and two middle rails of the same width as the angles, but only 1in. thick, thus dividing the whole into three panels. The bas-reliefs represent Thothmes II. making offerings to Amon-Ra, the erasures being probably owing to Akhenaten. Underneath are a series of magical signs, arranged in pairs, and the symbols of stability and duration. At the bottom is a range of the so-called false doors. Externally the panel is divided into six divisions, two of the rails being only thin pieces of ebony pegged on. Rows of the same emblems are arranged in the panels, and the stiles or rails are beautifully carved with dedicatory inscriptions of Thothmes II. The small leaf of the double door is also made of irregular-shaped pieces of ebony, dowelled together, and having eleven small ledges pegged on to one side, each of them about ¾in. by ¾in. and rounded on the back. The pivot side of the door is also rounded and the bolt side rebated for the other leaf. Four bronze staples for the bolts are still in position.

#### THE ARCHITECT AND HIS TOMB AND STATUE.

A description of this temple would be incomplete without a reference to its celebrated architect, Senmut. Though Hatshepsut, like Queen Elizabeth, was not beloved of her relations, yet she had the same power of drawing to herself great men. Of such a man, Senmut, the architect of her temple, we have many records. Besides his great work at Deir-el-Bahari, he directed the erection of Hatshepsut's two granite obelisks at Karnak, and superintended architectural work at the temples of Karnak, Mut, Luxor, and Erment. A kneeling statue of him was discovered by Miss Benson in 1896 at her excavations at the temple of Mut. The inscription states that it was "presented by favour of the queen." The lecturer's brother had the good fortune to discover his tomb high up on the north-east of the Gournah hills. It had been very magnificent, but the painted facing of the walls is now almost entirely destroyed. A clear white glass bead, inscribed Senmut, was found at Deir-el-Bahari, as well as a fragment of a statue of him. My brother has a carefully-worked piece of black marble inscribed with his name, which appears to have been a paint muller, and may have been used by him for mixing up his Indian ink. It is recorded that he was a man of the people, for "his ancestors were not found in writing," and his portrait-statue gives no very high-bred features, but an ugly, capable complacent face.

#### A PRIOR DISCOVERY IGNORED.

Mr. R. PHENE SPIERS, F.S.A., in proposing a vote of thanks to the lecturer, remarked that two-and-thirty years had passed since he stood on the plain of Thebes, and saw and sketched the temple described that evening. They owed a great debt of gratitude to the Egypt Exploration Fund and to M. Naville for the work of excavation carried out at that site. Since 1866 either the sand had been blown over or the cliffs' face must have fallen, for it seemed that everything was covered by lofty mounds till the excavators began, whereas more than thirty years ago he saw and drew the plans and details, the originals of which he now exhibited. He was surprised to find that Mr. Newberry did not even seem to have heard of the work then done by M. Brun, afterwards a professor of the Ecole des Beaux Arts in Paris, carried out between 1863 and 1866, in conjunction with the present speaker, and which was published at the time, and Mariette Bey, writing on the Theban tombs in 1877, forgot to give credit to Brun, although he was allowed to make use of his plan. The speaker exhibited a tracing of M. Brun's sketch and plan, made at Thebes, and a conjectural restoration of the temple, which agreed very closely with the plans shown by the lecturer that evening. Mariette Bey had 200 men under him, but did little more than was ascertained by Brun

and the speaker, and he (Mr. Phéné Spiers) thought it rather mean of Mariette, in his work of 1893, to claim that the explorations of 1863-6 were made for him by Brun; and when the speaker tackled M. Naville on the subject, he declared that Brun did not find anything at all. Mr. Spiers showed the original drawings of the hypostylar hall, made by himself, and concluded by formally moving a vote of thanks to Mr. Newberry for his interesting address.

Mr. ALEXANDER PAYNE said he visited Thebes last year, and found the site of the temple more completely freed from rubbish than was shown on the drawings. From the hillside Thebes, with Karnak on the opposite bank of the Nile, presented one of the finest architectural groups extant: nothing in Athens or Rome could have equalled it in architectural magnificence, and the remains described by the lecturer were utterly unlike any other temples in Egypt—rather resembling a cemetery or mortuary building than a temple. It was evident that, before the present excavations were made, two architects, by digging shafts and climbing up and down, would realise the plan and somewhat of the effect of the building; but the conjectural restoration made more than thirty years ago closely agreed with the remains found, and evidenced the greatest acumen in M. Brun.

Mr. C. H. BRODIE, Mr. H. V. LANCHESTER, Mr. ALEX. WOOD, F.S.A., and the PRESIDENT having spoken, the vote of thanks was carried by acclamation, and Mr. NEWBERRY briefly replied. He showed the section of the ground before and since M. Naville's excavations were made, which indicated that, to a great extent, the temple was till recently buried beneath lofty mounds of rubbish. M. Brun's restoration agreed very closely with the remains since found, except that in one place twenty instead of twenty-two columns were shown. (Mr. SPIERS pointed out that on the original drawing twenty-two columns were drawn—an explanation greeted with applause.) The face of the cliff was of a very pliable limestone, and great falls of material must have taken place since Messrs. Spiers and Brun's drawings were made.

#### THE INSTITUTION OF CIVIL ENGINEERS.

MR. W. H. PREECE, C.B., the new President of the Institution of Civil Engineers, delivered the inaugural address at the opening of the eighteenth session of the Institution on Monday evening.

The President said that since 1859 the members of the Institution had increased from 894 to 7,088, of whom over 70 per cent. were home members, over 20 per cent. Colonial, and about 8 per cent. foreign members. It was not alone in numbers, however, that growth was shown. It was more so in the business of the engineer. The field of the profession had extended in all directions by the advances of practical science, and by a process of evolution and agglutination. The introduction of the steam-engine, the development of the railroad, the invention of the paddle and the screw, and the evolution of the ocean greyhound; the conversion of iron into steel, and the demand for ores; the opening of coal and oil fields, and the production of gas; the sanitation of our dwellings and our towns, and the demand for pure air and pure water; the application of electricity;—these and other causes had contributed to break up the profession into special branches and into individual groups, with their separate organisations and with their independent homes. The Engineering Conference held by the Institution in 1897 had results so successful as to call for its repetition in the approaching spring of 1899. The first practical application of the science of electricity was for the protection of life and property. Franklin, in 1752, showed how to secure ourselves and our buildings from the disastrous effects of a lightning stroke. Very little had been done since to improve on his plan. A mischievous and baseless delusion was prevalent that protectors actually attracted lightning, and might be sources of danger. Every exposed building should be fitted; but a well-protected dwelling-house was the exception, not the rule. Even when protectors were fixed, apathy led to their imperfect maintenance. Their failure to act was always traceable to the neglect of some simple rule. Telegraph and telephone wires which spread all over our towns and country were very much



exposed to the influence of atmospheric electrical effects. Every instrument was now protected; every telegraph pole had a lightning conductor. Accidents were rare, and the system itself was a public safeguard. In 1837 Cooke and Wheatstone showed how electricity could be practically used to facilitate intercommunication of ideas between town and town and between country and country. The first line was constructed in July of that year upon the incline connecting Camden Town and Euston-grove Station, the resident engineer being Sir Charles Fox, father of the senior vice-president. The pioneer line of 1837, a mile and a-third long, had since spread over the face of the earth to the extent of 1,111,366 miles. In this country we had always been in advance of other countries in telegraphic progress, and that was greatly due to the inventive genius of Cromwell Varley, a member of the Institution. With regard to submarine cables, no one had done more to improve their working than Lord Kelvin. His recording apparatus was almost universally adopted on long cables. By the duplex method of transmission the capacity of cables had been practically doubled, and this had been still further improved by applying to cables the system of automatic working. As for telephones, speech was now practically possible between any two post-offices in the United Kingdom. It was theoretically possible to talk with every capital in Europe, and it was practically possible for every house in the United Kingdom to speak to every other house. The progress of the use of the telephone in Great Britain had, however, been checked by financial complications. The introduction of electricity into our houses had added materially to the comfort and luxury of home, and was capable of indefinite extension. It was, however, in supplying us with light, without defiling the air we breathed in our dwellings with noxious vapour, that electricity had proved a true benefactor to the human race. The introduction of electricity into our lighthouses had not been such an unqualified success as in the case of our ships, chiefly owing to the prime cost of its installation and the annual expense of maintenance. The President also referred to electric traction, electro-chemistry, and other branches of electrical science, concluding that every engineer must ultimately become an electrician; and that electricity would be the most general, the most useful, and the most interesting form in which he applied the fundamental principles of energy to the wants, the comforts, and the happiness of mankind.

#### EXHIBITION OF THE COMPANY OF TURNERS.

THE exhibition of specimens of turning held last week at the Mansion House chiefly consisted of specimens of turned newels and balusters, tables and what-nots. In the section of wood the general design of the work and the execution has, from the judge's report, been maintained. No doubt in the latter point the work shows a high standard; but still there is the same want of adaptation of ornament and moulding in many of the designs we have had to complain of before. The first (prize silver medal and Freedom of the Company) is given to Wm. Gleeson, Cardiff, for some teak and walnut newels. Some of them are ribbed or fluted, and the square parts relieved by panels and turned ornament and carving. The latter is rather lumpy. The second prize (bronze medal and four guineas) is given to R. H. Isaac, Haggerston, for three sets of square pine balusters; very clean, with some nice mouldings. The third prize is won by C. A. Priest, Cannon-street-road, E., for circular mahogany frame table and newel. The spiral turning is not elegant in shape or outline. A fourth prize was won by J. Howard, Newington Butts, for square balusters and standards in deal, pitchpine, teak, and mahogany; the mouldings are good and very cleanly cut. The fifth prize to T. W. David, Cardiff, for a pair of doors and dado in oak, shows some design in the arrangement of the panels, which have circular mouldings on each. A mahogany what-not wins the sixth prize (J. Read, Finsbury), a very creditable piece of work; but the proportions and design are not good; the lower rails are very fragile. Other prizes are given to W. P. Williams, Newport, Mon., for spiral candlesticks and a pair of vases; to W. Willis, Haggerstone-road, for the same subject, and to Stephen Thwaites, Hastings, for turned profile rings and specimens.

The apprentices have done well, the first

prize being awarded to L. G. Seegar, Kingsland-road, for two mahogany flower stands; the second prize to Herbert Wilson, Coventry, for deal balusters, and four others are commended for balusters, table legs, and mouldings. The work shows careful execution, and in one or two cases skill in design. The amateurs also ought to be commended for the collection of exceedingly well-executed and interesting work in wood and ivory, amongst which we may mention the carved articles, trays and boxes, of the Rev. C. C. Ellison, Lincoln, and two other clergymen. In the metal exhibits there are few specimens that show any great advance.

#### THE CROWN THEATRE, PECKHAM.

A NEW theatre, embodying the results of good planning and many recent appliances, has been erected at Peckham High-street, and was opened last Monday with Mr. Wilson Barrett's performance "The Sign of the Cross." The Crown Theatre occupies a conspicuous site, with an area of 14,000sq.ft., placed between two side streets. Viewed from the street, it presents an imposing front of red brick and terracotta, the latter being confined to the upper arched part of the facade and to the angles and corner cupolas. The main block in front is unpierced by windows except two pedimented openings which light the balcony on the grand circle level. The entrance on the western side forms a recessed wing, and is entirely of terracotta, supplied by Doulton and Co., with relieved ornament on the spandrels of upper windows. Corner flat octagonal cupolas, with consoles at angles, emphasise the main front, which in its elaborate pierced parapet presents a Spanish Renaissance character. The auditorium abuts on the High-street, and the stage is placed from west to east in the rear, by which a great width of stage is given suitable for spectacular effects.

Leading from the crush-room, which is 20ft. by 19ft., panelled in oak with mosaic floor, we enter an antique saloon 35ft. by 21ft., decorated with real Flemish carved oak wainscot, a fine specimen of 18th-century wood-carving, with the walls over of a rich red flock. The orchestra- and pit-stalls are reached from the crush-room by a short wide staircase. There are 13 rows of stalls, with an emergency exit on the Stafford-street side, and there is a lounge under the orchestra. Ascending to the grand circle level by a flight of stairs, we pass a foyer 32ft. by 20ft. 6in., with open balcony along the main front. This is treated handsomely in a Renaissance style. The foyer for ladies is furnished in the Sheraton style, and there are several good retiring rooms adjoining. At the staircase end a lofty saloon of the dimensions of that below is seen, the dado and counter-front decorated with luminous vitreous mosaic, giving a rich mother-o'-pearl effect, and the walls are covered by a rich brocade paper, with a modelled frieze and ceiling. A few steps from foyer leads us to the grand circle tier, with eight rows of seats; a wide gangway, or lounge, with loggias at the angles for fire hydrants, &c., make a pleasing feature. Several roomy private boxes are provided, and two communication stairs to the stalls. The amphitheatre and gallery are reached from Stafford-street, and are of nine rows and two private boxes. A large saloon 26ft. by 21ft., and open balcony and lavatory accommodation are provided. Descending again, we find the pit is approached by a short flight of seven steps from High-street level, and there are seven rows of comfortable seats with backs upholstered in red plush. A large saloon decorated in a Japanese style is on the east with retiring rooms.

Mr. Ernest Rüntz, the architect, has been successful in his general scheme of decoration, which is bright without being tawdry; he has given a restful colour to the eye by his choice of tints, which may be described as a bluish or neutral green, with red-coloured draperies and upholstery in the same key. The circle and box-fronts are in two shades of ivory enriched by gold, with low relief ornamentation. The square auditorium ceiling looks strange, perhaps a little conflicting with the curved lines of centre fronts; but it is certainly unique, and the arrangement of the panels between radiating stiles and centre is pleasing, and produces a rich effect. The decoration is suggested by the "Imperial Crown" of the Queen-Empress and her dominions. We see the colonies represented in four panels, with cupids holding the crown over each. Other panels represent Art, Poetry, Music, and the Drama. A deep moulded cornice and stencilled

frieze runs round. The proscenium is also decorated in modelled plaster, with marble plinth and jambs, and there is a painted frieze and emblematic subjects introduced, designed by Mr. Charles Buchel, silver medallist of the R.A., whose work contrasts very favourably with other decorations of the kind. The auditorium has a width of 62ft. and a depth of 58ft., and the stage is 138ft. across and 40ft. in depth, while the grid is 62ft. above the stage-level. Mr. Isaac Cohen, past master in stage craft, is credited with the stage design and equipment. An inspection of this portion of the building shows a complete arrangement of the adjuncts and mechanical appliances, which are quite up-to-date. A very complete electrical installation by Messrs. Strode and Co., Osnaburgh-street, has been carried out. The stage entrance is on the prompt side, and there are eight large dressing-rooms, and on the O.P. side six dressing-rooms heated by hot water, lavatory basins, hot and cold supply, a paint room, with wells below the floor 26ft. deep, artists' rooms, and every facility for perfect production. The building is fireproof throughout; every tier and staircase is of fire-resisting materials. The exits and other construction details fully comply with the regulations of the L.C.C., two exits being provided (12 in all) to every part of the house. The constructional ironwork has been supplied and carried out by Messrs. Dennett and Ingle, Whitehall. Messrs. G. Jackson and Sons executed the modelled plaster-work. The general contractors are Messrs. Colls and Sons, of Coleman-street, the architect being Mr. Ernest Rüntz. The ventilation is effected by electric exhaust fans, and low-pressure heating with radiators is employed.

#### ENGLISH, FRENCH, AND GERMAN HALL FURNITURE.

THE German Cabinet here shown differs somewhat in detail from the more usual examples of its class, and the panels of the cupboards are enlivened by figure-subjects. The French Table, from South Kensington Museum, is in walnut, and belongs to the second half of the 16th century. It is an uncommonly graceful and admirable design. The 18th-century English Settee, also in walnut, is so thoroughly characteristic of its time (1760-80) as to need no description. The large balls to the eagle-claw feet are bigger than usual, and the shells carved at seven points on the forepart of the piece additionally emphasise its florid character.

#### CHIPS.

The Newton Abbot Rural Council have adopted estimates and plans for a reservoir, to hold 60,000gals., and the necessary pipes to supply Kingkerswell with water. The estimated cost is £1,900.

A new stained-glass window has just been added to St. George's Roman Catholic Cathedral, Southwark, as a memorial of the centenary celebration of St. Augustine at Ebbs Fleet and Canterbury last year. It contains portraits of Cardinal Vaughan, Cardinal Perraud, the Duke of Norfolk, Bishop Bourne, the Abbot of Ramsgate, and others who were present on the interesting occasion. The window, designed by Mr. F. A. Walters, F.S.A., was presented by Mr. and Mrs. E. B. Lavery. Another, to complete the seven required in the south aisle, is about to be erected by Alderman Sir Stuart Knill, an ex-Lord Mayor of London. Messrs. Hardman and Co. are preparing the designs.

A new church of St. Barnabas is about to be built at Peterborough. Mr. W. Boyer, of that city, is the architect; and Messrs. Thompson and Sons, of Peterborough, are the builders.

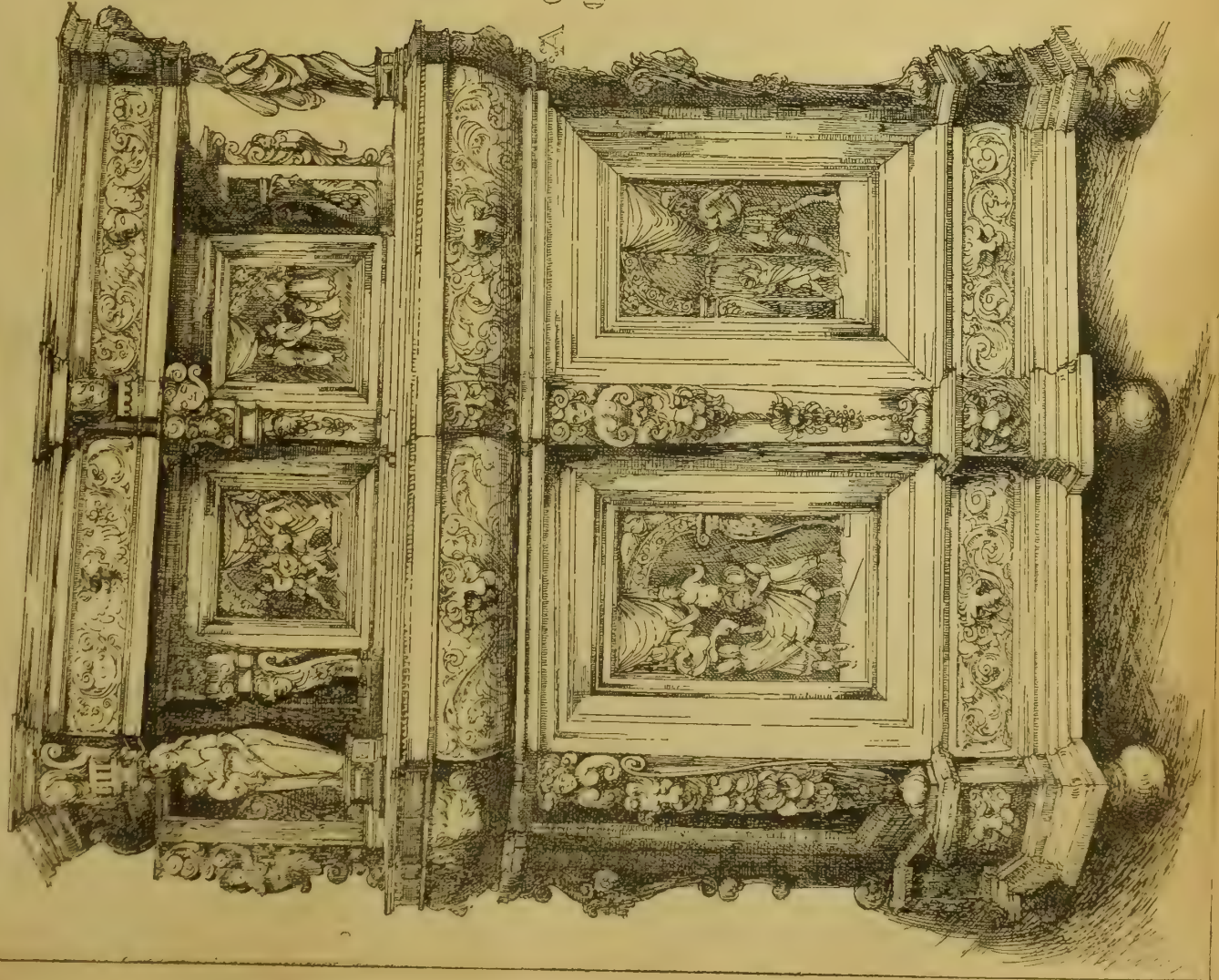
The urban district council of Burnham, Somerset, have unanimously resolved to extend the new sea front from the pier further northwards to the point near Catharine-terrace, instead of to the church. This scheme involving a further outlay of £2,000, making in all £9,000, it has been decided to petition the Local Government Board to grant the extended loan without further public inquiry.

The Archbishop of Dublin presided at the re-opening of St. Teresa's, Clarendon-street, Dublin, last week. The church has undergone thorough repair and decoration, under the supervision of Mr. W. H. Byrne, of Dublin.

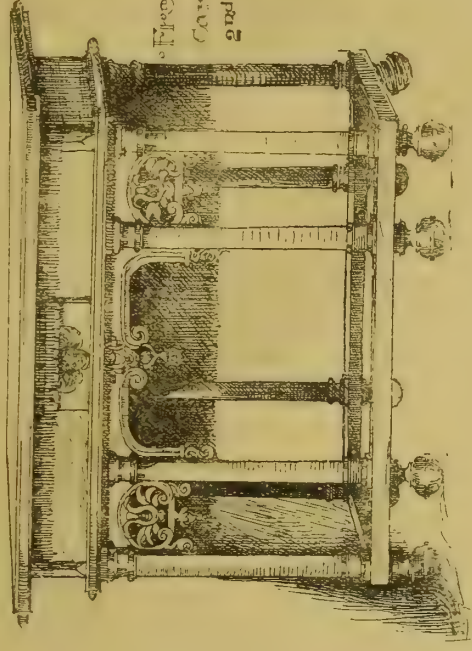
The new Roman Catholic cathedral at Westminster, now in course of erection from Mr. J. F. Bentley's designs, will be completed before long. The cathedral itself, which is Basilican in character and constructed of brickwork, will hold 10,000, and seat 8,000. Internally it will be 100ft. high, 350ft. long, and 170ft. wide.



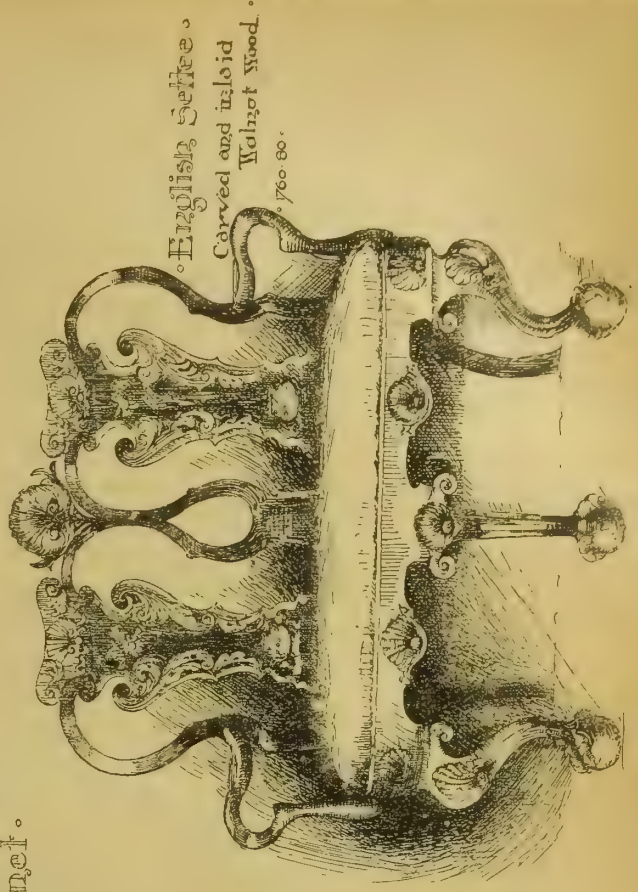
GROUP OF HALL FURNITURE.



A German Cabinet.



French Table.  
Carved Walnut  
good half century.

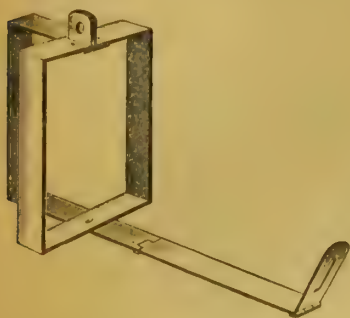


English Settee.  
Carved and inlaid  
Walnut wood.  
760 80.

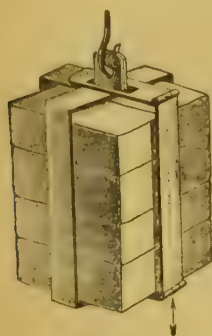


## THE PHOENIX BRICK-CARRIER.

THE diagram will at once show the handiness and value of this idea, which is also adaptable for tiles and slates. Rope-tying is certainly



not safe, and, moreover, the time wasted in adjusting slings will more than repay the slight cost of the carrier. Many a contractor—especially if frequently engaged in building tall chimney stacks or lofty structures—will save the price of the carriers a thousand times by escaping the penalties of the Employers' Liability Act. The carrier is



the invention of Mr. George Phoenix, of Wolverhampton, and it is made by Messrs H. Fearncombe and Co., of the Phoenix Works, Wolverhampton.

## CHIPS.

The parish church of Thorneage, Norfolk, has just been restored. The walls of the chancel have been rebuilt, a new roof covered with Broseley tiles placed over nave, the stonework of windows has been reconstructed where necessary, and a new pulpit, lectern, credence table, seating, and other fittings supplied. The chancel fittings and pulpit were carried out by Mr. E. Chapman, of Hanworth. Mr. Blyth, of Foulsham, was the builder, and Mr. Lacey, of Norwich, the architect.

On Sunday morning there was dedicated at Troutbeck Church a stained-glass window, erected to the memory of the late Mr. Daniel Irvine Plattely, of Windermere and Longsight. The window represents the Ascension, and has been carried out from designs by the late Sir E. Burne-Jones.

A stained-glass window in memory of the late Professors Candlish and Drummond was unveiled on Friday in the Free Church College, Glasgow, by Professor Bruce. The window, which is in three divisions, has been executed by Messrs. Guthrie and Wells, Glasgow, under the direction of Mr. J. J. Burnett, architect. It is intended to typify collegiate instruction. In the centre are Classical figures representing students and teachers. On the left is a building representing a university of science, and the right division has a representation of a school of theology.

The county council of Ross and Cromarty have agreed to construct a new road from Kyle to Balmacara, in the vicinity of the terminus of the Dingwall and Skye Railway, the length of which will be three miles, and the estimated cost £5,000. The existing road is of a circular nature, over seven miles in length, besides being most dangerous. It was also decided to construct a few iron bridges at different points in the island of Lewis at a cost of £1,214.

Works of restoration have just been carried out at Saxlingham Church, Norfolk. The walls have been re-stuccoed, a new roof placed on nave, and a pulpit, altar-table, and sanctuary supplied. Messrs. Cornish and Gaymer, of North Walsham, were the builders, and the pulpit and chancel fittings are the work of Mr. Chapman, of Hanworth.

## OBITUARY.

MR. J. LATIMER CLARK, F.R.S., whose death occurred suddenly on Sunday from an affection of the heart, was intimately associated with the development of our present system of electric telegraphs and submarine cables. Born in 1822 at Great Marlow, he gained his first practical experience in railway engineering, being appointed in 1847 resident assistant engineer under Robert Stephenson at the building of the Britannia and Conway tubular bridges. He next entered the employment of the Electric Telegraph Company, and from assistant engineer rose to be engineer-in-chief. In this capacity he superintended the construction of much of the telegraphic system of this country, and in 1854 introduced the device of pneumatic despatch tubes for the transmission of messages, now extensively used by the Post Office. As a member of the committee instituted in 1859 by the Government to inquire into the causes of the numerous failures of submarine enterprises, he was of great assistance to the cause of oceanic telegraphy, and he prepared a supplementary report on the determinations of the laws of electric currents in submarine cables which embodied the results of his own practical experience and experimental work. In 1860 he entered into partnership with Sir Charles Bright, and many of the cable enterprises carried out during the ensuing ten years were under their supervision as consulting engineers. A joint paper by them, contributed to the British Association in 1861, was the means of putting electrical measurement on a firm basis. After it had been read, Sir William Thomson, now Lord Kelvin, obtained the appointment of a committee to devise a national system of electrical units, and the result of its labours was the absolute system now in universal use, the terms volt, ampere, ohm, &c., being adopted according to suggestions made in Bright and Clark's paper. The "Elementary Treatise on Electrical Measurement," which has become a standard work, appeared in 1868, and a few years later Mr. Clark, in conjunction with Mr. R. Sabine, published "Electrical Tables and Formulae." In 1873 he devised the Clark standard voltaic cell, which has proved of great value in promoting accurate measurements of electrical potentials. Mr. Clark was deputy chairman at the St. James's and Pall Mall Electric Light Company, and as a partner in the firm of Clark, Ford, and Taylor had to do with the manufacture and laying of thousands of miles of cable in various parts of the world. One of the founders of the Society of Telegraph Engineers (now the Institution of Electrical Engineers), he became the fourth president of that body in 1875. He was elected a member of the Institution of Civil Engineers in 1858, and of the Royal Society in 1889.

MR. WILLIAM W. BOYINGTON, one of the first architects to settle in Chicago, Ill., died in that city, October 16. He was a native of Massachusetts, but went to Illinois in 1853. Besides a number of churches in that city, he had designed the old University of Chicago and Observatory, the Female Seminary at Hyde Park, the Rock Island and Northwestern depots, the Sherman House, the Gardner House, the Grand Pacific Hotel, and the Illinois Building at the World's Fair. The extent of his work is indicated by a statement he is reported to have made that if all the buildings he had constructed were placed side by side they would reach a distance of thirty miles. One of his achievements was the construction of the Lake Front Exposition building in 90 days. The contract required that the building should last two years, and at the end of twenty years it was difficult to tear it down.

The fine 13th-century church of Montluel, in the Rhone Department, collapsed on Sunday week, as the result of heavy rains undermining the foundations, and is now an absolute wreck.

The Board of Trade have confirmed the provisional order granted by the Light Railway Commissioners for the making of the Isle of Axholme light railway. The line will, by means of various branches, connect Epworth, Haxey, Crowle, Luddington, and Hatfield, and will have a branch giving connection with the Goole and Marshland line, now in course of construction, by a junction at Swinefleet, which is connected with the Goole and Doncaster railway of the North-Eastern Railway Company. An inquiry into the application was made last February by Lord Jersey and his colleagues on the Commission.

## ARCHÆOLOGICAL.

RECENT ANTIQUARIAN DISCOVERIES AT CHESTER. —The Chester and North Wales Archæological Society opened its session on Tuesday week, when a fair company assembled at the Grosvenor Museum, Chester, under the presidency of Archdeacon Barber, to hear a paper by Mr. R. Newstead, F.E.S., on recent archæological discoveries in the city. The excavations have been in Love-lane, Stocks-lane, Hunter-street, and on the premises in Eastgate-street belonging to Mr. Geo. Dutton. Dealing generally with the different strata and their deposits, the lecturer said the objects which first called for attention were the numerous and varied fragments of pottery belonging to the Elizabethan period, consisting for the most part of the common black glazed many-handled drinking cups, glass wine-bottles, and odd examples of the earliest-made tobacco-pipes. Also here and there met with were encaustic floor tiles, probably the remains of one of the ecclesiastical buildings of the city. These Medieval remains were superposed upon the Roman relics. Immediately superposed upon the Roman remains the archæologist generally expected to find a stratum of earth containing Saxon remains, but no Saxon remains had come under his observation, and they were only occasionally met with in Chester. In the lowest stratum the evidences were found of Roman Deva. They consisted chiefly of architectural fragments in the form of roofing tiles, bricks, pottery, and various types such as Upchurch and the red glazed Samian ware, fragments of glass, a few coins, and various objects in bronze. Had the site of Roman Deva been preoccupied by the Celts or prehistoric people, there would probably be evidence of their existence in the form of stone and bronze instruments characteristic of the period, but with the exception of a single relic of doubtful origin there was no evidence which was reliable. Describing then the several "finds," the lecturer said the relics from Love-lane were of a very broken character and little importance, but several objects from Hunter-street were of great interest. They consisted of a part of a weighing apparatus resembling modern steel-yards, a lead hand-lamp, and a few interesting bronzes. The objects found on Mr. Dutton's premises in Eastgate-street included a Roman wooden spade, an object 14in. long and 8in. or 9in. wide, and resembling the modern shovels used by bakers. Originally, it had a haft fitted into it in a curious fashion, but this was missing. It was made of oak, and was almost identical with two examples found on the borders of Shropshire two years ago in some old lead workings. Several objects in bronze were found there, the most perfect being a fibula or brooch, and a miniature bell shaped something like an umbrella. There were also a piece of Roman herring-bone pavement and a fine glazed jar of the Medieval period. The lecturer then dealt with the Roman structure which remains *in situ*, and expressed the opinion that it might have been used for the storage of wine, seeing that it had a layer of clay and fine sand, which might have received the pointed bases of the wine jars or amphoræ which were extensively used in the Roman period, and of which there had been found so many broken examples. The finds in Boughton included a cinerary urn and tear-bottle.

The annual report of the Metropolitan Industrial Dwellings Company, Limited, states that a "valuable building site in Park-walk, Chelsea, has been secured, and extensive buildings of a similar style to Holbein House are now being erected thereon. The design provides for about 500 rooms, divided into two, three, and four room suites, and it is hoped that the first portion may be finished ready for letting early next summer."

The General Purposes Committee of Brighton Town Council has agreed to plans by which great improvement will be effected at the Brighton Aquarium. The property has been for a long time in the market, and at length it has been acquired by a syndicate, who propose to form a Winter Garden on the site. Negotiations have been in progress, and an agreement has been arrived at under which five thousand superficial yards will pass into the possession of the town, enabling the Marine Parade to be widened by 20ft. from the new pier to the site of the toll houses of the old Chain Pier.

The corporation of Glasgow will promote in Parliament next session a Bill for the Valuation and Taxation of Land Values in Scottish Burghs. The Secretary for Scotland will be asked to take the Bill up as a public measure.



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## ILLUSTRATIONS.

HOUSES, COTTAGES, AND SHOPS AT PORT SUNLIGHT.—NEW ROOF AND CHANCEL SCREENS, CHURCH OF ST. PETER, SHORWELL, ISLE OF WIGHT.—NEW PREMISES, CXXVII., CHARING CROSS ROAD, W.C.—GERMAN, FRENCH, AND ENGLISH FURNITURE.

## Our Illustrations.

## BUILDINGS AT PORT SUNLIGHT, CHESHIRE.

ONE of the most complete settlements erected in modern times is the village at Port Sunlight, where the proprietors, Messrs. Lever Bros., have built some three hundred and twenty-eight houses already, in occupation by a population of between 1,500 and 1,600 persons, all of whom are engaged at the works hard by. At the present time 112 houses in various stages of completion are in hand. The distinguishing feature beyond the notable extent of the undertaking is the picturesque and varied character of these buildings, several leading architects having been engaged by the proprietors for the preparation of the designs thus realised or about to be put in hand. Among these we may name Messrs. Ernest George and Yeates, Douglas and Minshall, Ernest Newton, William Owen, Lockwood and Sons, Maurice B. Adams, Edmund Kirby, E. J. Lutyens, Grayson and Ould, and others. Such a list of well-known names is a sufficient guarantee of the architectural quality of these dwellings and various village buildings thus deserving of mention in connection with the series of illustrations which we commence to-day in the BUILDING NEWS. The estate comprises 200 acres, of which 60 acres are reserved for the factories and works. Portions of the village have been set apart for recreation grounds, and also a park. One feature of this industrial homestead is that every villager desiring it can have an allotment garden—an advantage of which the majority of the tenants have availed themselves. The promoters have adhered to the principle of "prosperity sharing," with which the scheme was inaugurated some few years ago, and this practical method of mutual advantage takes the form of building each year a certain number of cottages, which are let to the workpeople at low rentals, so as to provide for the payment of rates, taxes, cost of maintenance and repairs without providing any direct return on the capital expended on erecting the houses, or sunk originally in the purchase of the land. The roads are set out in picturesque contours, and are enriched by well-established trees, some of the older poplars, oaks, and plantations, all of which are well preserved, being part of the historic estate on which this interesting colony has been developed. The accompanying views will afford our readers a good idea of the old-world character which has been imparted by the methods and men employed in realising this very up-to-date and prosperous undertaking. Besides the houses of varying accommodation for the different classes of artisans, there are dwellings for clerks and other employés. A big school has been built for boys and girls, and another for infants. The large central hall of these educational buildings, of which Messrs. Douglas and Fordham were the architects, has a chancel at-

tached to it, and divided off by a movable partition, so that regular church services may be held on Sundays and festivals. A clock-tower and spire attached to this group add quite an ecclesiastical character to the design. There is a stone-built bridge, recalling some artistic historic example, leading to Bridge-avenue, and the village Institute, where entertainments are held, makes another quaint addition to the place, to say nothing of its popularity. The cricket pavilion and club, too, make very prettily designed buildings, and the village shop, also in the half-timbered style, must be mentioned. We give a view of it, and plans of the adjoining cottages, as well as the plans of some others, which are illustrated. We shall give further drawings shortly.

## NEW ROOF AND SCREENS, CHURCH OF ST. PETER, SHORWELL, ISLE OF WIGHT.

MOST visitors to the Isle of Wight know the church of St. Peter at Shorwell, as it practically abuts on the coach road between Ventnor and Freshwater. In 1896 the vicar consulted me about the state of the roof, which, on inspection, I found so rotten that a new covering to the church became absolutely and immediately necessary. In designing the new roof I have kept it open to the ridge, thus increasing the height of the church—a great gain artistically. It is oak throughout, with the exception of the boarding, which is of deal, with oak moulded fillets to cover the jointing. The chancel tie has been made into a rood beam, the detail of which speaks for itself. The two kneeling figures represent the archangels Michael and Gabriel. The corbels of Sin and Death supporting the beam are carved, the one in Irish limestone, the other in Hopton Wood, partly polished. The screens inclosing the north court and west court chapels are not yet in position. They are to form memorials to the Leith and Gordon families. Mr. Jenkins, of Newport, I.W., was the contractor for the work, and the carving has been admirably carried out by Messrs. Nicholls, of Wincott-street, S.E., a successful endeavour having been made on their part to break away from the commonplace, according to my desire. The drawing was exhibited in this year's Academy. PERCY G. STONE.

## NOS. CXXVII.—CXXLI., CHARING CROSS ROAD, W.C.

THESE new premises have recently been erected in Charing Cross-road. The site has a frontage of about 53ft. and a depth of about 40ft. The materials used are Portland stone and red brick facings, and the roofs are covered with green Westmoreland slates. As to the exterior, the ground and first floors have been grouped together, and an attempt has been made to make this portion as bold as possible; they serve to indicate the show-rooms. Above are the offices and store-rooms. The outlay has been somewhat over £5,000. The general contractors were Messrs. E. Lawrance and Sons, who have most efficiently carried out the design. Mr. Gilbert Seale is responsible for the carving to the main cornice. Messrs. Waygood supplied the hydraulic lift. The N.A.P. Window Company supplied the steel casements. Mr. Banister F. Fletcher, A.R.I.B.A., is the architect.

A stained-glass window is about to be placed in St. Mary Stoke parish church, Ipswich, as a memorial of the late rector, the Rev. Canon Bulstrode; the artists are Messrs. Heaton, Butler, and Bayne, of Garrick-street, Covent Garden. A movement is on foot for building for the same parish a parochial room and mission chapel in brickwork at the corner of Luther and Rectory roads, on a site given for the purpose.

A special meeting of the Motherwell Town Council had before them, on Friday, the question of laying down an installation of electric light within the burgh. The committee submitted a report by Professor Alexander B. W. Kennedy, who has been retained by the burgh. The total capital expenditure is calculated to be over £23,000, the scheme providing for private lighting thirty arc lamps and 400 32 candle-power incandescent lamps for street purposes, and for power for mechanical purposes. After some discussion the report was adopted. The works will be proceeded with at once.

The Barrow-in-Furness Tramways Company, Ltd., have agreed to sell their undertaking to the British Electric Traction Company Limited, for the sum of £22,750; but before they can complete the transfer the corporation of Barrow have a statutory right of refusal to buy at the same price. The tramways, which are six to seven miles in length, originally cost over £60,000.

## COMPETITIONS.

**BRISTOL.**—The directors of the Colston Hall Company fixed Saturday in last week as the final day for receiving the names of architects who desired to enter into the competition for the premium offered for designs for the reinstatement of the large hall, and about 130 applications were received. The directors have appointed a vice-president of the Royal Institute of British Architects to be their assessor and adviser in the restoration of the building, and to aid them in the selection of the most approved plans. Visits have been paid by a sub-committee of the board to the best-arranged halls in London and the provinces, with the aim of making the restoration of Colston Hall as perfect as possible, both as regards the arrangement of the seating accommodation (so that everyone may see and hear), ventilation, and means of egress and ingress. It is stated that the directors have received prospectuses and particulars of nearly every patented invention up to date, more especially with regard to fireproof materials, and in the work of reinstating the hall their attention will doubtless be directed to making the building as nearly fire-resisting as the present state of invention in that direction renders possible.

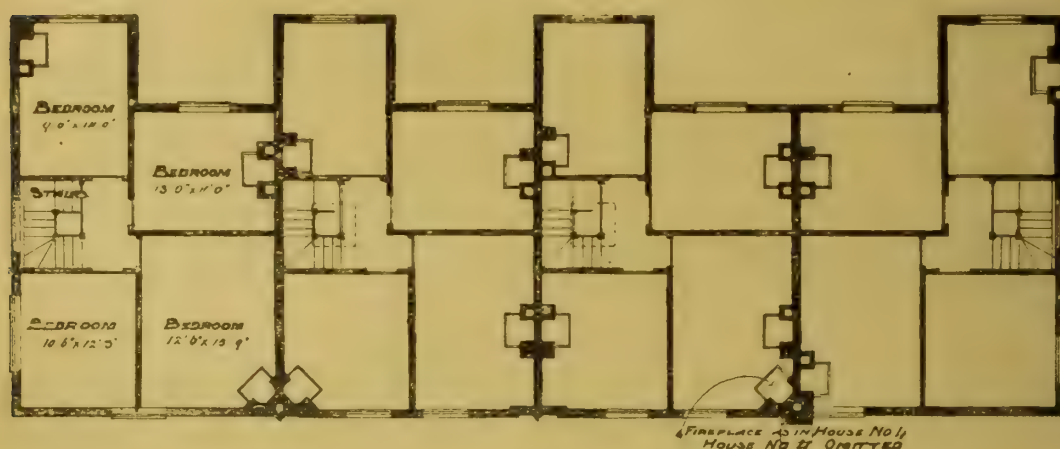
**GODALMING.**—A limited competition has been held for new municipal buildings to be erected on the site of the present town-hall, which is to be incorporated in the new group of buildings, which will include a court-house, with rooms for the magistrate and officials, as well as parochial offices. The council-chamber will be on the first floor, with committee-room and offices for the town clerk. The scheme also includes a fire-engine station and men's quarters. £7,000 is the limit of the outlay. The choice has been made of the premiated designs from eight sets of plans submitted; but Mr. A. H. Tiltman, who was among the invited architects, did not prepare a plan. Messrs. Lanchester, Stewart, and Rickards are awarded the first place, Mr. E. R. Robson, F.S.A., was awarded the second premium, and Messrs. Ardron and Dawson the third place. The chosen design is to be in brick, with stone cornice and wooden windows set within brick architraves. The centre part of the façade is in stone, enriched by a loggia of Doric columns, with Ionic shafts flanking the first-floor windows, the whole being surmounted by a simply-designed pediment. The skyline will be broken by a lead-covered turret, boldly treated. A projecting clock will stand out over the pavement. Mr. E. W. Mountford acted as assessor.

**WOLVERHAMPTON.**—The Wolverhampton Board of Guardians again considered on Friday the plans for the new workhouse, which is to be erected at Wednesfield. Several letters were read from the architects who had submitted competing plans for the workhouse. Mr. Marshall referred to what he called indirect canvassing of members of the board, as in his opinion such conduct was of an underhand and unprofessional character. Mr. Berrington, in his letter, stated that he had never said a word reflecting on the decision of the assessor (Mr. T. W. Aldwinckle) or Mr. Marshall, and he protested against the suggestion that in order to obtain assistance he had circulated damaging statements. Mr. Aldwinckle, the assessor, wrote supplying more details as to the plans, and the clerk informed the board that that morning the new workhouse committee had held a meeting, when the members passed a resolution confirming their recommendation to the board to employ as architect for the new workhouse Mr. Arthur Marshall, of Nottingham, whose plans bore the motto "North and South," the estimated cost for carrying out the work being £129,000, though it was believed, according to a statement of the clerk, that the amount could be reduced by £12,000. The adoption of the report having been proposed and seconded, a long discussion followed. Mr. Norbury was of opinion that a new workhouse ought to be erected for £50,000, and he moved that the whole of the plans be rejected. Further resolutions were submitted that the plans of Messrs. Mangnall, Littlewood, and Johnson, Mr. F. T. Beck, and Mr. R. E. W. Berrington be accepted. On votes being taken, Mr. Berrington's plans were rejected by 18 votes to 9; Mr. Beck's by 19 votes to 7; Messrs. Mangnall, Littlewood, and Johnson by 19 votes to 6; and Mr. Norbury's motion, in favour of the whole of the plans being rejected, by 21 votes to 4. The recommendation of the workhouse committee, in favour of Mr. Marshall's plans, was then adopted unanimously.



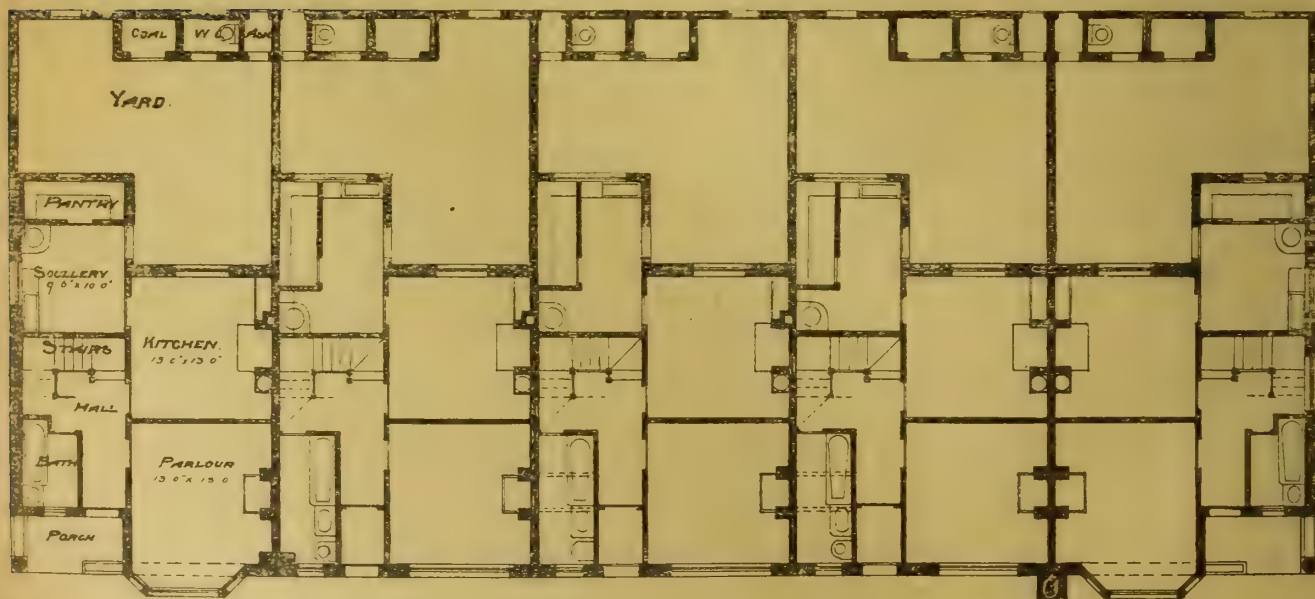


BLOCK OF TWO WORKMEN'S HOUSES AT PORT SUNLIGHT.—For MESSRS. LEVER BROS., LTD.



FIRST FLOOR PLAN

feet 10 15 20 30 40 50 60 70 80 90 100



GROUND FLOOR PLAN.

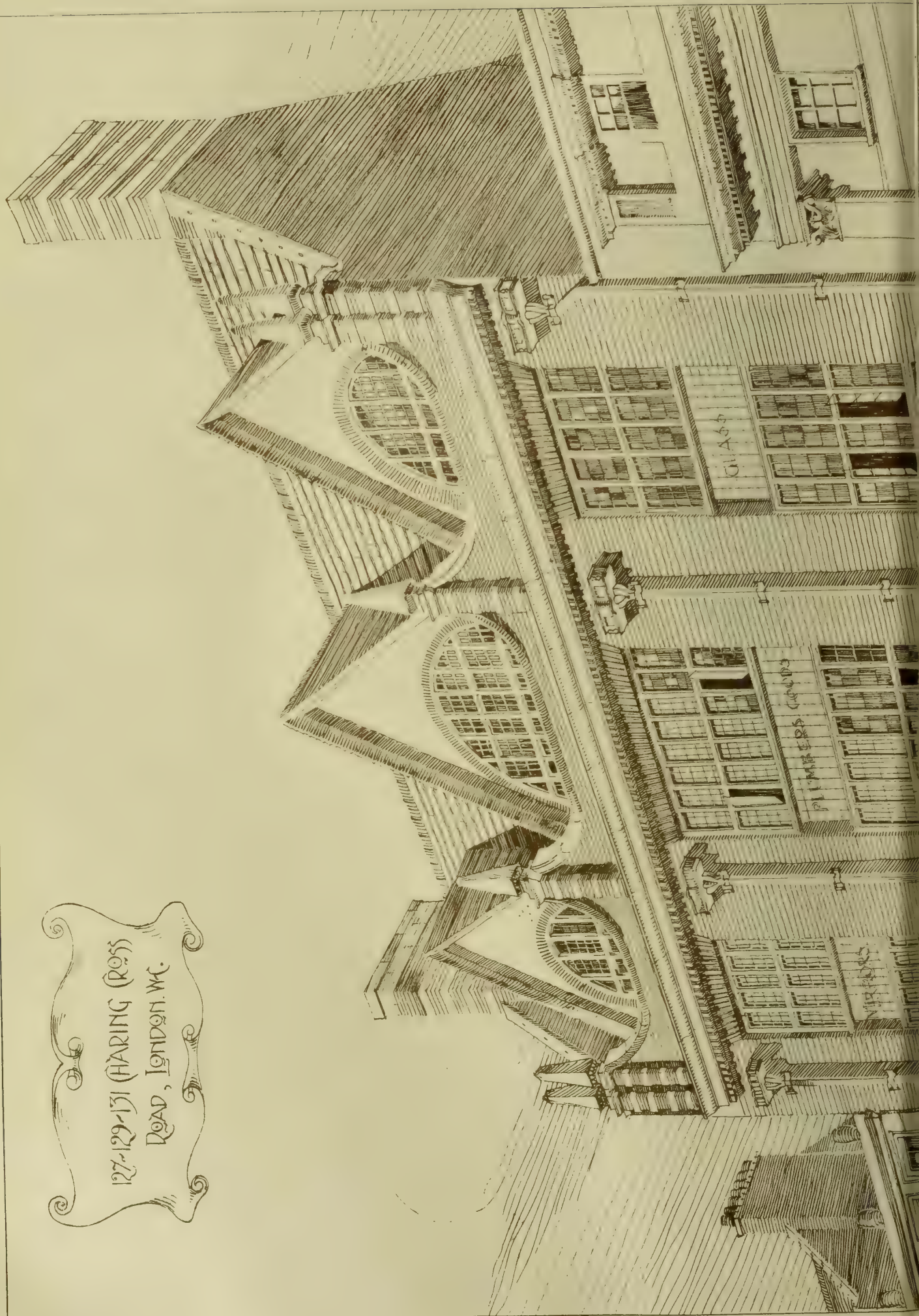
BLOCK OF FIVE CLERKS' HOUSES AT PORT SUNLIGHT.—For MESSRS. LEVER BROS., LTD.



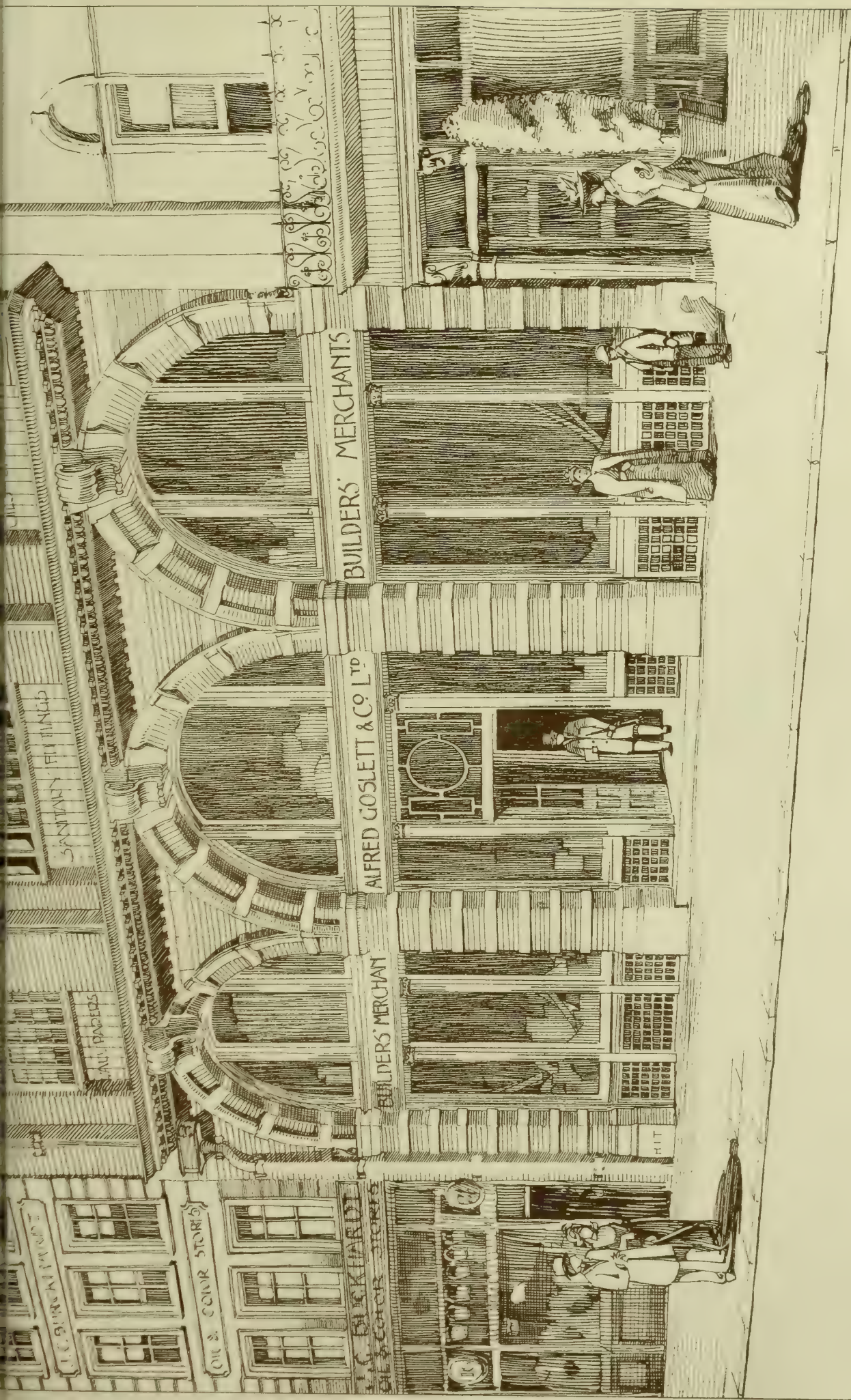




127-129-131 HARING ROAD,  
LONDON. W.C.

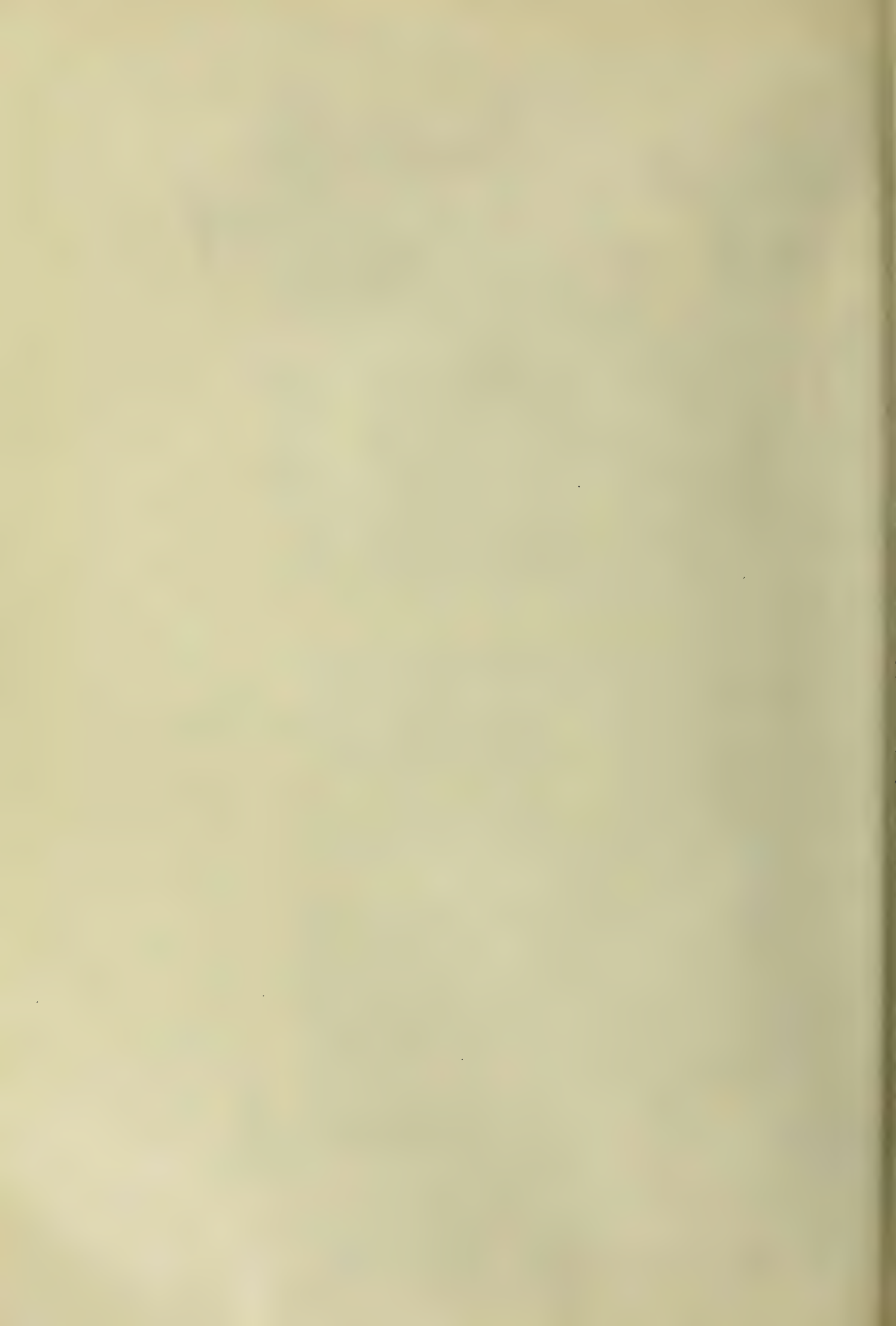






Builders' &  
Merchants  
Agents.













Church of St Peter  
New roof and gables



Nov. 4. 1895.



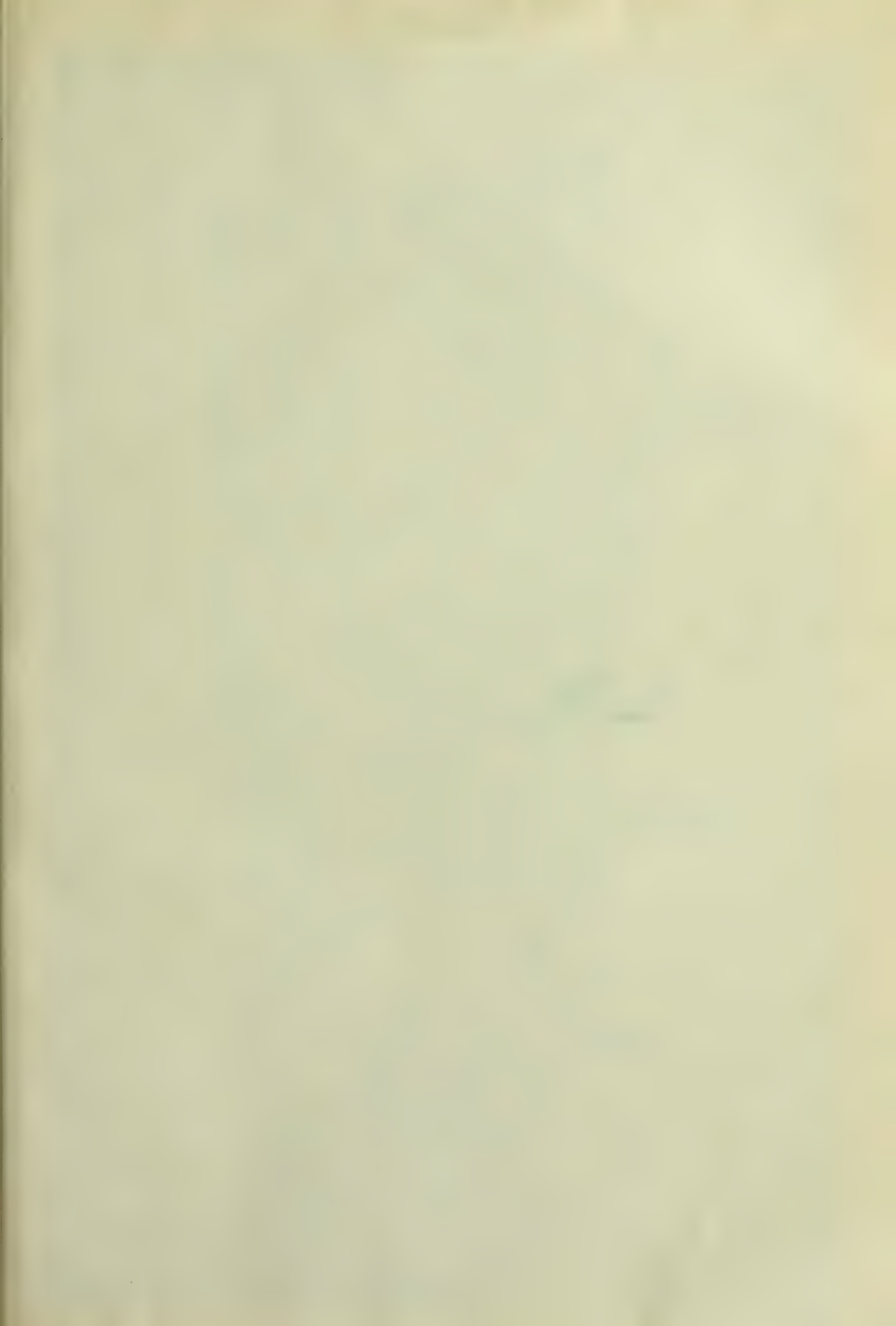
Mr. Shortwell's  
Chancel Screens.

PERCY STONE ARCHT











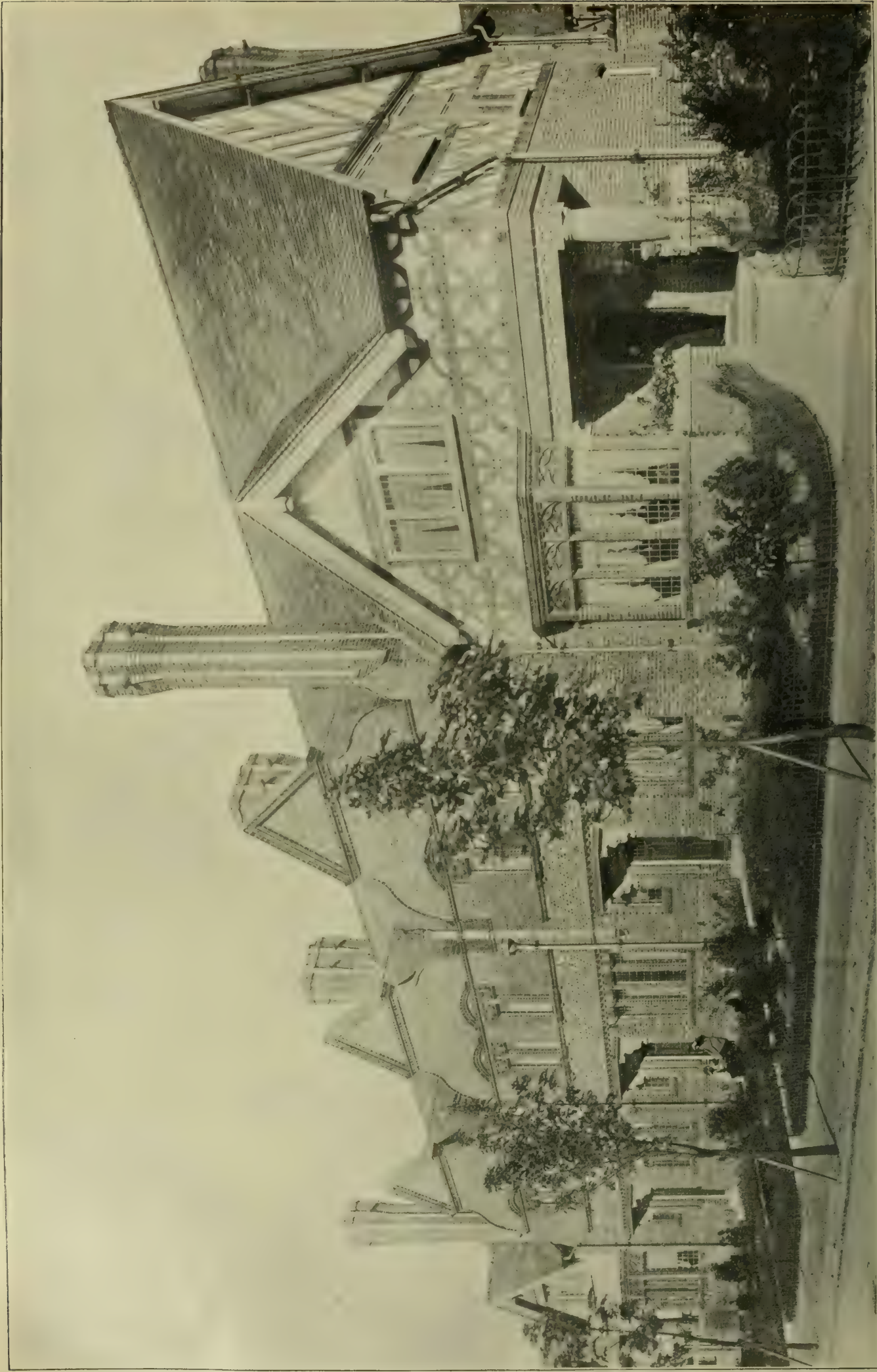


BRIDGE COTTAGES, PORT SUNLIGHT.





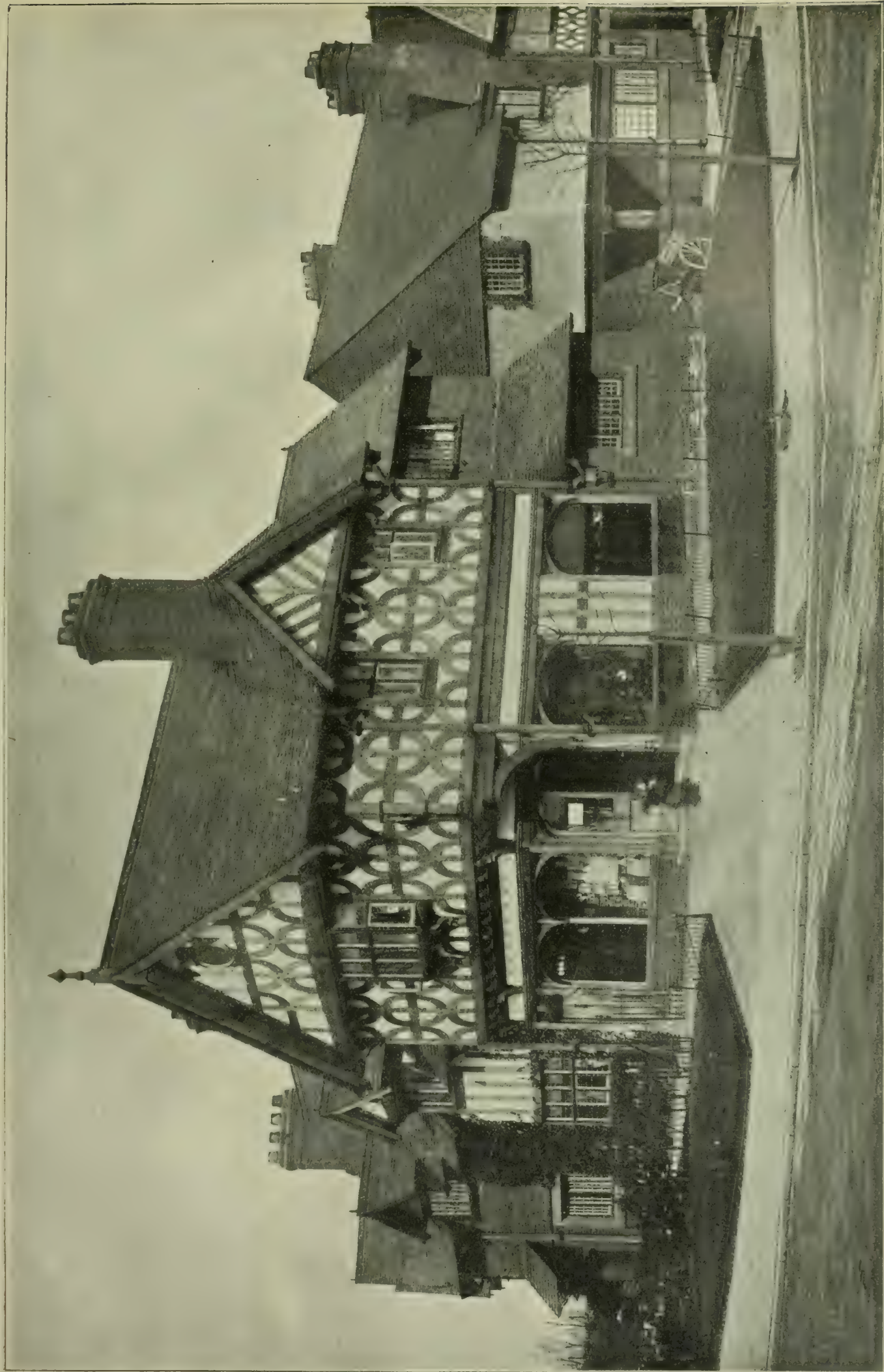




CLERKS' HOUSES, PARK ROAD, PORT SUNLIGHT.

WILLIAM OWEN, ARCHITECT.





THE VILLAGE SHOP, PORT SUNLIGHT.

GRAYSON & OULD, ARCHITECTS.









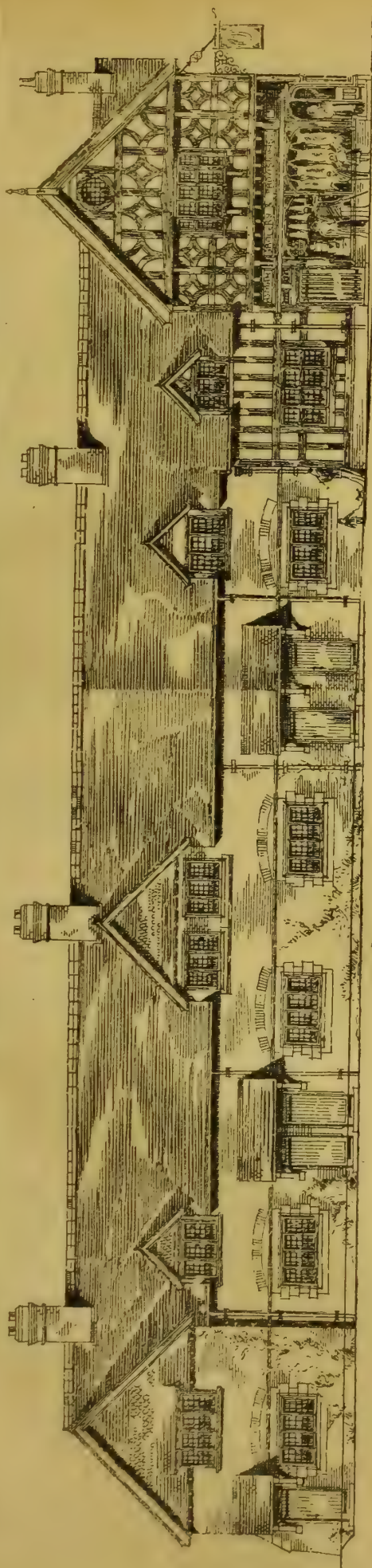
WORKMEN'S HOUSES, PARK ROAD, PORT SUNLIGHT.

WM. OWEN, ARCHITECT.









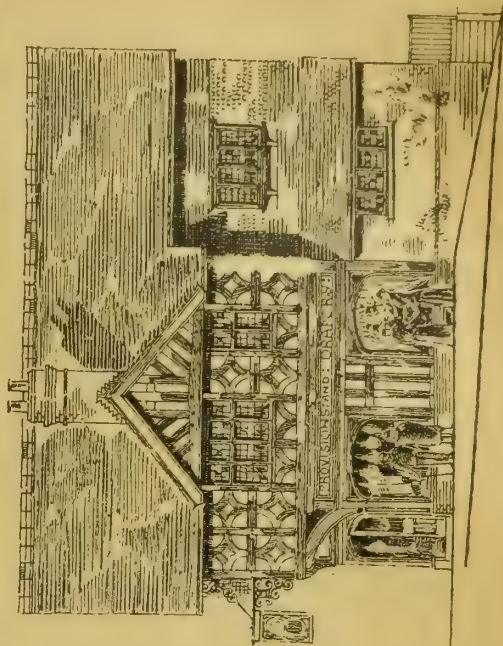
Front Elevation

VILLAGE SHOP and COTTAGES

PORT SUNLIGHT

Scale 0 10 20 30 Feet

© Grayson and Gould Architects Liverpool



First Floor Plan

Ground Floor Plan



## Building Intelligence.

**ALL HALLOWS, BARKING.**—At the dedication festival of All Hallows, Barking-by-the-Tower, the Bishop of London unveiled the east window, which has been filled with stained glass in memory of Canon Mason, the former vicar. All Hallows is one of the few buildings in the City which survived the great fire. As the result of an inspection made by the late Mr. J. L. Pearson, R.A., in 1892, a great deal has been done during the past few years. The masonry and windows of the north aisle have been completely renovated, and the chancel portion of the great central roof has been restored in accordance with earlier design. Altogether about £8,000 has been spent on the restoration of the building.

**BREAD-STREET, E.C.**—St. Mildred's Church, Bread-street, E.C., was reopened on the 27th ult., after having been closed for over two years, a thorough structural repair of the fabric and a general repair of the interior having been commenced in June, 1896. While the repairs were in progress the whole of the church except the vaults had to be excavated to a depth of 16ft., and 470 cases of coffins and human remains were taken to Brookwood Cemetery, Woking. After their removal a floor of steel girders and concrete was laid over the whole of the church, and all the repairs intended were completed, the whole of the expense being defrayed from funds provided by the Charity Commissioners. The works were carried out under the supervision of Mr. Charles Innes, architect, by Messrs. Dove Bros. The organ has also been overhauled by Messrs. Gray and Davidson, and the electric light introduced. The present church took the place of the building, dating from about 1300, which was destroyed at the Great Fire. It is, though small, one of Sir Christopher Wren's finest examples of church interiors, and was completed about 1683. It possesses a large and enriched dome of good proportions.

**BRISTOL.**—The new High Grade Board School in Fairfield-road was opened last (Thursday) evening by Sir George Kekewich, secretary of the Education Department. The range of buildings has been erected on a three-cornered site on the sloping ground of a hill, the mixed school, science school, and infants' school being grouped in triangle fashion, so as to leave a small playground in the centre and larger playgrounds in two of the angles of the land. The external masonry is of Pennant stone, relieved by red brick window and door-openings, and terracotta decorations. The mixed school has a central hall 62ft. by 30ft. on the ground floor, and a similar apartment on the floor above. Round these rooms are grouped a series of classrooms, and there are also teachers' rooms, store-room, cloak-room, &c. The science school is provided with chemical and physical laboratories, apparatus-room, and lecture and drawing-rooms, while beneath the science floor there is a large workshop. The infants' school has a central hall 50ft. by 24ft., with four classrooms and a teachers' room opening out. In all, the school is designed to accommodate 1,054 pupils, and the total cost, including site, buildings, and equipments, has exceeded £20,000. The designs for the buildings were furnished by Mr. W. L. Bernard, F.R.I.B.A., of Bristol, and Mr. John Perkins, of Redland, was intrusted with the contract.

**HIGHGATE HILL.**—The Old Crown Inn, opposite St. Joseph's Retreat, has within the last week closed its doors, and transferred its business to a new structure which has been erected on the site of the tea-gardens facing Hornsey-lane and Highgate-hill, where in the last century the first Crown Inn originally stood. The new building, which has been designed by, and carried out under, the direction of Mr. G. Gard Pye, of St. Olave's House, Ironmonger-lane, E.C., has been planned with a view of catering among others for the large number of visitors frequenting Waterlow Park, whose principal gate faces the new building, the accommodation of which includes saloon, private and public bars, refreshment and billiard-rooms, and an assembly hall. The site was a difficult one to build on, there being about 12ft. difference between the levels of Hornsey-lane and Highgate-hill, and running sand was encountered during the progress of the excavations for the foundations. The style adopted is Gothic, freely treated. The dismantled Old Crown is to be converted into a private residence.

**MARYLEBONE.**—The foundation-stone of the

new front blocks of the St. Marylebone Workhouse was laid on Monday. The site is in the Marylebone-road, immediately facing Tussaud's Exhibition. The new block, which will cost about £52,000, has been designed by Mr. A. Saxon Snell, F.R.I.B.A. The buildings comprise two double ward blocks, connected on the ground floor and basement. Each block will be three stories in height above the ground floor, with a fourth story over the centre part. The top and third floors will contain wards and day-rooms for infirm men too feeble to leave them. The roofs over the wings will, however, be flat, and available for such of those inmates as may be able to take advantage of them. The second floor will contain dormitories only, and the first dormitories and two large day-rooms. The outer wing of both blocks will contain on the ground floor accommodation respectively for male and female imbeciles and lunatics, the inner wings being divided into two large general day-rooms. The total accommodation will be 555 beds for old and infirm men, eleven male and ten female imbeciles, and three male and three female lunatics.

**STOCKPORT.**—To the General Infirmary, built in 1832 from the designs of the late Mr. Lane, a north wing is being added. Messrs. Woodhouse and Willoughby, of Manchester, are the architects, and the contractors are Messrs. T. and W. Meadows, of Stockport, who were the contractors for the south wing, added in 1871, from plans by Messrs. Pennington and Bridgen, of Manchester. The extensions now in course of erection consist of a pavilion block, four stories high, in line with, and in continuation of, the present range of buildings facing Wellington-road, and a laundry and mortuary block at the rear of the main buildings. The pavilion block covers an area of 420 superficial yards, and will provide two wards for 14 beds each, with ward scullery and bathroom at the entrance end of wards, and a suite of sanitary offices in a tower at the far west end of ward; a suite of servants' bedrooms for 14 beds on the top floor, with similar sanitary and bathroom accommodation; an operating theatre, north lighted, with suite of rooms attached for anaesthetics, instruments, &c., and surgeons' rooms, and a two-bed surgical ward; matron's suite of rooms, consisting of sitting, bed, and bathrooms; day-room on the ground-floor level; and on this floor also a doctor's bathroom and sanitary conveniences, various storerooms, and heating cellar. Communication is obtained between the rooms by means of a stone staircase, which, together with the whole of the new wing, will be of fireproof construction. The laundry and mortuary block covers an area of about 230 superficial yards, and comprises washhouse, with finishing room, boiler-house, coals, and servants' conveniences. The mortuary consists of a small room fitted with three slabs, and a post-mortem room adjoining. The amount of the contract is £10,500.

**TRURO CATHEDRAL.**—At the annual diocesan conference held at Truro on Friday, the Cathedral Committee reported that, owing to the death of Mr. J. L. Pearson, R.A., they had requested his son, Mr. Frank L. Pearson, to act as architect of the work in accordance with his father's designs. The execution of the working drawings for the nave, excluding the towers and spires, had required some considerable time, and they were not fully completed. Not until the drawings are ready, and the quantities prepared by the surveyor, could tenders be invited. The grave responsibility rested on the committee of having to arrive at some definite conclusion on the all-important question of continuing the building of the nave. The committee had still to raise some thousands of pounds before they could secure the minimum amount of the estimated cost of erecting the nave, even without the porches, north and south, and only attempting the building of the western towers as far as the height of the eaves. To begin the work with the possible unsatisfactory issue of having to spend money on another temporary west end, or to leave off with unfinished walls and a make-shift roof, seemed most undesirable. Not a voice had been raised in favour of incurring a building debt, or starting a guarantee fund. But, on the other hand, a serious responsibility would be incurred if no vigorous effort were made to proceed with the work. After paying £1,983 for the cost of the foundations, some £26,675 was available for the continuation of the building. The Earl of Mount Edgcumbe said the Cathedral Building Committee had about £26,000 in hand, and the lowest estimate was

about £40,000. They had the alternative of attempting to begin work with a deficit of from £15,000 to £20,000, or reducing the character of the western end and bring it more within their means, or else to wait until more money was brought in. The Bishop moved a resolution encouraging the Building Committee to proceed with the work next spring, on the understanding that the sum of £8,000 in addition to the £27,000 already subscribed would be sufficient to build the nave. The resolution was carried *nem. con.*

## WATER SUPPLY AND SANITARY MATTERS.

**METROPOLITAN WATER SUPPLY.**—At Tuesday's meeting of the London County Council, Mr. Dickinson, chairman of the water committee, in moving that the committee's report on the subject of the purchase of the undertakings of the London water companies and the provision of a supplementary supply from Wales be received, urged that the experience of the past summer had proved that any further delay would be a serious matter for London. The report was received. On the first recommendation, that a Bill be promoted in the next session of Parliament for the purchase by the Council of the undertakings of the water companies by agreement, or, failing agreement, by compulsion, Lord Onslow moved an amendment in favour of delay pending the report of the Royal Commission which is inquiring into the subject. After some discussion, the amendment was rejected by 101 to 15 votes, 27 Moderates voting in the majority. The recommendation was then agreed to, as well as a series of consequent recommendations, including one for the promotion of a Bill empowering the Council to bring an additional supply of water to London from the watersheds of the Wye and Towy.

**THE SWINTON SEWAGE TREATMENT DIFFICULTY.**—In consequence of representations made by Mr. Lees Knowles, M.P., and Mr. Leigh-Clare, M.P., the Local Government Board recently sent Major Carey, C.E., one of their inspectors, to inspect the sewage works of the Swinton and Pendlebury Urban District Council, with a view to reporting as to their capacity for the treatment of the sewage of the district. The Local Government Board recommended the district authority to take 125 acres of land for the treatment of their sewage; but the urban council pointed out that they were already producing an effluent which satisfied the Mersey and Irwell Joint Committee, and when other improvements now being carried out at the works under the superintendence of Sir Henry Roscoe have been completed, the works will be "second to none for efficiency in Lancashire." The council's sewage farm consists of 37 acres, and Messrs. Lees Knowles and Leigh-Clare have pointed out the impracticability as well as the needless expense of the requirement as to additional land.

## CHIPS.

It has been decided to build a dispensary in connection with the infirmary at Paisley, at an estimated cost of £4,000.

A new organ has been erected in the west gallery of Keresley Church, Warwickshire, by Mr. C. H. Whiteley, of Chester.

Southampton, which has already two public baths on the river Test, has now decided to provide one on the river Itchen, and has adopted plans by Mr. W. B. G. Bennett, the borough engineer, for open-air baths at Northam, 190ft. long by 30ft. wide, and estimated to cost about £660 in construction.

The laying of the foundation-stone of a new parochial hall and Sunday-school in connection with St. Simon and St. Jude's Church, Anfield, Liverpool, took place on Friday. The building, which is situated at the rear of the church, will consist of a schoolroom 83ft. by 30ft., a parish room 30ft. by 20ft., and two large classrooms. The exterior is to be carried out in grey brick, with buff brick and red sandstone dressings, in keeping with the church building, the style adopted being 12th-century Gothic. The cost will be £1,630, the work being carried out from the designs and under the superintendence of Messrs. R. Owens and Son, architects, Crosshall-street, while the contractors are Messrs. J. and G. Chappell, Walton.

Since the Liverpool tramways were taken over by the corporation, the question of electric traction has occupied the attention of the tramways committee. Already a new line, on the overhead electric trolley system, has been constructed, connecting the city with one of the southern suburbs, and at their next meeting the city council will be asked to authorise a scheme recommended by the city engineer, by which it is proposed to apply the system of electric traction to several of the existing routes, as well as to some short new lines about to be constructed. The scheme is estimated to cost over £140,000, and that is exclusive of the electrical equipment.



## Engineering Notes.

**AVIEMORE AND INVERNESS RAILWAY.**—The completed line of the Highland Railway from Aviemore to Inverness was formally opened on Saturday. It reduces the route between Inverness and Perth and all places south by 26 miles in distance and by an hour in time. The new line is 33½ miles in length, and it is 15 years since it was first contemplated, while the first section (that from Aviemore to the village of Carr Bridge) was opened in 1892, and the second (from Carr Bridge to Daviot) has been in use for nearly eighteen months. On these two sections the line is single, though all the bridges and viaducts have been constructed to allow of a double line if decided upon in the future; but from Daviot to Inverness, a distance of ten miles, the line has already been made double all the way. Between Aviemore and Carr Bridge, a distance of seven miles, the line runs through the Seafeld Estate. The portion of railway passing through the mountain region of the Monadhliadh has been no easy matter to construct, owing to the deep cuttings, huge bankings, numerous bridges, and great viaducts. Of these the most important is the viaduct across the valley of the Nairn, between Daviot and Culloden Moor. Its total length is 1,785ft., it reaches a maximum height of from 130ft. to 140ft. from the bed of the river, and it consists of twenty-eight arches of 50ft. span, with the exception of the arch in the centre, which crosses the river, and it has a span of 100ft. Founded on rock on the north side of the valley, and on hard gravel on the south side, the viaduct is built of red sandstone found in the locality. Next in importance to this is the viaduct across the valley of the Findhorn. In length it is about 445 yards, with a maximum height of 140ft.; it has been built on a half-mile radius, and on a gradient of one in sixty, falling to the north. Then there is the stone structure that crosses the valley of Slochd, at a height of 107ft., and the steel girder bridge of 180ft. span that carries the railway across the Dulan, and there are a large number of bridges, both under and over the old coachroad, the route of which the line follows for a considerable portion of the way. The engineer is Mr. Roberts, and the contractors have been Messrs. Brand, Arbuthnot, and Ross.

**MANCHESTER.**—The Parliamentary Sub-committee of the City Council considered on Friday an alternative scheme for an extension of London-road Station, submitted in a rough plan by the London and North-Western Railway Company. In the last session of Parliament the company's proposal to extend the station by the erection of bridges over thoroughfares was strenuously opposed by the corporation, and that part of the Bill was thrown out by a Parliamentary committee. The company now propose to build an entirely new station, adjoining the present London-road Station, on the Ardwick side of Fairfield-street and clear of London-road, its nearest point to that thoroughfare being bounded by Boardman-street. In the opinion of the committee the scheme will solve a difficult problem and cause the smallest inconvenience to the public.

**THE REBUILDING OF KEW BRIDGE.**—At Friday's meeting of the Middlesex County Council the finance committee, on behalf of the joint committee of Surrey and Middlesex, presented supplementary estimates to the extent of £35,000 for the rebuilding of Kew Bridge. The report of the joint committee showed that while the estimate of the total cost of the widening, given by their engineer—Sir J. Wolfe Barry—was £118,000, the lowest of seven tenders received for the work, that of Mr. Easton Gibb, of Skipton, Yorkshire, was £169,288. Sir J. Wolfe Barry explained that his estimate was based on the prices paid for similar work at the Tower Bridge, with a considerable addition. The cost of all work in the neighbourhood of London had been steadily increasing during the past two years owing to the obligations imposed by the Employers' Liability Act, the action of the London County Council with regard to the terms of labour, and the great demand for materials at the present time. He estimated that £20,000 to £25,000 might be saved by the substitution of internal brickwork or concrete for stonework. The committee further reported that they had ascertained that a reduction of about £20,000 might be made on Mr. Gibb's contract in the way suggested, and they recommended that the tender should be

accepted for a sum not exceeding £150,000, and that a Bill be promoted to authorise the additional borrowing. An amendment to the effect that the Council should refer the matter back to the joint committee, with a view to bringing the total cost of the bridge approximately within the amount authorised by Parliament, was carried by 32 votes to 8.

### PROFESSIONAL AND TRADE SOCIETIES.

**EDINBURGH BUILDING TRADES EXCHANGE.**—The first annual meeting of the shareholders in this Exchange was held in the rooms at Shandwick-place, on Friday, Mr. Peter Lawrence, surveyor, chairman of the company, presiding. The chairman said the venture was a new one, and it had so far proved very satisfactory, as it had enabled them to pay a dividend of 5 per cent. That did not exhaust their resources, because they had a lucrative source of income from the catalogue which was being prepared, and which would enable them to pay a larger dividend next year. The Exchange was founded to weld together the different branches of the building trade and the manufacturers. The membership was increasing, and what they desired was that the members should take advantage of the rooms provided for them in their present premises in order to interchange views. In olden times there used to be hole-and-corner work among builders, but that had disappeared, and they wanted to meet and consider what wages they should pay their men, and what prices should be given for their work. The directors had also under consideration the question of insurance, in view of the Employers' Liability Act, and it had been remitted to a committee to consider whether a federation of the building trades in Scotland, or in Edinburgh, could not be formed for the purpose of insuring themselves against accidents. Sir Thomas Gibson-Carmichael, M.P., hon. president of the Association, moved the adoption of the report. Mr. Colin Macandrew seconded the motion, which was unanimously agreed to. Directors were afterwards appointed.

**GLASGOW BUILDING TRADES EXCHANGE.**—The fourth annual meeting of the members of this Exchange was held on Friday, in the Exchange, Gordon-street. Colonel Bennett presided. The report, which was adopted, bore that income, amounting to £822 3s. 1d., had exceeded expenditure during the year by a sum of £149 10s. 6d. Out of the surplus it was agreed to pay off a further 10 per cent. of the preliminary expenses, to allow 5 per cent. for depreciation on furniture and furnishings, and to pay a dividend of 5 per cent. on the paid-up capital. New members to the number of 34 were admitted during the year. The library was gradually increasing. Reports showed also that large cities were rapidly following Glasgow's example in establishing an Exchange. Financially and otherwise, the Glasgow Exchange had been a great success, although there was still considerable room for improved attendance at Exchange hours. Complaints were made as to the delay which contractors suffered in getting measurements of work done from the measurers, and it was stated that negotiations were in progress with a view to having the matter remedied. The retiring members of the executive were re-elected.

**GLASGOW INSTITUTE OF ARCHITECTS.**—The newly-elected council of this institute held their first meeting on October 27 in the office of Messrs. MacLean, Fyfe, and MacLean, 115, St. Vincent-street, when the following office-bearers were elected, viz.:—President, Mr. David Barclay; vice-president, Mr. Alexander Petrie; auditor, Mr. W. Forrest Salmon; secretary and treasurer, Mr. C. J. MacLean, writer, 115, St. Vincent-street. The various committees for the year were appointed, including a committee on architectural education, and on public architecture and competitions. A special committee was appointed to consider the subject of general conditions of contract, including certain grievances brought forward by the Building Trades Exchange.

**SCOTTISH BUILDING TRADES FEDERATION.**—The fourth annual meeting of the Federation was held in Edinburgh on Friday. Mr. J. B. Hay, builder, Dundee, president, in the chair. Representatives were present from all parts of Scotland. The report of the executive, which was submitted by the secretary, Mr. James L. Selkirk, C.A., Glasgow, set forth the principal matters which

had engaged their attention during the year. These included the formation of branches of employers in various towns not already organised, the starting of a monthly trade organ, the first number of which had just been issued, the forming of a Federation insurance company, and the initiating of a special fund to meet important emergencies that may arise from time to time. The progress of the Federation during the year was regarded as most encouraging, and an earnest desire was expressed that many additional towns and districts would be organised during the next year. Thereafter members of executive were elected in room of those retiring, with Mr. James Leslie, contractor, Aberdeen, as president; Messrs. Thomas Kay, wright, Glasgow, and Alexander Beveridge, builder, Perth, vice-presidents; and Mr. James L. Selkirk, C.A., Glasgow, secretary and treasurer.

### CHIPS.

The ancient tapestry in St. Mary's Hall, Coventry, is about to be repaired and restored for the city council by Miss Gemmell, of the Decorative Needlework Society, London.

The new Sacred Heart Church at San Francisco, the imposing edifice which has been in process of erection for the past two years, was solemnly dedicated on September 25 by Archbishop Riordan. The style of the new church is Romanesque. The large basement will be used for assembly rooms. The seating capacity of the main building is 1,000, including the galleries on either side. The cost of the structure, exclusive of pews, was about £15,000 sterling.

The imports of timber for the first three quarters of this year are about 6,395,000 loads, or nearly 1,000,000 loads less than in the same period of the past year. The declension is both in hewn and in sawn timber, and is general at the chief ports. A year ago the imports were unusually heavy, and it is probable that the lessened import this year allows some accumulated stocks to be drawn upon; but the decrease in import is very noticeable.

In a short time the new museum promised by Dr. Jonathan Hutchinson, F.R.S., ex-president of the Royal College of Surgeons, to Selby will have become an accomplished fact. Already the plans for altering the Mechanics' Institute premises for the reception of the many curiosities which are to be brought into the town are being rapidly prepared, and by the end of the year the buildings, which had assumed a condition far from acceptable for any public purposes, will be reopened.

The Duke of Cambridge will open the newly-erected Technical Institute, built by the united parishes of St. Thomas and St. John, in Tooley-street, on the 28th inst.

The Holmes Wood New School, Rufford, near Preston, is being warmed and ventilated by means of Shorland's patent Manchester grates, the same being supplied by Messrs. E. H. Shorland and Brother, of Manchester.

The latest estimate of the cost of the proposed railway to the summit of Mont Blanc, including the station at Les Houches, with cafés, restaurants, &c., electrical installation (with the river Arve as motor-power), tunnel 10,000 metres in length, and terminus, is £392,000 sterling.

A new board school at Ambler-road, Blackstock-road, Finsbury Park, was opened on Tuesday week. The new buildings will accommodate 930 children—300 girls, 300 boys, and 330 infants; and the total cost of the building and site has been £26,000. It is the 430th school that the School Board for London have built to accommodate 514,000 children; and another school is to be built at Princess May-road, in the same district, to accommodate nearly 1,000 children.

The death took place last week, at his residence, 4, Brompton-road, Southport, at the age of 72 years, of Mr. Thomas Kenrick, the oldest master builder in the town. He came to Southport thirty-five years ago, and built the first houses in what is now called Virginia-street, but which was then a barren waste of sandhills. He also erected nearly all the houses in Albert-road, Birkdale, as well as St. Joseph's Roman Catholic Church in the same township. He was a Conservative and a Roman Catholic.

The Duke of Cambridge visited Colchester on Monday, and laid the foundation-stone of the new town-hall, which is being erected at a cost, excluding private gifts, of about £35,000, from designs by Mr. John Belcher, F.R.I.B.A., of Hanover-square. A conspicuous feature of the building will be the Victoria Tower with clock and chimes, costing £2,000, the gift of the Mayor (Alderman James Paxman, J.P., C.E.). The borough member (Sir Weetman Pearson) is presenting an organ, at a cost of £1,000, for the assembly-room. Other gifts include a statue of the Queen, and stained-glass window illustrating the history of the town.



## TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the BUILDING NEWS, 332, Strand, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

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## ADVERTISEMENT CHARGES.

The charge for Competition and Contract Advertisements, Public Companies, and all official advertisements is 1s. per line of eight words, the first line counting as two, the minimum charge being 5s. for four lines.

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Advertisements for the current week must reach the office not later than 3 p.m. on Thursday. Front-page Advertisements and alterations in serial advertisements must reach the office by Tuesday morning to secure insertion.

## SITUATIONS.

The charge for advertisements for "Situations Vacant" or "Situations Wanted" is ONE SHILLING FOR TWENTY-FOUR WORDS, and SIXPENCE for every eight words after. All Situation Advertisements must be prepaid.

## NOTICE.

Bound copies of Vol. LXXIV. are now ready, and should be ordered early (price Twelve Shillings each), as only a limited number are done up. A few bound volumes of Vols. XXXIX., XL., XLVI., XLIX., LI., LIII., LVIII., LIX., LXI., LXII., LXIII., LXIV., LXV., LXVI., LXVII., LXVIII., LXIX., LXX., LXXI., LXXII., and LXXIII., may still be had, price Twelve Shillings; all the other bound volumes are out of print. Most of the back numbers of former volumes are, however, to be had singly. Subscribers requiring any back numbers to complete volume just ended should order at once, as many of them soon run out of print.

RECEIVED.—P. D. A.—S. W. I. and Co.—R. L. J.—G. H.—A. T. M.—D. and Son.—T. R.

BUCOLIC. (Your sketches appear to show a good arrangement, but they are not very clear. We should be inclined to bolt to the bressummer a cast-iron shoe of the usual form, or two L-shaped irons or cleats  $\frac{1}{2}$  in. thick to be bolted to the bressummer, shaped to incline of rafter, and bolted also to it, with hole drilled for the tie-rod. The latter plan is apparently what you show.)

## "BUILDING NEWS" DESIGNING CLUB.

## SECOND LIST OF SUBJECTS.

B.—A Mountain Chapel, to be built in stone in random courses with dressed quoins and dressings. Style, Late Gothic. The nave to seat 200 worshippers, with stalls in the square-ended chancel for two priests, eight choir-men, and ten boys. The floor of the chancel to be three steps above the nave floor, and the altar-face four steps above the floor of the choir. A small organ transept to be contrived on south side of the chancel, with space for the stone stairway leading down to the choir vestry. The priests' vestry to be level with the choir, and to have an external lobby or porch, with outside stone steps leading down to the churchyard, and inclosed with a dwarf wall only. The choir vestry to be about 22ft. long by 15 to 16ft. wide, or of that area, so contrived as to be suitable for small public or church meetings, and having a porch into the churchyard. The land rises rapidly from east to west at the rate of one in eight, and the approach is from the south-west of the building. The exposed position of the church, standing over against a Welsh hill-side village, must be considered in making the design. Put a good porch on south side. No side aisles are necessary, and the central gangway of the nave is to be 6ft. wide. At the west end, beyond the chancel, a space 12ft. deep the whole width of the church is to be provided. Here the font is to stand. An oak pulpit and screen on a stone base at entrance to the chancel to be shown with a rood over the cornice of the screen. A return way for communicants is optional; but the organ must not be boxed into a so-called "organ-chamber." The vestry to have an E.C. and lavatory in connection with it; but this accommodation must not be too much in evidence, and, at the same time, should be placed conveniently for the use of the clergy without passing through the larger vestry. The roof of the church to be open-timbered and covered with stone slates. No objection would be made to rough-cast walls outside; but the stone dressings in any case must show. A square simple tower the width of the nave, with provision for a small

peal of bells is suggested. The seating of the church to be shown. Elevations and sections  $\frac{1}{4}$ th scale. Plans may be to smaller scale. A view is essential.

DRAWINGS RECEIVED.—"Isis," "Hoopoe," "Philomel," "The Auk," "Brush," "Notts," "Troy Town," "F.", "Espoir," "Piper," "Apex," "Dont Know," "Goat," "Souris," "Swan," "Dr. Nikola," "Bat," "Hope," "Fan," "Nothe," "Rooksbury," "Tie Beam."

## Intercommunication.

## QUESTIONS.

[12085].—**Dilapidations.**—Where covenant in repairing lease runs "well and substantially repair, support, amend, and keep, with all manner of reparations and amendments whatsoever, the whole of the said premises, &c.," and in a further covenant, "will paint with two coats at least of good oil-colour, and in a proper and workmanlike manner, such parts of the said premises as have usually been painted, &c."—is the lessee bound to repaint, grain, and varnish such parts of the premises as have been previously so done? or can two coats plain paint only be required?—W. M. A.

[12086].—**Damp.**—Can you tell me (through the medium of your paper) what is the cause of dampness in internal walls of a house built six months ago? The house has been occupied about six months, and the dampness did not show itself until the recent wet weather; neither does it show itself in the partitions, and, therefore, cannot be attributed to the plaster or distemper. The walls are built with bricks, made from clay obtained about ten miles from the sea. Would they attract sufficient moisture to cause the dampness?—J. FEACAT.

[12087].—**Hip and Valley Rafters.**—What are the functions of hip and valley rafters? On what principle should their sizes be determined? Most textbooks refer in the vaguest of terms to these portions of roofs, and I find no formulae bearing thereon.—INQUISITIVE STUDENT.

[12088].—**Green Moor Stone.**—A very hard stone known in London under this name is used for repairing stone treads of staircases. I cannot trace it to any particular quarry or place. I can find no reference to "green" stone, but several to "moor" stone, at places wide apart. Where does it come from?—R. W.

[12089].—**Floor of Hall.**—I am commissioned to design a drill-hall (size 97ft. by 48ft. 6in.), which is also intended to be used for dancing and promenade concerts. I am instructed to specify the floor to be of wood, and so constructed as to insure springiness instead of that deadness and rigidity which distinguishes floors composed of boards laid upon, and nailed to, firmly fixed joists, or laid with wood blocks. Any hints from fellow subscribers or casual readers of the "B.N." will be very acceptable.—HAMPTON.

[12090].—**Ranges.**—What are the main points in a good close kitchen range? What should the boiler be in shape and thickness? How should the flues be formed? What thickness of plates, &c.? are questions that I should like to know.—BUILDERS.

[12091].—**Bedding Ironwork.**—Is it necessary to place iron girders on lead or felt seatings? Many iron girders rest on the stone templates.—A. T. S.

[12092].—**Fluting and Tiling.**—I should be glad to know if there are any good books on this subject giving examples of roofs, tile hanging, and other details.—STUDENT.

[12093].—**Plumbing Work in Large Hotels.**—Are there any good examples to be seen in London? I mean as regards the arrangement of waste-pipes from sinks and lavatories, the means of disconnecting them, water supply, and other details that a young plumber may require to know?—G.

## CHIPS.

At a public meeting held at Hull on Monday, it was decided to proceed with the restoration of the parish church of Holy Trinity. Towards the estimated outlay of £1,500, over £1,300 was promised in the town, in addition to an offer by Mr. Owbridge to provide a chancel screen at a cost of £650.

An extensive addition to the Cheshire County Lunatic Asylum, near Chester, was formally opened on Monday. The extension, which has cost about £90,000, provides accommodation for 400 additional patients, and includes a new administration block.

At a meeting of Berwick-on-Tweed Town Council, on Friday, a letter was read from the Local Government Board sanctioning the proposal to borrow £7,000 for the erection of a new lock-up and police-station at Berwick.

Sir David Salomons paid, on Friday, to the treasurer of the Urban District Council of Southborough, near Tunbridge Wells, the sum of £3,000, as a contribution to the cost of erecting a Victoria Hall in that town, as a memorial of the Diamond Jubilee. For the erection of the building, the tender of Messrs. Strange and Sons, of Tunbridge Wells, has been accepted at a little under £4,000, the balance of the cost being contributed from the rates.

Major Cardew, on behalf of the Board of Trade, paid a special visit to Liverpool, on Friday, for the purpose of inspecting the experimental line of electrical tramways which extends from South Castle-street to the Dingle. He was met by Mr. Holmes, corporation electrical engineer, and Mr. J. O'Neill, manager of tramways.

## LEGAL INTELLIGENCE.

IN RE W. BOWYER, JUN., NORTHWICH.—At Crewe Bankruptcy Court, on Friday, before Mr. Registrar Speakman, William Bowyer, jun., builder, of Middlewich-road, Northwich, attended for his public examination. The debtor's gross liabilities were set forth as £2,175 16s. 4d., of which £667 15s. 2d. were expected to rank as dividend. The estimated deficiency was £77 4s. 8d. In reply to questions by Mr. Thomas Bullock, the Official Receiver, the debtor said that he commenced business in Northwich in 1892, with a capital of £100, which he had saved. He at once began speculative building. He believed he was solvent until about five weeks ago, when, on account of the pressure of creditors, he was compelled to file his petition. The debtor admitted that he did not keep proper accounts of his transactions in regard to his buildings. The debtor was closely examined as to some payments he had made shortly before filing his petition. Within a few days of his bankruptcy he had paid one of his creditors £22 10s., and had also allowed him to take some timber, machinery, &c., in satisfaction of a portion of his debt. He had also returned some borrowed money. He had also made over to his father-in-law, in payment for provisions and borrowed money, a piano worth £20. The examination was adjourned.

PENALTY FOR BREACH OF BUILDING REGULATIONS.—At the Salford Police-court, on the 26th ult., John Ward, builder, Barfield-road, Pendleton, was summoned for a breach of the Salford Improvement Act, 1871, by building half-brick partition walls in the construction of six dwelling-houses in Barfield-road without placing a course of hoop-iron in every story. The offence was proved by Mr. William Young, building inspector for the corporation, and the defendant, who said he had trusted to another man to do the work properly, was fined £30 and costs, with the option of two months' imprisonment.

CONFLICTING EVIDENCE AS TO MORTAR.—At the County Petty Sessions, Coventry, on Friday, Arthur Augustus Wurcot, a local builder and member of the Coventry City Council, was proceeded against by F. A. Dismott, the surveyor to the Foleshill Rural District Council, for committing a breach of the Rural Council's by-laws when erecting houses. It was asserted by the surveyor that the footings of 9in. walls were laid dry, and practically without mortar, other minor contraventions of the regulations being also alleged. Dr. Bostock Hill said the samples of mortar taken from the buildings and analysed by him contained one part of slaked lime to two parts of other material. There was no sharp sand in it—an essential requirement; and the material would not harden as it weathered. Mr. F. W. Lloyd, for fifteen years a Birmingham Corporation building surveyor, also supported the case for the prosecution. A considerable amount of evidence was called in the case, and eventually the Bench dismissed the summons on the grounds that, the evidence being so extremely conflicting, they could not deem an offence had been proved.

VAUXHALL-BRIDGE IMPROVEMENT.—At the Sheriff's Court, Red Lion-square, on Friday, before Mr. Under-Sheriff Burchell and a special jury, a claim against the London County Council by the Clothworkers' Company was heard in respect of freehold wharf property on the Surrey side of Vauxhall-bridge let on lease to Messrs. Francis and Co. (Limited) for a term of which 52 years were unexpired at a ground-rent of £515 a year. The claimants called Sir J. W. Ellis, Mr. Bousfield, and Mr. James Green, who all agreed that the value of the property, including the customary 10 per cent., was £22,660. For the London County Council the witnesses were Mr. Alderman Green, Mr. Farmer, Mr. Horsey, and Mr. Field, whose valuations were £14,162, including the 10 per cent. The jury returned a verdict for the claimants for £22,660.

LONDON COUNTY COUNCIL'S BUILDING REGULATIONS.—At the Surveyors' Institution on Tuesday, before the tribunal of appeal, consisting of Mr. Arthur Cates, Mr. A. A. Hudson, and Mr. J. W. Penfold, an appeal was heard from Mr. H. W. Hill, Old Bond-street, against the decision of the Building Committee of the London County Council to sanction the erection of buildings in Stanbrook-court, Old Bond-street. The letter of the London County Council stated that they had decided not to sanction certain deviations from the plans certified; but the appellant contended that the plans on which the building was erected had been passed by the committee. In May, 1897, Mr. Hill, who was rebuilding the premises, had received a notice from the County Council, under the Factory and Workshops Act, to construct a new staircase and other works to provide means of escape in case of fire. For this purpose he acquired the premises in the rear of Bond-street, 5 and 6, Stanbrook-court, and sent to the Council plans which were eventually passed without any restriction. Having this authority, Mr. Hill proceeded to erect the buildings; but afterwards he received notice from the district surveyor that they contravened section 43



of the London Building Act. The buildings were at that time half-way built, and as the whole, very much through the action of the Council, had cost £40,000, the buildings were proceeded with, and this appeal made. It was agreed that the builders had been under the impression that they had had their plans approved; but the Council contended that the approval was only conditional on their complying with all the conditions of the Building Act. The appellant relied on the letter approving his plans, whilst the Council contended that section 43 of their Act had been contravened. After hearing evidence, the chairman stated that, having inspected the building, they considered, taking all circumstances into consideration, the appeal should be allowed, but they made no order as to costs. At the same time, he suggested that the consents of the Council be amended. It was stated that this had already been attended to.

**CLAIM AGAINST THE LONDON SCHOOL BOARD.**—Mr. Under-Sheriff Burchell and a special jury at Red Lion-square, on Wednesday, heard the case of "Pickard v. the School Board for London," a claim for compensation in respect of the leasehold interest in house property at Tollington Park, Holloway. The case, though relating to one house only, is one of a series arising out of the erection of large schools in the district, and there was a difference of opinion as to the actual rental value, the witnesses for the claimant contending that it was somewhat more than the rack-rent receivable by their client—namely, £36; while the experts called for the Board estimated the value on a yearly tenancy at £30 per annum. Mr. T. G. Perrin (Messrs. Robson and Perrin) and Mr. Frederick Ball (Messrs. Cooke, Baines, and Ball) were the principal witnesses for the claimant; and Mr. Edwards (Messrs. Newbon, Edwards, and Shephard) and Mr. Frederick Warman were called on behalf of the School Board. The jury awarded the claimant £425 as compensation for the property in question.

**THE VALUE OF GROUND-RENTS.**—Mr. Robert Vigers, President of the Surveyors' Institution, sat on Tuesday as arbitrator in the case of "Milledge v. the School Board for London," a claim for compensation in respect of the freehold interest in four houses at Tollington Park, Holloway, known as Nos. 31, 35, 41, and 43, Marriott-road. It appeared that the four houses in question were each let at £36 per annum, and produced a ground-rent of £6 10s. per annum per house. Mr. E. F. B. Fuller (Messrs. Fuller and Fuller) and Mr. Edwin Fox (Messrs. Edwin Fox and Bousfield) were the principal witnesses for the claimant, and they asserted that such ground-rents would fetch 33 years' purchase. On the other hand, Mr. Warman, Mr. H. H. Fuller, and Mr. Edwards (Messrs. Newbon, Edwards, and Shephard) expressed the opinion that 28 years' purchase was a proper price, and that extensive sales of these securities had been lately effected at that figure. The award was reserved.

Mr. Walter G. Roberts, architect, was at the recent municipal elections returned unopposed for the Acklam Ward to the Middlesbrough Town Council. Three years ago, Councillor Roberts won the seat after a stiff fight.

Mr. M. Alton Bazeley, architect, of Plymouth, has been returned, after a hotly-contested election, as one of the members of the town council for Greenbank Ward in that borough, displacing a member of long standing.

Damage, amounting to about £10,000, resulted from a fire at Burnley, on Tuesday, at the brick, tile, and sanitary ware establishment of Messrs. J. Duckett and Sons. The pipe-room, with machinery and moulds, was destroyed. The damage done is covered by insurance.

The opening concert of the eleventh season of the A.A. Lyric Club will take place at the Swallow Assembly Room, Swallow-street, Piccadilly, this (Friday) evening, at 8 o'clock, when the chair will be taken by Mr. G. H. Fellowes Pryne, president of the Architectural Association. An attractive programme has been arranged by Mr. John Murray, president of the club.

Mr. E. A. S. Fawcett, an inspector from the Local Government Board, has held an inquiry at Maesteg into an application to borrow £14,575, for a sewerage scheme.

At the Auction Mart, last week, the demand for sound investments preserved the firmness which has prevailed for some time. The chief feature was the letting of the important site in London-wall and Finsbury-circus, fully referred to in another column. The aggregate realisation was £125,361, exclusive of the letting just mentioned, which alone represented a capital value of about half a million sterling. Last year the returns for the corresponding week were £83,760.

The Countess of Huntingdon Chapel at Copthorne, North Sussex, built in 1828, was reopened on Wednesday week after reconstruction, from plans by Mr. Hooper, of Redhill.

## Our Office Table.

The applications for the appointment of superintending architect to the London County Council, in succession to Mr. Thomas Blashill (resigned on account of having reached the limit of age), will be received by the clerk at Spring-gardens, S.W., up to 10 a.m. on Monday week, the 14th inst. The salary offered is £1,500, and we hear that one of the candidates will be Mr. Ellis Marsland, district surveyor for Camberwell, and the author of the well-known and concise handbook to the London Building Acts. Mr. Marsland has for many years been the honorary secretary of the Society of Architects.

An important sale of building sites in the City was held at the Mart, Tokenhouse-yard, on Friday afternoon, when Messrs. Baker and Sons, acting on the instructions of the Bridge House Estate Committee, offered by public auction, on a building lease for a term of 80 years, the building site abutting upon Finsbury-circus and London-wall, where the premises are about to be pulled down and set back to a new line of frontage, including the formation of a fresh roadway, 36ft. wide, leading from London-wall to West-street, parallel with Finsbury-pavement. The area, about 50,000sq. ft., is said to be the largest ever offered in the City for public competition. The auctioneer suggested, in opening the auction, that the land was worth 7s. per square foot, or £17,000 a year. The biddings commenced at exactly half this sum, and after a brisk competition the land was knocked down to Mr. Ludwig Neumann, of Wornford-court, Throgmorton-street, at the precise amount mentioned by the auctioneer, which, it is said, considerably exceeded the reserve figure set by the Corporation.

MR. TALFOURD ELY, M.A., F.S.A., writes from Stone, Hayling Island, stating that he has by personal effort laid bare the foundations of the Roman buildings in the Towncil Field in that island, and through the courtesy of the occupier of the land, they may be seen for a few days before the ground is required again for farming purposes. Few objects have been found save nails, bits of coarse pottery, and the debris usually met with in such operations. Working alone and depending on his own spade and pickaxe, Mr. Ely has not been able, in the time at his disposal, to excavate the site as thoroughly as might be wished, but the general outline of the edifice may be recognised.

"EXCAVATING in Egypt, and its Results" was the subject of a lecture given by Professor Flinders Petrie at the Athenæum, Manchester, on Monday night. The first part of the lecture was devoted to a description of discoveries made by the professor in Egypt of relics of a prehistoric people. Coming to the period which, he said, used to be known as the beginning of things, he described the discovery, at the foot of one of the pyramids, of the remains of a complete temple, which was probably the oldest building in the world. Ivory carvings, statues, and stone slabs covered with writings showed the high state of art culture possessed by the earlier Egyptians. Such was the preservative character of the dry sand of Egypt, that in the course of his explorations he found baskets left by the workmen of some 5,000 years ago perfectly intact, and still, probably, capable of raising loads of earth, for which purpose they were originally used. The excavations further proved that the brick arch, which was supposed not to have been adopted till many centuries later, was perfectly well known and in use at a period 3,400 B.C., and how much earlier he could not say. Examples of high relief work, sculpture, &c., furnished evidence of the history of the period to which they belonged. Implements of various kinds were found just as the ancient workmen had left them, and it was curious to note that many of them were similar to those in use at the present day.

The Borough of West Ham moves busily with the times. The following works have been in different stages of progress during the year, under the superintendence of its busy engineer, Mr. Lewis Angell:—Lunatic Asylum: Contract No. 1, £10,130; contract No. 2, £6,000; contract No. 3, £209,531. New Sewage Pumping and Electric Lighting Station: Buildings, £35,430; engines, boilers, &c. (sewage), £20,751. Dagenham Hospital: £20,475. Recreation Ground, Hermit-road: £497. Pitching: North Woolwich-road, £13,995; Victoria Dock-road,

£11,992 15s. 8d.; Church-street and Portway, £9,502 6s. 3d. Private Street Works: Contracts, £12,830 6s. 8d. Plans have been prepared for the following works: Artisans' dwellings, £11,976 6s.; police-court extension, £4,440; police cells, £470; mortuaries, West Ham and Canning Town, £1,580; fire-brigade barracks, Canning Town, £16,000; town hall extension, £12,500; water scheme, £28,560; northern and southern sewers, £19,991 2s. 8d.; pitching The Grove, Leytonstone, Leyton, Chobham, and Major-roads, £18,759; private street works, in addition to contracts given above, £9,413 7s.; general expenditure, in addition to the above, through the engineer's department, highways, sewers, &c., approximately £53,400; the jobbing works, including artificial stone-making, exceeded £16,000. The above represents over half a million (£574,224) value of work either in execution or preparation.

## MEETINGS FOR THE ENSUING WEEK.

**FRIDAY (TO-NIGHT).**—Architectural Association (Discussion Section). Debate opened by F. M. Elgood, A. R. Jemmett, and H. V. Lanchester, on "Modern Architectural Tendencies as Illustrated by Contemporary Work." 7 p.m.

**MONDAY.**—Royal Institute of British Architects. Opening Address by Professor Geo. Aitchison, R.A., President. 8 p.m.

Society of Engineers. "The Preparation of Rhea Fibre for Textile Purposes," by Perry F. Nursey, Past-President. 7.30 p.m.

Liverpool Architectural Society. "Construction of Hospitals for Consumptives," by John W. Hayward, M.D. 6 p.m.

**TUESDAY.**—Institution of Civil Engineers. "The Extraction of Nickel," by Professor W. C. Roberts-Austin, C.B., F.R.S. 8 p.m.

Auctioneers' Institute. "Effects of Recent Decisions on Owners' Rights and Liabilities as to Drainage of Buildings," by Alex. Macmorran, Q.C. 8 p.m.

**THURSDAY.**—Carpenters' Hall Free Lectures. "Setting-Out Work and By-Laws," by James Bartlett, M.S.A. 8 p.m.

**FRIDAY.**—Architectural Association. "Arts and Crafts," by H. Wilson. 7.30 p.m.

## THE ARCHITECTURAL ASSOCIATION.

NOVEMBER 11th.—ORDINARY GENERAL MEETING, 9, Conduit-street, 7.30 p.m. Mr. H. WILSON on "ARTS AND CRAFTS." E. HOWLEY SIM } Hon. Secs.  
G. B. CARVILL }

## Trade News.

### WAGES MOVEMENTS.

**GLASGOW.**—It is stated that a bold step in the dispute between the employers and men in the furniture trade has been decided upon by the masters, who have agreed to make all the shops non-unionist, and to procure non-unionist workmen to fill the vacancies.

On Saturday afternoon, Lord Russell of Killowen (Lord Chief Justice of England) formally dedicated to the public a red granite drinking-fountain on Hackney Common, which has been erected as a memorial to Mr. Charles Button, J.P., chairman of the Hackney Vestry, who died on February 11, 1896.

A memorial to the late Miss Christina Georgina Rossetti, erected in Christ Church, Woburn-square, was dedicated on Tuesday by the Bishop of Durham. It consists of a carved reredos, 16ft. in length and 12ft. high, in the Perpendicular style, designed by the vicar, the Rev. J. J. Glendinning Nash, and executed by Messrs. Walker and Son, under the superintendence of Mr. Turner. The reredos contains paintings of Our Lord and the Four Evangelists, designed by Christina Rossetti's friend, the late Sir Edward Burne-Jones. In the front of the memorial a slab of marble, from one of the ancient Roman quarries, is incised with an inscription.

Alterations are being made to the Boy's Home, Brentwood, and special consideration has been given to the ventilation, which will be carried out on the Boyle system.

The Mayor of Salford reopened last week the ancient half-timbered mansion in that borough known as Ordsall Hall, a portion of which has been restored for use as a working-men's club, and the other part as a university settlement and clergy training college.

Mr. Edmund Fredrick Good, for many years at Messrs. Doulton's Lambeth Pottery, and since 1889 manager to Messrs. H. A. Goodall and Co., Bartlett's-buildings, E.C., died on Saturday at his house in Burton-road, Brixton, aged 77 years.



## LATEST PRICES.

IRON, &c.			
	Per ton.		Per ton.
Rolled-Iron Joists, Belgian.....	£6 0 0	to	£8 10 0
Rolled-Steel Joists, English.....	£6 10 0	"	7 0 0
Wrought-Iron Girder Plates.....	£5 15 0	"	6 10 0
Bar Iron, good Staffs.....	7 0 0	"	8 0 0
Do., Lowmoor, Flat, Round, or Square.....	17 0 0	"	17 5 0
Do., Welsh.....	5 15 0	"	5 17 6
Boiler Plates, Iron—			
South Staffs.....	7 17 6	"	8 5 0
Best Suedshill.....	10 0 0	"	10 10 0
Angles 10s., Tees 20s. per ton extra.			
Builders' Hoop Iron, for bonding, &c., £3 15s.			
Builders' Hoop Iron, galvanised, £15 10s. 0d. per ton.			
Galvanised Corrugated Sheet Iron—			
No. 18 to 20. No. 22 to 24.			
6ft. to 8ft. long, inclusive	Per ton.		Per ton.
gauge.....	£10 15 0	...	£11 0 0
Best ditto.....	11 5 0	...	11 10 0
	Per ton.		Per ton.
Cast-Iron Columns.....	£8 5 0	to	£8 15 0
Cast-Iron Stanchions.....	6 5 0	"	8 15 0
Rolled-Iron Fencing Wire.....	7 0 0	"	8 0 0
Rolled-Steel Fencing Wire.....	7 0 0	"	7 10 0
Galvanised.....	10 10 0	"	11 10 0
Cast-Iron Sash Weights.....	4 2 6	"	4 5 0
Cut Clasp Nails, 3in. to 6in.....	8 15 0	"	9 15 0
Cut Floor Brads.....	8 10 0	"	9 10 0
Wire Nails (Points de Paris)—			
0 to 7 8 9 10 11 12 13 14 15 B.W.G.			
9/0 9/6 10/0 10/9 11/8 12/6 13/6 15 3 17 3 per cwt.			
Cast-Iron Socket Pipes—			
8in. diameter.....	£5 10 0	to	£5 15 0
4in. to 6in.....	5 5 0	"	5 10 0
7in. to 24in. (all sizes).....	4 15 0	"	5 0 0
[Coated with composition, 2s. 6d. per ton extra; turned and bored joints, 6s. per ton extra.]			
Pig Iron—			
Cold Blast, Lilleshall.....	106s. to 110s.		
Hot Blast, ditto.....	57s. 8d. to 62s. 6d.		
Wrought-Iron Tubes and Fittings—Discount off Standard Lists f.o.b.:			
Gas-Tubes.....	75p.c.		
Water-Tubes.....	70		
Steam-Tubes.....	62½		
Galvanised Gas-Tubes.....	60		
Galvanised Water-Tubes.....	55		
Galvanised Steam-Tubes.....	45		
10cwt. casks. 5cwt. casks.			
	Per ton.		Per ton.
Zinc, English.....	£27 5 6	to	£27 10 0
Do., Vieille Montagne.....	28 5 0	"	28 10 0
Sheet Lead, 8lb. per sq. ft. super.....	14 17 6	"	15 17 6
Pig Lead, in 1cwt. pigs.....	14 2 6	"	15 2 6
Lead Shot, in 25lb. bags.....	17 10 0	"	18 10 0
Copper Sheets, sheathing and rods.....	63 0 0	"	64 0 0
Copper, British Cake and Ingots.....	55 10 0	"	56 0 0
Tin, Straits.....	82 7 6	"	83 7 6
Do., English Ingots.....	85 10 0	"	86 10 0
Spelter, Silesian.....	23 5 0	"	23 7 6
TIMBER.			
Teak, Burmah.....per load	£13 0 0	to	£15 10 0
" Bangkok.....	10 10 0	"	14 10 0
Quebec Pine, yellow.....	4 2 6	"	6 0 0
" Oak.....	4 2 6	"	6 0 0
" Birch.....	3 10 0	"	5 10 0
" Elm.....	4 10 0	"	5 10 0
" Ash.....	3 15 0	"	5 0 0
Dantsic and Memel Oak.....	2 2 6	"	4 2 6
Fir.....	2 15 0	"	4 15 0
Waincot, Riga p. log.....	4 15 0	"	6 5 0
Lath, Dantsic, p.f.....	4 10 0	"	5 10 0
St. Petersburg.....	4 0 0	"	6 10 0
Greenheart.....	8 0 0	"	8 10 0
Box.....	4 5 0	"	15 0 0
Sesquial, U.S.A. ...per cube foot	0 1 8	"	0 1 10
Mahogany, Cuba, per super foot			
1in. thick.....	0 0 5	"	0 0 6
" Honduras.....	0 0 4	"	0 0 6
" Mexican.....	0 0 4	"	0 0 5
Cedar, Cuba.....	0 0 4	"	0 0 4
" Honduras.....	0 0 3	"	0 0 4
Satinwood.....	0 0 9	"	0 1 6
Walnut, Italian.....	0 0 3	"	0 0 7
Deals, per St. Petersburg Standard, 120-12ft. by 1½in. by 1½in.:			
Quebec, Pine, 1st.....	£18 0 0	to	£24 10 0
" 2nd.....	13 0 0	"	16 10 0
" 3rd.....	6 0 0	"	9 10 0
Canada Spruce, 1st.....	8 10 0	"	10 10 0
" 2nd and 3rd.....	7 0 0	"	8 10 0
New Brunswick.....	7 0 0	"	8 0 0
Riga.....	7 15 0	"	8 15 0
St. Petersburg.....	9 5 0	"	13 15 0
Swedish.....	9 5 0	"	16 5 0
Finland.....	9 5 0	"	9 15 0
White Sea.....	10 5 0	"	17 10 0
Batens, all sorts.....	5 0 0	"	16 0 0
Flooring Boards, per square of 1in.:			
1st prepared.....	£0 9 9	"	£0 16 3
2nd ditto.....	0 8 3	"	0 13 3
Other qualities.....	0 6 6	"	0 7 6
Staves, per standard M.:			
Quebec pipe.....	—		—
U.S. ditto.....	£35 0 0	"	£42 10 0
Memel, or pipe.....	210 0 0	"	220 0 0
Memel, brack.....	190 0 0	"	190 0 0
OILS.			
Linseed.....per ton.	£17 17 6	to	£18 10 6
Rapeseed, English pale.....	23 12 6	"	23 15 0
Do., brown.....	22 0 0	"	22 10 0
Cottonseed, refined.....	15 5 0	"	15 10 0
Seal, pale.....	28 15 0	"	29 0 0
Cocanut, Cochin.....	21 5 0	"	21 10 0
Do., Ceylon.....	27 10 0	"	28 0 0
Palm, Lagos.....	24 15 0	"	25 0 0
Oleine.....	22 10 0	"	22 15 0
Lubricating U.S. ....per gal.	0 6 8	"	0 7 6
Petroleum, refined.....	0 6 0	"	0 6 ½
Tar, Stockholm.....per barrel	1 0 0	"	1 5 0
Do., Archangel.....	0 12 6	"	0 15 0
Turpentine, American.....per ton	23 15 0	"	24 0 0

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### TENDERS.

Correspondents would in all cases oblige by giving the addresses of the parties tendering—at any rate, of the accepted tender: it adds to the value of the information.

BERKHAMSTED.—For alterations and additions to premises, High-street, Berkhamsted, for Messrs. Ind. Coopes, and Co., Ltd. Messrs. Harrington and Ley, 103, Fenchurch-street, E.C., architects. Quantities by Mr. L. A. Francis:—  
Matthews, H. and J. Berkhamsted £361 1 6 (Accepted)

BERKSHIRE.—For the superstructure of new buildings at the Berkshire Asylum, near Wallingford. Mr. George T. Hine, F.R.I.B.A., Westminster, architect. Quantities by Mr. L. A. Francis:—  
Curtis, R., Reading..... £29,966 5 0  
Lovatt, H., Wolverhampton..... 29,376 19 9  
Kingerlee, T. H., and Sons, Oxford..... 26,392 0 0  
Benfield and Loxley, Oxford..... 25,694 0 0  
Fitt, McC. E., Reading..... 25,394 0 0  
Pattinson, W., and Sons, London..... 24,401 0 0  
Parnell, J. and Son, Pennington-street, Rugby (accepted)..... 24,056 0 0

BETTSWY-Y-COED.—For carrying-out works of sewerage, for the urban district council:—  
Jones, H., Llanrwst (accepted).  
(Lowest tender received.)

BODMIN.—For internal repairs at the workhouse for the board of guardians. Mr. W. J. Jenkins, architect:—  
Goodfellow, E. J..... £72 10 0  
Brown, J. T. C., and Son (accepted)..... 63 10 0  
Webster and Climo (masonry only)..... 40 0 0  
(Architect's estimate £65.)

BURTON-ON-TRENT.—For erection of house at Winhill, for Mr. J. R. Ewers. Mr. Thomas Jenkins, 35, High-street, Burton-on-Trent:—  
Bottrill and Alvey..... £439 5 0  
Parker, G..... 400 0 0  
Harlow and Wallis (accepted)..... 391 0 0  
Kenshaw, E..... 855 0 0  
Kennard, G. (accepted)..... 362 10 0

BURTON-ON-TRENT.—For erection of house at Swadlincote, for Mr. Norman E. Cooke. Mr. Thomas Jenkins, 35, High-street, Burton-on-Trent, architect. Quantities by the architect:—  
Chamberlain, E. (accepted)..... £562 0 0

BURTON-ON-TRENT.—For alterations to shop in High-street, for Messrs. Bindleys, Ltd. Mr. Thomas Jenkins, 35, High-street, Burton-on-Trent, architect. Quantities by the architect:—  
Edwards, H. (accepted with additions) £300 0 0

BURTON-ON-TRENT.—For addition to shop at Winhill, for the Burton-on-Trent Co-operative Society, Ltd. Mr. Thomas Jenkins, 35, High-street, Burton-on-Trent, architect:—  
Geary, A. (accepted)..... £151 19 6

BURTON-ON-TRENT.—For erection of block of stables at Victoria-crescent, for Mr. Charles Swain. Mr. Thomas Jenkins, 35, High-street, Burton-on-Trent, architect:—  
Harlow and Wallis (accepted)..... £350 0 0

CHELMSFORD.—For the erection of small detached residence, Cottage-place. Mr. George E. Clare, Chelmsford, architect:—  
Samms, N..... £520 0 0  
Choat and Son..... 510 0 0  
West, E..... 500 0 0  
Johnson, F. (accepted)..... 491 0 0  
(All of Chelmsford.)

COBBHAM.—For alterations and additions to the brewery at Cobham, for Messrs. Ashby's Cobham Brewery Co., Ltd. Messrs. Treadwell and Martin, 2, Waterloo-place, S.W., architects. Quantities by Mr. H. Williams Mellor, 17, Buckingham-street, Adelphi, W.C.:—  
Peters and Son..... £2,920 0 0  
Cropley..... 2,785 0 0  
Gower..... 2,757 0 0  
Smith..... 2,700 0 0  
Wood..... 2,398 0 0  
James..... 2,370 0 0

DISLEY.—For the execution of sewerage work at Higher Disley, for the Disley Rural District Council:—  
Lomax, J. H., Mile-end, Stockport £79 5 6  
(Accepted. Lowest of three tenders received.)

EDINBURGH.—For the construction of the first gas-holder tank at the new Granton works, for the Edinburgh and Leith Gas Commissioners:—  
Macandrew, C., Edinburgh..... £17,904 0 0  
(Accepted.)

FINCHLEY.—For the erection of Glenthorne, the Bishop's Avenue, N., for Mr. J. Sainsbury. Mr. Ernest Carrist, 57, Lincoln's Inn-fields, W.C., architect. Quantities by Mr. R. Williams Mellor, 17, Buckingham-street, Adelphi, W.C.:—  
Ashby Bros..... £4,983 0 0  
Brown and Co..... 4,784 0 0  
Johnson and Co..... 4,538 0 0  
McCormick and Sons..... 4,484 0 0  
Grover and Son..... 4,471 0 0

GIBRALTAR.—For the construction of Admiralty Docks: Topham, Jones, and Raiton, of Westminster (accepted), between £2,000,000 and £3,000,000.

GRAVESEND.—For the erection of buildings to house the Gravesend Rowing Club and the Thames Conservancy Board, for the corporation:—  
Sandford, T. G., jun. (accepted)..... £295 0 0

HEREFORD.—For the erection of two pairs of villas in Westfaling-street. Mr. Ernest G. Davies, M.S.A., 6, St. John-street, Hereford, architect:—  
Mason, J., Hereford (accepted)..... £1,030 0 0

HEREFORD.—For the erection of a pair of villas in Ryeland-street. Mr. Ernest G. Davies, M.S.A., 6, St. John-street, Hereford, architect:—  
Mason, J., Hereford (accepted)..... £690 0 0

HIGHGATE.—For the entire re-drainage and new sanitary work and fittings to the Archway-road Infirmary, Highgate, N., for the Guardians of the Poor of the Holborn Union. Mr. H. Williams Mellor, 17, Buckingham-street, Adelphi, W.C., surveyor:—  
In excess of the prime cost of the priced schedule of prices:—  
Adams..... 37½ per cent.  
Finch and Co..... 35  
Sharrum..... 33½  
Barrett and Power..... 25  
Minter..... 17½  
Reason..... 17½  
Wall, H., and Co..... 15

LEOMINSTER.—For the erection of cottage hospital in South-street, for the Hospital Committee. Mr. Ernest G. Davies, M.S.A., 6, St. John-street, Hereford, architect:—  
Page and Son, Leominster..... £1,825 0 0  
Davies, J. J., Leominster..... 1,769 0 0  
Morgan, J., Kingston..... 1,698 0 0  
Taylor, W. C., Ross..... 1,594 0 0  
Holland, T., Leominster..... 1,412 2 6  
Watkins, J., Leominster..... 1,395 0 0  
Edwards, C., Leominster..... 1,350 0 0  
\* Accepted subject to slight modifications, reducing to £1,310.

LITTLE BIRCH, HEREFORDSHIRE.—For alterations and additions to house for Mr. Evans. Mr. Ernest G. Davies, M.S.A., 6, St. John-street, Hereford, architect:—  
Taylor, W. C., Ross (accepted)..... £250 0 0

LITTLEHAMPTON.—For the erection of the Connaught-road boys' school, for the Littlehampton School Board. Mr. Gordon P. G. Hills, A.R.I.B.A., 4, Adam-street, Adelphi, London, architect. Quantities by Mr. O. A. Bassett-Smith, 10, John-street, Adelphi, London:—  
Longley and Co..... £4,983 0 0  
Wallis, W..... 4,597 0 0  
Burrell, A..... 4,527 0 0  
Linfield and Son..... 4,030 0 0  
Snewin Bros. (accepted)..... 4,015 0 0

LIVERPOOL.—For fixing at the Everton centre. St. Domingo-road, a 36in. electric fan, with galvanised shafting, for the city council:—  
Walsall Electrical Co. (accepted)..... £56 0 0

LIVERPOOL.—For alterations to chimney at Windsor pumping-station, for the city council:—  
Ball, J., Oldham (accepted)..... £134 14 0

(Continued on page XV.)



# THE BUILDING NEWS AND ENGINEERING JOURNAL.

VOL. LXXV.—No. 2288.

FRIDAY, NOVEMBER 11, 1898.

## ALL-ROUND MEN AND SPECIALISTS.

IT is becoming increasingly hard in these days to draw a line between the designer of buildings and the numerous branches about which the modern architect has to know something. Attempts have been made to differentiate the fine-art architecture from the constructional and commercial aspects of the profession, but to very little purpose. The architect is now employed to build a large block of offices, an asylum, or a monster hotel, and is paid 5 per cent. on the total cost, and is expected to bring to his task a sufficient knowledge of iron construction, sanitary arrangements, of warming, ventilation, and a host of other qualifications. That he is able to do so with any degree of ability or satisfaction to himself is not very evident; but he is called upon to undertake the work in its entirety—it is part of his profession, and his building is judged by the results. That he is prepared for such a multiplicity of attainments is by no means certain. What he is chiefly expected to do is to see that the several requirements of his building are carried out; to arrange with the contractors and tradesmen, and generally superintend their work. Fine-art architecture is a minimum quantity—the owner and the public are not very critical about the artistic discernment shown in the elevations, their proportions, or details; ever since the era of invention set in, architecture as an “art,” so called, and as a commercial business or agency, began to diverge. No doubt these reflections are profoundly disappointing to the younger men whose aspirations are those of the now-historical group of Memorialists who started the question in 1891, “Is architecture a profession or an art?” or the clique of artist-architects who keep aloof from the commercial interests. These men are honest up to a certain point. They set before themselves an ideal of art divorced from modern requirements. Men who lived in the “forties” and “fifties,” imbued with the idea of Revivals, could sympathise with this view; but the situation is completely changed. The scholastic school of architecture has given place to the practical, and it is now a question of embodying all that is new in materials, new methods of construction, appliances in warming, lighting, ventilation, and inventions introduced to meet the requirements of trade, and the architect who can do this without any scruples about taste with the least expenditure is the coming man of the profession. Those who take this wider view of art consider that it must develop with the times, instead of being a sort of petrification of a previously-existing age or nation. In the future there will be fewer opportunities for men like Britton, Pugin, Rickman, and their *confrères*; nor will perhaps an occasion again arise in our time for the wholesale rebuilding in any one style like that which fell to the lot of the late Sir Gilbert Scott, or the older revivalists. These were periods of transition that have passed away. With the change in the domestic and industrial life of the age, and the marvellous developments in such things as iron and steel construction, electricity, heating by steam, the complex arrangements of buildings for offices, baths, technical institutes, hospitals, big hotels, and play-houses, there is less opportunity to employ any of the old-world features of architecture. It is impossible, except, perhaps, in church building, to carry out any particular style in its integrity without committing ourselves

to a seeming anachronism; but we can still endeavour to work on the principles of all true and abiding art, to try and make our work true and honest in intention, to express what we mean agreeably to a reasonable limitation of our materials; in a word, to apply the spirit, if not the letter, to our buildings. In an able address on “The New Architect,” by Mr. Howard Pentland, R.H.A., delivered at Dublin, at the opening meeting of the Architectural Association of Ireland, this broader view of architecture is upheld. Mr. Pentland disclaims against anything like an exclusive art aspect; he ridicules the idea of the memorialists that the art faculty cannot be appraised or tested by examination. Mr. Norman Shaw and his colleagues, in that famous repudiation of professional registrable architecture, is taken to task, and the President of the Irish Association of Architects maintains that, in respect of the “new architect,” his registration becomes every day more of a necessity.

But the modern practitioner—the “new” architect, as he is called—cannot be a proficient in every branch of his art. The Italian Cinque Centists, who practised various subsidiary arts, did so under favourable conditions, and succeeded—they worked in harmony with painters, sculptors, potters, and goldsmiths; but since the inevitable split between architecture and craftsmanship, the architect is handicapped: his only opportunity is to become a specialist or an administrator—he seldom can become both. Mr. Pentland speaks of those instances where the architect has to be made responsible for the design and execution of buildings in which experts of different kinds are employed. Joint employment of skilled men is not common; a consulting architect or engineer is generally intrusted with the guidance of work, and a man with an administrative capacity, who has a knowledge of each branch, is the man who insures an agreeable co-operation; as, for example, when a large hotel is built, where constructional and steel experts, hydraulic and electrical engineers are enlisted, and hot-water, ventilating, cookery, and laundry work have to be carried out in detail; but imagine an army of independent tradesmen let loose without control;—all careful selection or co-operation is out of the question, and the results are unsatisfactory in the extreme. These are the alternatives, therefore: a man possessing administrative skill and understanding the general principles and practice of a variety of engineering work; and a specialist who knows nothing of any but his own art. The architect ought, if possible, to combine architecture with engineering and science, though in practice, this combination of talent is not often formed under our present system.

One of the admitted difficulties of the architect is to fall into line with experts of engineering, constructional manufacturers, craftsmen in metal and wood. He finds their materials and methods different to his own. His training has not fitted him for undertaking the inception and design of large iron roofs, fireproof floors, or the construction of special structures intended for various purposes. Take, for instance, the qualifications required for designing a theatre to embody all recent improvements and appliances, as to fireproof tier construction, stage machinery, and apparatus for the moving and shifting of scenery, hydraulic details, and lighting, ventilation, &c. These are things beyond his usual province. If circumstances throw a building of this kind in his way, he has to resort to a variety of experts before he can properly prepare his design and specification; but even after he has done this, he must leave a great deal to their control. Here his administrative power is called for. The advice given by Mr. Pentland is this: Let an architect extend his professional knowledge, and, if he require

help in any particular, let him be the consulting architect for the whole as well as the specialist in those branches he has at his finger-ends, and engage a good temporary assistant from a practitioner or a manufacturer skilled in the work, or even another practitioner, and turn out complete drawings and specifications on which definite tenders may be invited. “His work will hang together as no patched combination of independent schemes ever can,” and he will soon gain administration of power, and become an “all-round architect with strong points, rather than a specialist with weak ones, which is about the best account that many architects can honestly give of themselves.” The advice is sound as far as it goes. Administrative skill is desirable, but must be accompanied by knowledge. Competence in more than one thing is an essential, and the man who can turn his art to engineering and can look upon both as aspects of his profession with equanimity, is the architect of the future.

## MODEL SPECIFICATIONS.—XXXVIII.

### IRON STAIRCASES—STOVES AND RANGES, STABLE FITTINGS.

WE give now a few general clauses for stoves and ranges, and stable fittings. These are items which are best left to circumstances, and are generally selected from the goods of well-known manufacturers. If the architect desires anything of a special kind or of a particular design, he must prepare details or provide a special sum. First, as to stoves, there are several kinds—slow-combustion and “register” stoves, dog-grates, open hob ranges, &c. Both “register” and “slow-combustion” stoves are fitted with tile cheeks, fixed to the stove or separately. Slow-combustion stoves are made of various widths, advancing by 2in. from, say, 2ft. 6in. to 3ft. 4in.; and “register” stoves are made from 14in. to 3ft. 4in. wide. Both are to be had with or without tiles. Hob registers are made from 14in. up to 3ft. wide. Other names are given, such as “interiors” and “mantel registers.” The interior means the grate without the side tiles or covings; the mantel register is a stove including an iron chimney-piece. These are made of various widths, from about 18in. to 2ft. 6in., or 42in. The many kinds of slow-combustion stoves have largely taken the place of the register and open-hob grate. Many good forms are in the market. The iron backs and sides have given place to firebrick backs for the better radiation of heat. A length of bar equal to about 1in. for each foot of the length of room is considered a good size, and half that amount for every foot of breadth of room. Shorland and Brother’s Manchester grates, the Carron Co., the Norwich stoves are among the stoves of this description. Then there are several kinds of radiators such as the “Safford” (Hayward Bros. and Eckstein), those of the American Radiator Co., both for steam and hot-water, largely used for warming halls, banks, churches, schools, and public buildings generally, made in various lengths, and sizes, and patterns. The names of firms like Strode and Co.; Messenger and Co., Loughborough; E. H. Shorland, Manchester; Ashwell and Nesbit, Limited, of Great James-street; and others give a guarantee of quality and workmanship. Some of these radiators are made circular and semicircular shapes for corner of rooms, and in any arrangement of tube, as those of Messenger and Co. and Hayward Bros., and either for hot-water or steam.

Kitchen ranges are of three general kinds—open-fire, close-fire or kitcheners, and portable ranges, and they may be had from 20in. up to 66in. or more. The close-fire ranges or kitcheners are largely used, as being economical in fuel, with fire-openings



of 10in. or 14in. wide, and these are made with oven and open boiler: the fires can be "open" or "close." High-pressure boilers of the boot or other shape can be attached. The boiler should be 3in. riveted plate, with manhole and holes for circulating pipes, and should be built round with flues in firebrick under and at back of boiler 14in. by 6in. The architect is advised to obtain the catalogues of good firms to select from, or provide a p.c. sum for same. Close-fire and open ranges should be provided with brass taps, bright mountings, skirting, iron or tile coverings, plate-rack, dish-rest, draw-fret, dampers and frames, sliding register, soot-doors, and a boiler of sufficient size—2ft. or 3ft. long and 2ft. 6in. high, and 9in. deep. In large ranges, an oven and "roaster" are both required. When a roaster is not required the space is called a "sham."

Stable fittings should also be selected from good firms. We give a few general clauses. Referring only to the ironwork here—the importance of gutters and drains—it is necessary to specify a form of gutter that is both strong and will not choke up. Many forms of cast and wrought iron gutters are in the market. The St. Pancras Ironwork Co. make a good open gutter in wrought iron, which we show in sketch 7. Being made in wrought iron, it can be laid perfectly straight, and it is made in 10ft. lengths. The old cast-iron gutters are liable to get cracked. The same company make a covered gutter (see sketch 8), which has a movable cover of wrought iron, the bottom or channel being of cast iron. But their flat, covered gutter, made of wrought iron, leaves little to be desired. Good paving bricks or Staffordshire paviments, with grooves laid in parallel lines in one direction, make a good standing for stables; and several blue-black Staffordshire paviments, blue-black throughout, are to be recommended. Sketch 9 shows a stall division-post, with ball head.

45. *Pavement Lights*.—The pavement lights, with glass lens (name if of the St. Pancras Ironworks Co., Ltd., or Hayward's), to be fixed into rebates on the kerbs bedded in neat Portland cement, and afterwards grouted with cement, and the joints cleaned off and pointed below (see section 1 and 2). (Most of the best firms like the above send out the lights ready for fixing. If it is necessary to have iron bearers to support the lights, specify a T-iron joist, and let the pavement light rest on the lower flange.) Or—

The pavement lights to be No. 3 pattern of the St. Pancras Ironwork Co., 6ft. 2in. long by 3ft. 10in., with 4in. by 13½in. glasses (or best roof plate), fitted to 2in. flange, let into stone kerb in neat cement, grouted and pointed complete; or "No. 5 pattern" light, 4ft. by 1ft. 4in., with semi-prism lenses.

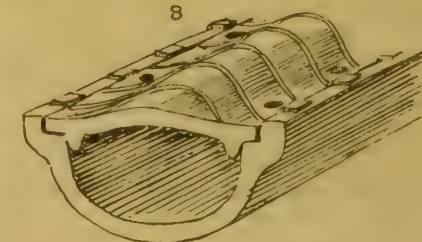
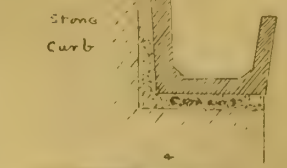
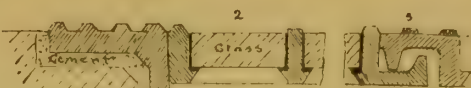
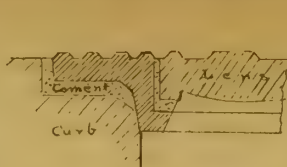
46. *Cellar Flap*.—Provide and fix one of St. Pancras Ironworks "No. 13 pattern" glazed rough-plate (or semi-prism lenses) balanced cellar flap, with patent system of balance, fitted with guttered kerb frame on three sides, with movable bearing bar at back, 6ft. 7in. by 2ft. sight opening. It is to be fitted with gutter frames, bedded in neat Portland cement and grouted. Or—

47. *Rolling Light*.—The basement to have a rolling basement light, 6ft. by 1ft. 6in., to run on wheels on bars of L-iron, glazed with 4in. by 3in. semi-prism lenses, and fitted in a grooved frame (see section). The stall-board light to be No. 16 pattern (St. Pancras Ironwork Co.), glazed with rough glass (or prismatic reflecting lenses), and to be hung on hinges to open inwards or outwards (see section 5); or the cellar to be provided with Hayward's patent cellar-flaps with frame all round, with patent gear fitted with rough plate or semi-prism lenses; or to be fitted with Hayward's "Luxfer" prism pavement lights, No. 19 pattern, 6in. by 3in., bedded in cement in iron frame.

48. *Manhole Covers*.—The manhole covers to be perfectly air-tight, strongly made, and to fit into a grooved frame with flange, and set on the brickwork in cement. Or—

Provide and fix over manholes Young and Marten's "new pattern locking manhole covers," triple locked, with rounded bevel lugs to fit into slots in frame.

49. *Circular Iron Staircases* (See Clause 37 ante).—The iron spiral staircase shown on plan is to be one of Hayward's "Improved"



circular staircases, with tread, riser, and spandrel in one, with open-scroll tread, right hand, 6ft. diameter, with central iron column 4in. diameter, and cast-iron shoe-plate, and top landing, with ornamental cast-iron panels and twisted bars, one to each step, with dado screen between; or to be Hayward's pattern, with open riser, No. 15 bar, and No. 25 panel on each step, with newels, and handrail complete.

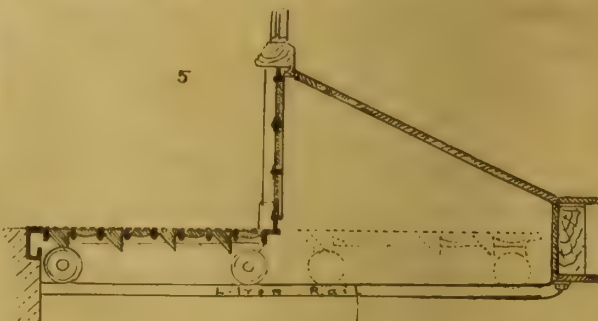
50. *Iron Staircases from Drawing-Room*.—Provide and fix from drawing-room to garden Hayward's Improved iron staircase and landing 3ft. wide, with tread, riser, and spandrel in one; the landing to have Hayward's patent lights, with No. 140 cast-iron panels to steps (one to each), and handrail, supported on round-iron columns, with bed-plate in concrete. (State height of landing from ground or floor, if columns or cantilevers are required for support, if handrail and balusters are to be on one or both sides, or give sketch.)

51. *Fire-Escape Staircase*.—Erect as shown on plan a fire-escape staircase, with straight flights, winders, and landings, to three or four floors, fixed with wrought-iron columns fixed to bed-plates in concrete, with balusters, newels, handrail, &c., complete; or fix Hayward's (or St. Pancras Co.'s) iron staircase, as No. — in catalogue.

52. *Stoves* (See clauses 43 and 44 ante).—The reception-rooms to have strong register stoves of approved patterns selected by the architect, to be supplied by Messrs. Young and Marten (Stratford), or state No. 604 (or No. 2418) with square front (or finished tile grates of selected patterns), with brass mouldings, brick back wrought bars, semi-slow fire and ashes fret, with canopy, and hand-painted tile panels.

53. *Registers*.—The bedrooms to have strong hob registers, with brick backs and strong bars 36in. wide (or tile mantel registers with two rows of 6in. tiles of grey or terracotta tint all round).

54. *Dog Grates*.—The fireplaces of drawing and dining-rooms to have superior dog-grates, selected by the architect, or quote number in catalogue of approved maker (as No. 2257 Messrs. Young and Marten).



The fireplaces to have E. H. Shorland and Brother's patent Manchester stoves, with warm-air flues and chambers; or Shorland's patent combination open-fire and warm-air generating Manchester stoves, 36in. wide, with ascending or with fluted down-draught pipe, to be fixed according to their directions.

55. *Close Kitchen Ranges*.—Provide the sum of £20 (p.c. net) for strong close fire, oven, and back boiler range, with wrought-iron oven, covings, bright fittings, sliding register, plate-rack, steam escape-pipe. Or—

Provide and fix in kitchen a best quality double-oven kitchener of improved manufacture, 30in. high by 22in. deep, fitted with oven and roaster (or two large ovens), covings, sliding register, ventilators over ovens, bright mountings, dampers brought out in front, fitted with wrought welded boot boiler with manhole, safety-valve, &c., or provide the sum of £25 for same. Or—

56. *Kitcheners*.—Provide in kitchen a double-oven kitchener of improved manufacture, of extra strong metal, 4ft. 6in. or 5ft. wide and 30in. high, with cove plates all round, patent open and close fire arrangements, lifting fire, plate-rack, with polished edge brackets, sliding register, top plate, ventilator for oven and roaster, wrought-iron roaster, doors with double hinges, movable fire-bars, movable bottom grate in rebated frame, three dampers, two bright outside table shelves, draw-out fret, ash-pan, rake, cover-lifter, &c., complete, or provide Hayward Bros.' (or Steven Bros.) kitchener answering to above description.

57. *Kitchen Ranges*.—Fit up in kitchen the "Acme" or other approved range, 48in. wide, with oven and boiler with tap (or double ovens and hot closets), with strong metal bright mouldings, dish-rest, open or close fire, fall-bar to fire, and skirtings fitted with smoke-pipes, &c. Or—

Young and Marten's "Georgian" kitchener, oven and side boiler, with iron covings, No. 2972, made with large wrought-iron oven, bright mouldings, dish-rests, upright wrought fire-bars, draw-fret, heavy hot-plate, fall-bar to fire, plate-rack, sliding cover to fire, ash-pan, &c., 48in. wide, p.c., £7 2s. 6d. Or—



Provide and fix Young and Marten's "Alberta" kitchen, with oven and side boiler, and strong iron coverings, No. 1322, 60in. wide, p.c. £15 7s. 6d. The same to have "Eagle" fire, rounded corners, and jamb mouldings, bright polished plate-rack, bright dish-rests, bright malleable hinges and latch.

The range to have a high-pressure bath boiler, 3in. thick, with arched flue and steel manhole cover.

The kitchen to have the "Eagle" Co.'s close fire range, with rising and falling fire, with vertical front bars, 4ft. 6in. wide (or 6ft.) iron flues, open-fire arrangement, two ovens, ashpan, and high-pressure boiler with the "Eagle" safety bell, with white glazed tile coverings.

58. *Open-Fire Ranges*.—Supply kitchen with Hayward Brothers' "Union" open-fire range with cast L-boiler, width 60in. (p.c. sum £16). Or—

59. *Setting Stoves and Ranges*.—All the stoves and ranges to be carefully set in firebrick and fire-clay pointed in cement. The backs of all stoves to be built up solid or filled in with fine cement concrete. The kitchen and other ranges to be solidly built round with firebrick sides in fireclay. The flues are to be carefully formed, or specify that the manufacturer is to form all flues and set the ranges.

60. *Wrought-Iron Gutters to Stables*.—The stables to have covered wrought-iron gutters with L, T, and cross-pieces for the same. The covers to be well roughed on surface, and the gutter to be provided with lugs to fix to concrete; or the surface-gutters to be those made by the St. Pancras Ironwork Co. (No. 97), with cover; or the stalls to have the St. Pancras Co.'s patent cast-iron (or wrought-iron) cover, the trough being bedded flush in concrete, with all L, T, and cross-pieces. Or—

The stalls to have the wrought-iron open gutter, No. 341, St. Pancras Ironwork Co., with roughed surface (see sketch) and lugs to secure to concrete bed; to discharge into trapped drain-pots, cast in one piece.

Stable fittings are generally selected from the catalogues of well-known manufacturers, as those of the St. Pancras Ironwork Co. (Messrs. Musgrave and Co.), or other reputed maker. (See catalogues.) The clauses may take this form:—

61. *Stable Fittings*.—The stable to be fitted for three (or five) stalls, each 9ft. 6in. by 6ft., and one loose box (size, 12ft. by 12ft.), by the St. Pancras Ironwork Co., or with their patent stable fittings (state particular pattern of stall-divisions selected, manger, and loose-box fittings). The ironwork to be accurately fitted together, and to be fixed with screws. The stall-divisions to 2in. thick, with wrought-iron riveted ventilating panelling at top to design (3ft. deep), with moulded wrought-iron ramped capping, moulded wrought-iron middle rail, prepared for 2in. boarding, and filled in with 3in. or 1in. wrought-iron bars, 3in. apart (centres). The boarding to fit at bottom into a cast-iron moulded sill, 2½in. by 2in. The loose boxes and stalls to have cast-iron pillars, 4in., with ball tops and cast-iron bases, and are to be bedded in concrete.

Other fittings may be described in detail, or the No. in catalogue stated; or allow p.c. sum.

62. *Stall and Loose-Box Divisions*.—(See Sketch 9.) The stall and loose-box divisions to be in accordance with drawings. The post to be cast (or wrought) iron 4½in. diameter, 5ft. 3in. high, with ball head tops with flanged base-plate bedded in concrete (or to be fixed on a stone base with four lewis bolts). The divisions to be 9ft. long and 6ft. apart, and to have moulded ramp and wrought-iron sill for 2in. boarding, ventilating ramp of wrought-iron with half-post at wall end. Or—

The stall divisions to be supplied and fixed by the St. Pancras Ironwork Co., with posts 4in. diameter with ball tops 4ft. 2in. high with wrought-iron ventilating ramp and sill for 2in. boarding (No. 664 or 562 in catalogue), with iron ring to post complete; with manger fittings with curved front, cross-bars, improved shoes and bearers, iron shackles, &c.; or as shown in catalogue No. 441 or 732.

63. *Manger Fittings*.—The stall manger fittings to be 6ft. long with extra large barrel front, wrought-iron hay-rack, sloping wrought-iron grid, seed-pan, and removable tray, large manger-pan, and water-trough, brass plug and washer, brass shackles for halter tyings, improved shoes and bearers, enamelled (or galvanised).

64. *Stall Fittings*.—Fit up stall manger fittings as shown, 6ft. long, with curved fronts, wrought-iron hay-racks, sloped grids, brass plug and

washer, iron shackles for halter tyings, and fixing with proper bearers. Or—

The manger fittings to have large barrel front wrought-iron hay-rack, sloping grid, seed-pan and tray, large pan and water troughs, brass plugs and washers, brass shackles for halter, and shoes and bearers complete. The fittings to be enamelled (or galvanised). Or—

The manger fittings to have a wrought-iron (or steel) curved safety front, wrought-iron hay-rack, brass plug and washer, brass eyelets for halter tyings, manholes, improved shoes and bearers, supplied by the St. Pancras Ironwork Co., and numbered 580.

65. *Loose Boxes*.—The loose boxes to be constructed with strong wrought-iron framed loose-box door, 3ft. 8in. wide, ventilating grating 2ft. 9in. deep, improved hangings, safety brass latch, and wood-work cappings, &c., to correspond with stall divisions. The boarding to be 2in. thick, 4ft. or 5ft. high, with 2ft. or 2ft. ventilating grating. The fittings are to be extra strong with barrel fronts, large manger pan, wrought-iron hay-rack, and sloping grid, fixed seed-pan, and removable seed-tray, watertrough, brass plug and washer, moulded skirting, enamelled or galvanised supplied by the St. Pancras Iron Co., No. 606.

66. *Generally*.—All the eaves-gutters to be jointed in red lead and bolted at joints; the rain-water pipes to be set up in red lead or iron cement (or joints to be plugged with tow and coated inside with tar); all iron casements and frames to be bedded and fixed in white-lead to wooden frames; all seatings to be of 8lb. lead, or to have stout pads of boiler felt 16oz. to the sheet; supply all necessary angle-irons to ends of iron joists riveted to webs; also stiffeners, bolts, and rivets, heads, nuts and washers, packings, and other requisites for the completion of the ironwork. All the ironwork to be painted before being sent out. (The position, lengths, and weights of all iron joists may be conveniently given in the specification of iron or fireproof floors.)

For all artistic wrought ironwork of superior design or finish, a sum ought to be provided; obtained from an art metal-worker.

#### ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE sixty-fourth session of the Institute of Architects was inaugurated on Monday night, when there was a good attendance of members and visitors. The President, Professor GEORGE AITCHISON, R.A., occupied the chair, and delivered

##### THE OPENING ADDRESS,

in which, after returning thanks for his re-election, and referring to the death of M. Charles Garnier, Royal Gold Medallist, who had, he remarked, given a new expression to French architecture, and had added a new leaf to her laurels, congratulated the profession on the

##### IMPROVEMENT IN LONDON ARCHITECTURE

that is now observable. It was a great triumph for architects to think that they were converting a rather dull city, mostly composed of brick walls with holes in them, into a town almost as picturesque and varied as the old towns of France or Flanders. Of very important buildings in the centre of London there had necessarily not been very many; but in the outskirts numberless town-halls, technical schools, and other municipal buildings had sprung into existence, and they had mostly some stateliness, picturesqueness, or originality. The President regretted to read the remarks of Mr. Norman Shaw, who had been acting as one of the assessors on the designs for the buildings of the Californian University. He said that, "The competition had been held in the hopes of discovering some architectural genius, but in this it had failed," and he felt "a twinge of national regret when no English name appeared among the selected eleven"; the plans selected were, without exception, of the French school. "Architecture," said Mr. Shaw, "was more thoroughly taught in France than in England; at the same time, French teaching destroyed individuality."

##### GENIUS AND EDUCATION.

It was peculiarly unpleasant that a celebrated English architect could justly speak of a more thorough teaching being given in France. One naturally asked, Why was this? For one would think that what was teachable could, and ought to be as well taught in England, America, and Australia as it was in France; at any rate, the first thing that the English architects should do was to see that this inefficiency was corrected.

He would hardly believe that teaching, if not carried far enough to stifle independent thought, could extinguish individuality, for certainly some of our great poets were the best educated men of their day. As far as we knew, we could not give ourselves genius; but it was most probable that, if a large number of persons would acquire that which a good architectural education could give them, there would be a genius among them; and surely a well-taught genius was better than an ill-taught one. M. Edmond Demolins had said that the education given to the English had peculiarly fitted them to be successful colonists.

Whether this method of education was deliberately chosen, or whether it was stumbled into through the natural bent of the people, did not appear; but they could only hope that, either by accident or design, they might find as successful a method of teaching architecture. Architecture was the poetry of construction, and the noblest poetry was naturally found in buildings that were applied to the highest transcendental uses. A certain amount of comeliness was necessary to every building, except such buildings as were required to create fear, horror, or a sense of ignominy, such as castles, gaols, gallows, and pillories. The man of the most striking appearance was not a perfect organism if he had some incurable internal defect; and so in a building no beauty would wholly compensate for its want of answering the purpose for which it was built, and even if it answered its purpose, and had a beauty that was quite incongruous with its use, it became as ridiculous in the eyes of judges as a man in a state dress acting as a scavenger. In some of the modern buildings that at first sight affected us strongly, from their size, mass, or ornamentation, if this size and this massiveness were not necessary, or these embellishments were not consistent with the uses of the building, we merely despised the factitious effects. As our knowledge of the strength of materials, of the strains and stresses that resulted from the different forms of buildings became more accurate, it would naturally affect the shapes of the different parts of the building, and they must look very much to this for

##### FUTURE ADVANCEMENT IN ARCHITECTURE.

We want, the President continued, to mark those portions of buildings that have special duties to perform with that architectural emphasis which is given by mouldings, and these mouldings have to produce the effect we want in our own climate. To use mouldings that were designed for climates different from our own, and consequently, do not properly answer their purpose, is really to declare ourselves indolent or incompetent; we have plenty of plausible excuses—i.e., that the Romans used the same mouldings whenever they built, and that their Renaissance imitators did the same, and that the archaeologists, our masters, would be shocked at any architect who attempted to think; but neither excuses nor bad examples will avail us, if our sole object is to advance our art. We have, too, to consider the purposes to which our buildings are to be put, the ratio of strength we must allow. According to the uses which the building is to subserve, we must consider the ornaments that are to be given to it by the sculptor, and whether their forms are to be taken from vegetable life only, or are to include animals or man. Where buildings are to be used for the highest intellectual or moral ends, it is, perhaps, difficult to find even figure sculpture that will sufficiently express their high use. Sculpture is wanted on all buildings; but its use should be imperatively called for by the people for all public buildings, and this is particularly called for when the buildings are for benevolent purposes, such as hospitals, asylums, workhouses, rests, refuges, and homes. The subject of colour is one that has of late years fallen greatly into disuse, but very unnecessarily. Hitherto, the proportions used, or, as the ancients more properly called them, symmetry, which forms so important an element in architecture, has been almost confined to those taken from the highest transcendental buildings of the past; but we see in nature every conceivable proportion, and most of these are good.

##### THE THING WE WANT MOST

is the Advancement of Architecture; but who is to show us the way? A deceased architect of marked ability said we must wait for another irruption of barbarians, and probably if they were barbarians of improvable quality they might solve the problem; but it would be a drastic measure that most of us, at least, would pray



might not occur in our time. The greatest obstacle to the Advancement of Architecture is the fact that the bulk of Englishmen do not care about it in the least, and the fine arts are not likely to improve if no one cares for them. So every architect should be ready to point out what architecture does for a nation, and so help to create the want. Architecture must even from the size and importance of its monuments create some sort of emotion in the beholder; and the least reflection will show him the vast army of various men that have been employed to get all those materials, and to bring them together, the thousands of craftsmen wanted to fashion them and put them in their places; and according to the stateliness, the impressiveness, or the beauty of these buildings will the power, wealth, and grandeur of the nation that has erected them be brought before his mind. If these buildings are for the highest purposes and clearly express their character, deep emotion will be excited in him, and he will also think of the science that these buildings presuppose, the artistic skill of the architect and artists employed, and of the artistic tastes of the nation at the time in which they were built. As the late Charles Garnier said, "Architecture is an obtrusive art." Its masterpieces thrust themselves upon you, and cannot be hid in a corner, and as long as they remain they call from the people who wish to see them a journey to the land of their creation: so if we want a good account of our time to be given to posterity, we must pick out good architects, encourage them to do their best in erecting important, well-built, and æsthetic structures; if this is neglected, the age in which we live will be lampooned. The case of the painters and sculptors is quite different from ours. It is not pleasant for a painter to paint a picture, or a sculptor to model a statue, that does not sell; but an architect cannot put up a monumental building in the hopes that the public will approve of it, and pay the expense. The most he can do is to show a drawing or a model in public, and persuade men in power, or of immense wealth, that he is both capable and original, and will be able to charm the public by his work. How did the architect of the Erechtheum persuade the State to employ him? So small a monument as that of Lysikrates could well have been shown by a model.

#### TO GET THE PROPER TEACHING

is not so easy as to say we want it; but in architectural education, as in general education, we must endeavour not to teach that which is dead, nor that which is useless, but confine ourselves to the necessary and the useful. The very first thing to be taught is construction, and it is not the mere rough knowledge of the main principles, but that exact and accurate knowledge which was possessed by the Late Romanesque architects of the properties of stone. They got this knowledge mostly by the failure of their buildings, but they reasoned on the causes of the failure; they observed, they thought, and they dared;—while we have most accurate means of testing the strength of every material that falls to our hand, and if we be mathematicians, we can solve every stress and strain, as the engineers have done. We have many new materials that our predecessors had not, and some of extraordinary strength, and of a capacity for taking nearly every form with ease. Cast iron, for example, is not without dangerous qualities when exposed to fire, but we ought not on that account to neglect it. With wrought iron we have other difficulties to contend with, besides the danger of fire, for it is very difficult, and still more expensive, to make this in any agreeable or beautiful shape, and to ornament it; but we cannot believe that the Mediæval architects would not have largely used both materials if they had possessed them. We have, too, practically a new material in concrete, but this material also is not without its difficulties and its drawbacks, and we have besides all the old-world materials to our hand to deal with structurally in a more perfect way than they ever could have been dealt with before, and the whole category of old shapes to use, and new forms to adopt, that have never been used before. If the dictum of Sir Joshua Reynolds be true, that by becoming familiar with the invention of others we learn to invent, the great knowledge that we possess of past architecture should make us more ready to invent; but, in fact, so far as architectural forms are concerned, the gift of invention seems almost extinct. We have only this to say in excuse: that from the fifteenth century to the middle of the last century, European architects

had nothing but Roman architecture, or its Renaissance imitation, to study and to use; since then we have had Greek and Gothic. Neither of these styles, however, was used to stimulate invention, but merely to copy, and even in the present day it is doubtful whether the invention of a new form, unless it were surpassingly beautiful, would be tolerated, for antiquarianism has usurped the place of architecture. We must study the expressive and beautiful buildings of the past to learn how their effects were produced; but, having learnt that, our object should be to invent other proportions and other shapes, whose effects shall be equal or superior to those of the past; and invention is merely the adaptation of some of the innumerable forms of nature. In the present day there is even less invention amongst architects than there was amongst the Romans, for the Romans, at least, started a new method of adornment when they carved the shafts of their columns, or covered their pilasters with running foliage; but, of course, it is to the Gothic architects that we must look for those rapid adaptations that we now call inventions. Gothic architecture, from the time that it emerged from Romanesque, passed rapidly through what we call Geometrical and Decorated, till it fell into the mechanical stiffness of Perpendicular. Were these men blessed with greater powers of invention or adaptation than we are? or is it that the gift has become atrophied for want of use? At any rate, the substitution of archaeology for architecture must tend to this result, for if the wing of the apteryx dwindled to the size of your thumbnail for want of use, it is probable that our powers of invention will do the same. We are not, however, so destitute of invention as we appear to be, for in out-of-the-way places in the country you see the elements of new Gothic and new Classic, where the architects have not been very learned, and have not had the fear of the archaeologist before their eyes.

#### IF WE HAVE THE GIFT OF INVENTION,

it is only by the constant exercise of it, and by comparing our inventions with the excellence of the past, that we are likely to progress. The architecture of one century, or perhaps even of one quarter of a century, should not exactly resemble that which went before it, for besides our proclivities and aspirations not being exactly those of our fathers' time, if our knowledge and invention were progressive we should want the one for use and the other for emulation. I do not speak about ornament, whether carved or painted, for that is the business of the sculptor or the painter. I by no means wish to discourage architects from being painters, sculptors, and ornamentalists, so long as they are good architects as well; but it is absurd to give up the advancement of our own art for the sake of being dabbblers in the arts of others. I have said nothing about the art of planning, although in these days, where convenience is thought of more importance than anything else, it is the art by which most competitions are gained. No one can deny that it is a useful art, and may be a very impressive one, and in its highest form it is not sufficiently studied.

#### THE RESULTS OF OUR OWN EXAMINATIONS

have had a very stimulating effect on the students. The examinations let them know some of the things they ought to study, and give them an object to aim at. Examinations, however, have certain shortcomings, like everything human: they test insufficiently. Besides, they lend themselves to cramming. Architecture in every one of its three branches requires accurate thinking to the end in view, and no cramming is of the slightest use in that direction. The only use ever claimed for it is that it enables a man to seem to know what he does not know, which may be useful on occasions. The plan or arrangement of a building requires to be made perfectly suitable for its purpose, and in the cases when the building is not for common use it should have a certain effect, and if for high purposes, the forms require to evoke feelings of dignity, stateliness, sublimity, or awe. I cannot refer to more perfect examples than the Parthenon and the inside of the Pantheon. Plans embody not only the general conception of the building and its supports, but should roughly inform a skilled person of the whole scheme of the completed building. We judge of the constructional skill of the architect by the smallness of the ratio of supports to the total inclosed area. Every one of the three branches of architecture is not only sufficiently

difficult, but may be considered transcendental—*e.g.*, when we look through many plans we see that some are not only more convenient and more striking than others, but sometimes it seems as if the great planner were first, and the rest nowhere. As buildings are meant to stand, it is rather a paltry trick to arrest attention, to make a building look unsafe, or to put in a piece of construction which forces us to ask how the architect has managed to make it stand. We want everything to look stable, so that our whole attention may be given to the æsthetic effect; but at the same time skill in construction will enable us to give great variety in the different parts of the building. Every building wants character, and that character should show its use; and when buildings are for the purposes of dignity, reverence, or awe, it is most important that their proportions should excite these feelings, and that any sculpture or painting that is put on them should heighten their effect in the same direction. Although it may seem a paradox to say so, the special convenience that should attach to every building is not so important in the highest sort of monuments, as for the monument to excite a feeling of sublimity, and for this reason—that high thought clothed with beauty is much more lasting than ordinary wants.

#### THE PRINCIPAL THINGS THAT WANT TEACHING,

when construction and the art of planning have been mastered, are the proportions that have raised the various emotions in existing buildings, the art of moulding and the exercise of the inventive faculties, for it is doubtful if invention is denied to any average human being, although some have it in such profusion that it is easy to them to invent. In every new building we arrange, difficulties arise in giving the necessary parts that æsthetic expression that we wish them to have. It is comparatively easy to mask the construction so that we may use the æsthetic solutions of deceased architecture, and so long as we pursue this course, architecture can never advance. What should be done is to encourage the student to solve the difficulty in his own way, and that is why ironwork is so serviceable, because in that the student has nothing to copy from, and he must use his inventive powers. Very long columns and stanchions, for instance, have junctions that must be kept together by ugly lugs and bolts or some other cumbersome addition, and these have to be made graceful or beautified. There are difficulties about moulding in iron, and in trying to solve these difficult problems the student should be recommended to aim at simplicity and elegance. If after many trials he cannot do anything towards a solution of these problems, he should abandon architecture. As regards the practice of some of the younger members, there is

#### TOO MUCH STRAINING AFTER EFFECT,

too much recourse to easy means of arresting attention, such as by rustics; too much partiality for curious and incongruous forms; the sewer-arch or water-opening is too much adopted for entrance doorways and attic windows—anything for a novelty! Corners of square openings are rounded off, and projecting members are slightly curved or bellied out. Now there is nothing like a straight line for dignity, and the rounded corners and bellied door and window heads mostly produce meanness. Another device is to make columns like those barrels that are used to fill in the odd spaces in ships, where the middle diameter is nearly double that at the base and necking—a gross and vulgar caricature of the entasis of the Greek columns. This device truly arrests attention, but only to make the judicious observer note the absence of any feeling but for vulgarity. Architecture is a very difficult fine art, and these attempts to attract attention easily merely show want of proper training and laudable ambition. The simplicity, grace, and restraint of Greek work cannot be too much studied, and that profusion of ornament that is now so common is not only opposed to Greek practice, but to good taste, for nothing great is obtained without simplicity. There is

#### ONE FEATURE WE WANT BADLY,

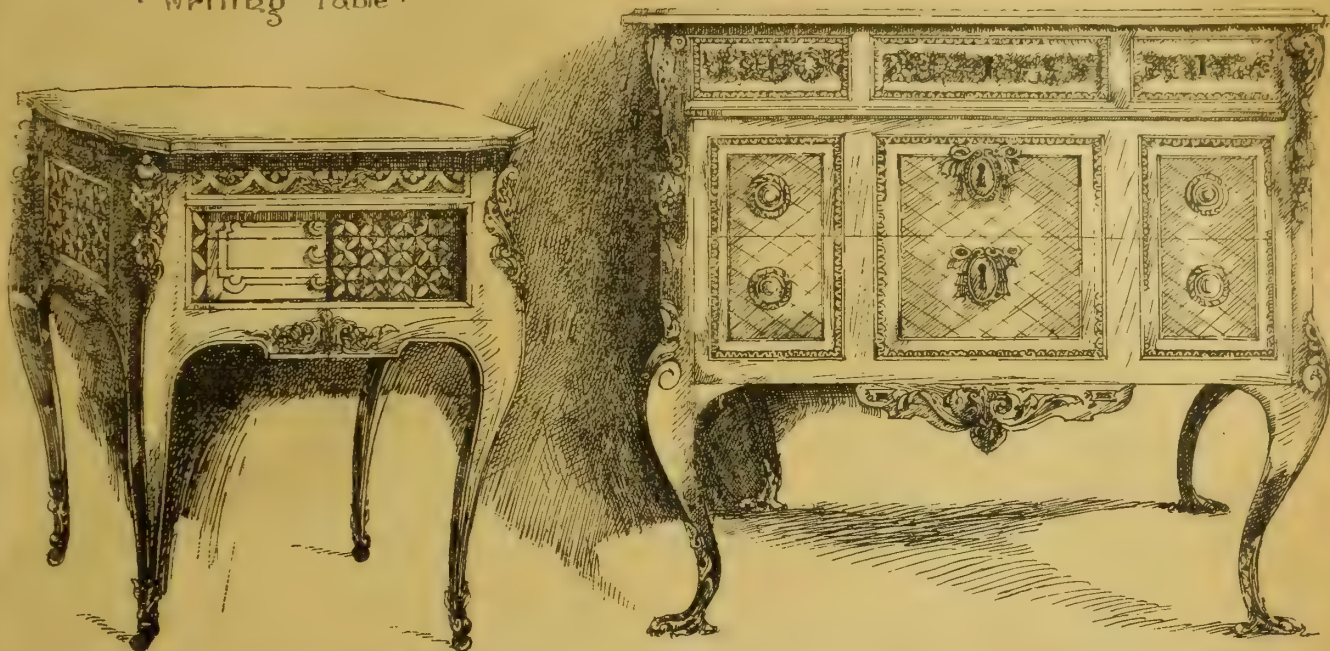
and that is a well-designed large window, for there is great demand for these in the new public buildings, and we have nothing but the huge Roman semicircular window of the Baths, and the west-end Perpendicular windows, which have little claim to beauty. There is a great want of study of lighting; half the effect of large



• FURNITURE FROM THE JONES COLLECTION SKM LOUIS XV PERIOD •

Commode inlaid black and woods by Gouthiere •

• Writing Table •



• Riserer Maroetry with  
ormolu mounts •

• Contains 3 small & 2 large Drawers with  
marble top •

WALTER J. WILKS DEL.

complex interiors is got by concentrated light against "a mighty contiguity of shade," while most of our buildings are spotted all over with windows. One of the architectural devices the student should study is to get harmonious grouping of immense windows with those of ordinary and small size, and another is how to treat the problem of the seventeen-story building; for, though we have not yet adopted this American device, the increasing scarcity of ground and the price of land in large cities tend to produce it.

THE ONLY USE OF THESE ADDRESSES

is to correct mistakes in teaching, to point out where the defects in our practice lie, and to stimulate each other to greater exertion, and, if possible, to find out the way to the advance of our art. The chief things that act as incentives to mankind are the hope of wealth, the hope of honours, and the hope of immortality; and we might well increase one incentive by insisting on being paid for our work, for we are not paid now. The powers that be might well make another incentive more common by bestowing honours on the profession, which is now hardly recognised, although it does so much to raise the reputation of the nation by designing monuments which persons from all parts come to see. I can only hope that the prospects of immortality may induce those with congenial genius and the highest ambition to devote themselves to architecture, and to spare no thought and no labour in perfecting their work, so that it may vie with the best Greek work in grace, and with the Mediaeval in impressiveness.

Col. LENOX PRENDERGAST, in proposing a vote of thanks to the President, remarked that the attempts of the modern French school of architects to evidence originality, as shown in the current issue of *l'Illustration*, were ridiculous and detestable.

Professor T. ROGER SMITH seconded the motion. He did not believe that a new style would be invented, but our architecture would be modified by the intelligent use of novel materials and fresh requirements. It was impossible for architects to forget the old forms, and equally impossible for the public to forget them. Originality must be sought for not in new forms, but in new combinations, possibly novel proportions, as to the effect of which he, for one, had grave misgivings. If anyone would compare the illustra-

tions that appeared weekly in the professional papers with those given in the same journals twenty years ago, they would be struck with the progress that was being made.

The vote of thanks having been carried by acclamation, Mr. WILLIAM WOODWARD interposed with the observation that the President had omitted to congratulate the Institute on the fact that the Government had appointed, on the recommendation of the Council, Mr. J. M. Brydon and Mr. William Young as architects for the new offices in Whitehall.

The PRESIDENT briefly acknowledged the vote of thanks.

FRENCH FURNITURE FROM THE JONES COLLECTION.

THE two examples of furniture illustrated are very fine specimens of Louis XV. period. The Writing-Table is of Riserer maroetry, with ormolu mounts, and contains four drawers, the lower three being covered by a jointed revolving shutter of inlaid woods. The Commode, by Gouthiere, contains three small and two large drawers, and is inlaid with black and white woods with mounts of chased ormolu, the top being of marble. The main body of the Commode is occupied by two large drawers, the fronts of which cut through the panels, enriching the front, irrespective of the construction adopted as the *motif* of the design, the two locks and the two sets of handles alone being in evidence as to the actual formation of this choice piece of French furniture. It bears the stamp of J. H. Riserer. Both these exquisite pieces of work come from the Jones collection at South Kensington Museum.

SIR W. B. RICHMOND ON ENGLISH ART.

AN address on the future of art in England was delivered by Sir W. B. Richmond, R.A., at the Birmingham and Midland Institute on Monday night. Happily, the lecturer remarked, a very healthy desire had grown up for the union of the arts, and with that a wholesome dislike of specialism. The arts were also widening their scope and play, and were therefore acquiring a firmer as well as a wider sympathy. The painting of pictures was slowly coming to be regarded as a very important branch of the arts,

but not the only one. The marked strides that sculpture had made in recent years were very remarkable. He questioned whether England ever had cause to be so proud of her sculptors as at present. Most of these were in the prime of life, and there was evidence that there was a younger race springing up whose energy and talent would ere long come to the front. The younger school of architects was composed of men who were original upon very safe lines. Their work was severe and restrained. With regard to the crafts, he confessed to having a very tender place in his heart towards them. The advance was so striking that one could not help drawing a conclusion therefrom—namely, that English people were really going to be tasteful as well as commercial. It was a remarkable sign of the times when technical schools were being established over the country, and a still more interesting fact was that the work done was already upon a high level of excellence. He congratulated Birmingham and the headmaster of the Birmingham School of Art that he and they moved with the times. The Birmingham School of Art was the best in England, because the instruction was not only very thorough, but very broad in its outlook. Especially did it interest and delight him to know that the lesser arts found great sympathy in their educational programme. The decorative arts would be the arts of the future. Designing for metals, mosaics, and pottery was only valuable when the designer knew the capabilities of his material. South Kensington had been a great lesson. The system there had failed to succeed, as it might have succeeded if the original plan upon which the department was framed had been practical, not theoretical. While the South Kensington authorities had been asleep, some cities such as Birmingham, and even towns, had become alive to the necessity of training for the crafts by practice in them. He looked forward to a time when England should take her place not even second to Italy at her best period. That would come when the unity of the arts had been established, when architecture, sculpture, and painting were all working together hand in hand with the crafts. When the taste for the beautiful had been fully established in small things, and when people declined to buy ill-made and badly-designed articles of finery, then the great epoch



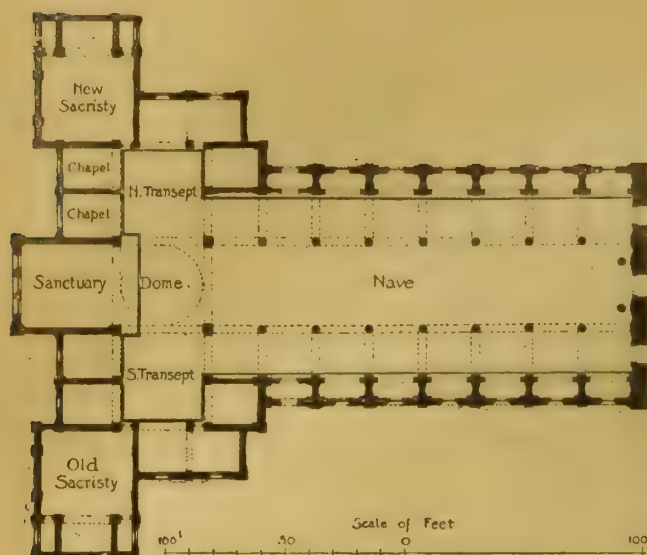


FIG. 1.—Plan of San Lorenzo, Florence.



FIG. 2.—Pulpit in Refectory, Badia di Fiesole.

to which he had alluded would commence. It would be a time of a great liberal union, a great federation of all the states of art. They were going the way to attain it, but there was a great deal to be done yet. Art as a commercial business would have to cease. All labour should be well paid, but the labour which was always a pleasure was often too highly paid. The great movement to which he had alluded was due, in a great measure, to the labours of Burne-Jones and William Morris. What was going on at the present time which was truly vital, moving, and influential was, in a large measure, due to those great artists. There was, indeed, hope for the future, and even the belief that Englishmen would ere long determine to have all things beautiful as well as useful.

#### THE HOUSING OF THE WORKING CLASSES IN LONDON.

AT Tuesday's meeting of the London County Council a report was received from the Housing of the Working Classes Committee, debating at considerable length what should be the housing policy of the Council. Having consulted the valuer, the medical officer, and the architect, the committee stated that it appears to be the opinion of these officers that for the Council to purchase large plots of land outside London, and to erect cottage dwellings upon them, would not tend to increase the accommodation provided for the working classes. A large number of persons are now building such cottages all round London, and the committee think it should be the policy of the Council not to interfere with work which is now being done fairly efficiently. The position of matters nearer the centre is, however, different. There the demand for houses is very great, and there are at present very few persons undertaking the supply. In the central districts of London there has apparently been a cessation of building on the part of many of the artisans' dwellings companies. This being so, the committee made a series of recommendations, of which the first was "That it be the policy of the Council to proceed from time to time, as opportunity shall offer, with the acquisition, under the Housing of the Working Classes Act, 1890, of sites available for the erection of working-class dwellings within the county of London." After a long discussion, during which several members protested against the idea that it was the duty of the Council to house the people of London, the recommendation was referred back to the committee with an instruction to report further in three weeks. Other recommendations were withdrawn.

Mr. J. W. Broughton, architect and surveyor, of Skipton, has been appointed an ecclesiastical surveyor for the diocese of Ripon.

#### ITALIAN RENAISSANCE ARCHITECTURE.

MR. WILLIAM J. ANDERSON, the Director of Architecture and Lecturer at the Glasgow School of Art, has just issued a second edition of his capital book giving "a general view" of this subject for the use of students, and published by Mr. B. T. Batsford only so recently as two years ago.\* We are not surprised, however, that this enlarged revision of the book has been found necessary, because the absence of any concise treatise in a convenient and handy form, such as this book may claim to be, had long been felt by those engaged in preparing for the Institute and other similar examinations, more particularly in the historical and comparative study of Italian buildings of this period approached from an architect's technical point of view. When Mr. Anderson's work originally came out we warmly recommended it for this reason, and we have the pleasurable duty to-day of advocating with equal force this new edition, which in several particulars unquestionably deserves to be described as embodying an improvement. There are some entirely fresh illustrations, for instance; but the chief gain in the new issue is comprised in the reproduction of many of the original subjects to a larger scale and in a better style of collotype printing, thus bringing out the detail in a much clearer way. Part of the letterpress has been rewritten, more especially the second chapter, giving an account of Brunelleschi's work, with added notes on the Badia Fiesolana and the wagon-vaulted cruciform church of Santa Maria della Carceri at Prato. Filippo Brunelleschi's monastic church of the Badia di Fiesole, near Florence, furnishes quite a series of illustrations of the greatest interest. Archaeologically they are interesting, and historically they no doubt demonstrate the retention of the Gothic spirit of the arched architecture of Mediæval Europe. In a similar manner the plan of San Lorenzo at Florence (Fig. 1) exemplifies the survival of the methods of the Middle Ages, conceived as they were on the lines of Byzantine ideas. Whether Brunelleschi was mindful of such considerations, or whether he was merely influenced by the circumstances with which he found himself surrounded, or not, none can say. Practically, it is scarcely of moment, perhaps, to the ordinary everyday architect of to-day which way the question is decided, though to the curious student such considerations naturally absorb much attention and excite the warmest interest. Viewed apart, however, from these limitations, no designer can fail to be struck, provided he is actuated by a true appreciation of genuine architectural art, with the austere reserve and evident determination of Brunelleschi to avoid everything which in any way tended to

mar the paramount ideal of simplicity which manifestly dominated his conception. Nothing that can be spared is utilised, and yet with an exquisite refinement of taste, the most delicate ornament is skilfully introduced in cultured contrast with the bold simplicity of the general design. This appreciation of relative value is particularly illustrated, too, in the simple charm, which even the casual observer can but notice, in the beautiful cloisters of the Badia di Fiesole. The pulpit in the Refectory (Fig. 2) is none the less remarkable because of its touch of incongruity referred to by the author, in perhaps somewhat unsympathetic terms, as the garments of Classical detail wrapped around a Mediæval conception and purpose. No matter if this be true—and why? Because the result is so charming, and no better or more conclusive answer than this need be given. It is a pity that no plan, however, accompanies these views of this church. We are glad to have in this connection the plan and section reproduced of the Pazzi Chapel, Florence, Figs. 3 and 4, as well as the collotype view of its exterior; from *Agincourt*, the Byzantine-like plan of Santo Spirito, Florence. Fig. 5 represents the plan of Sant' Andrea at Mantua, as completed by Alberti in 1470, and it makes a valuable block, because the plan explains so much which is not so readily understood. For some reason, not clear to the reader, only two of Donatello's Evangelistic symbols are given—the Lion and the Eagle. Why not all four? The Bull and the Man appear in the first edition: they might as well have been repeated in this. The set, anyhow, would have been complete, and most people would have valued all four examples. The well-known corbelled arcade from the Fava Palace, Bologna, Fig. 6, is specially interesting for the big Gothic brackets. The Cortile of the Palazzo Ducale Urbino makes an illustration new to the book, though for the merit of the subject is only too small. In conclusion, we know we have scarcely done justice really to Mr. Anderson's erudite chapter on Brunelleschi; but to do that efficiently it would be necessary to quote freely from his text at length. The volume bears the impress of a mature judgment, and shows a keen appreciation of the subject. Our aim, therefore, with all the more reason will be limited by the wish to direct the reader to the book itself, and at its close there will be found a most useful addition in the form of a table of the principal Renaissance buildings in Italy. The work fulfils its object reasonably, usefully, and well. It is enriched by many illustrations, and it is based on a personal knowledge of most of the buildings described.

#### REFUSE DESTRUCTORS.

AT the monthly meeting of the Leeds Association of Engineers, the president (Mr. William Sheldon) in the chair, a paper was read

\* The Architecture of the Renaissance in Italy. By Wm. J. Anderson, A.R.I.B.A. London: B. T. Batsford, Holborn, 1898. Second Edition.



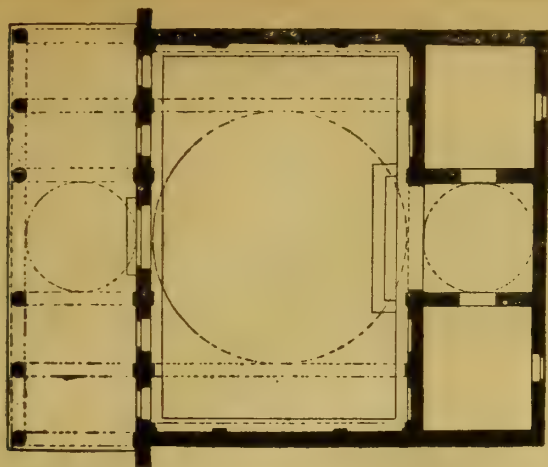


FIG. 3.—Plan of Pazzi Chapel, Florence.

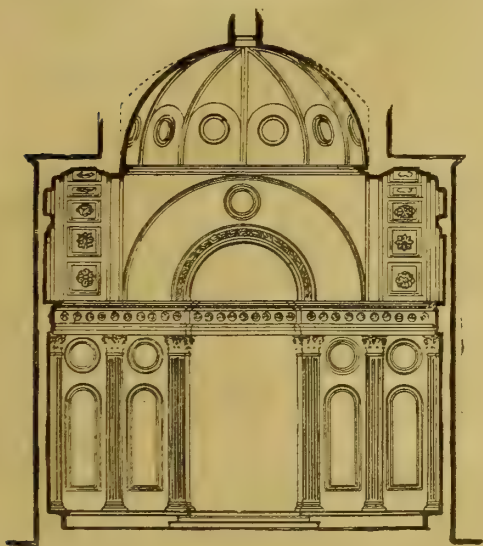
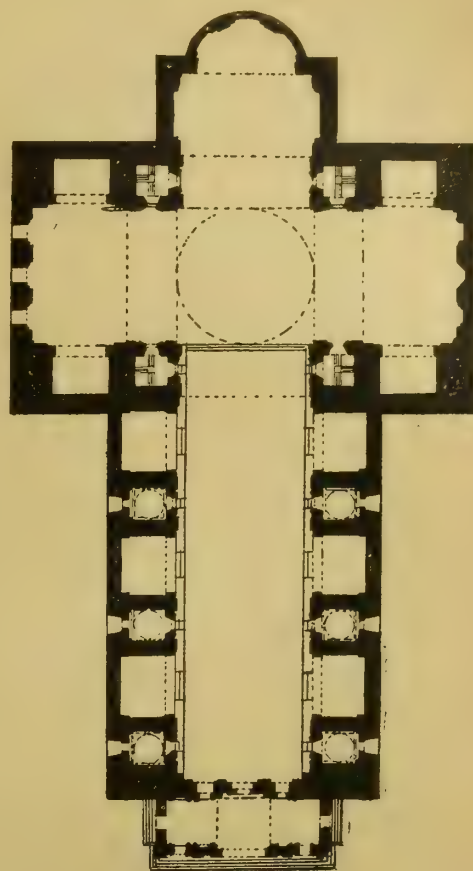


FIG. 4.—Section of Pazzi Chapel, Florence.



100 50 0 100 ft.

FIG. 5.—Plan of Sant' Andrea at Mantua.

by Mr. F. Leslie Watson, A.M.Inst.C.E., on "The Designing and Construction of Refuse Destructors." In the design of a successful refuse destructor, he said, there were certain essential points. Its primary object was a

ture of 1,600 to 1,800° Fahr. was desirable. It was necessary that the products of combustion passing up the chimney should be as free as possible from solid matter, as the effect of the dust upon the leaves of plants, the lungs of

boxed in. To insure a continuous process, the furnaces should be fed at one end and clinkered at the other. It had been shown that eight tons of refuse would raise as much steam as one ton of good coal, and it was advisable to provide sufficient boiler capacity and a suitable use for the power. Hard clinkers might be a source of revenue, but suitable machinery for grinding and mixing into mortar would be required. The author proceeded to give details of the way in which these objects had been attained in existing plants, remarking that in the majority of towns destructors were being constructed in combination with electric-lighting plants, and provided with boilers for taking up the whole of the heat. He regretted that in the case of Leeds the heat produced was absolutely wasted, although when the tramways were taken over by the corporation a combined electric-lighting and tramway scheme had been suggested. In the discussion which followed, Mr. H. Vernon said that for electric tramways great inconvenience would be involved in carting refuse from various parts of the town to a central generating station. Mr. G. W. Blackburn saw no difficulty in conveying the current along mains from various destructor plants to a central station. Mr. J. C. Moorhouse advocated the use of the backs of kitchen fires as auxiliary destructors. It was a bad practice to throw green garbage into ashpits in a moist state. There would also be a difference between the clinker formed and the heat produced from refuse in a wet condition and dry ash. In replying, Mr. Watson said that the scrapings off macadamised roads was about the only kind of refuse which could not be utilised.



FIG. 6.—Arcade on Brackets in Cortile of Pal. Fava, Bologna.

practically absolute chemical separation of the combustible from the non-combustible portions of the refuse, which included the complete oxidation of the former and the fusion into hard clinker of the latter. For this purpose a tempera-

animals, clothing, and furniture might be intolerable, and had been proved to be actionable at law. Machinery working where there is large quantities of dusty material deteriorated rapidly, and the machinery about a destructor must be

A specially-convened meeting of the Bridgwater Town Council was held last week for the further consideration of the Parrett navigation improvement scheme, as recommended by Mr. Wheeler, C.E., at an estimated cost of £110,000. A resolution was carried approving of the scheme, and authorising the town clerk to take the necessary steps with a view to apply for Parliamentary authorisation.



## BEVINGTON HOUSE, LIVERPOOL.

[WITH PHOTO-LITHOGRAPHIC ILLUSTRATION].

BEVINGTON HOUSE has been designed by the architects—Messrs. C. O. Ellison and Son, Liverpool—to offer to the working men all the advantages enjoyed by their fellows who use the Rowton Houses, London. The site is that formerly occupied by Messrs. Halsall, Segar, and Co.'s Brewery and cottages adjoining. It comprises about 2,200 square yards, is closely adjacent to, and seen from, Scotland-road, is near St. Martin's Market, and has frontages of about 45 yards to Bevington Bush, 30 yards to Nicholas-street, 35 yards to Aldersey-street, and 49 yards to Arden-street. Only a portion of this area is actually being built upon, the remainder being reserved for extensions; but the present building will accommodate 450 lodgers, whilst the scheme, when fully carried out, will provide 650 beds. The building will be six stories high (one less than the Rowton Houses, London), with the main entrance from Bevington Bush (close to the spot on which Mr. T. H. Ismay laid the foundation-stone). The charge for admission will uniformly be sixpence. This will give the lodger the exclusive right for one night to a thoroughly clean and comfortable bedroom or "cubicle," 7ft. 6in. by 5ft., with its own window at the occupant's command. He will also have free access to a spacious kitchen supplied with every necessary for cooking his own food; also to large and well-furnished dining, smoking, and reading rooms; also to lavatories and foot-washing pan; also to rooms where he may mend, wash, and dry his own clothes, all of which rooms will be lined throughout with enamelled bricks of various colours. If he prefer to buy cooked food, he will get it, good and most moderate in cost; and, for trifling additional charges, he will have a hot or cold bath, room for safely depositing luggage, &c., and the services of barber, tailor, and cobbler. All floors and staircases will be fireproof. There will be a large open courtyard containing the w.c.'s, &c., and throughout the buildings warmth, comfort, and sanitation will be most carefully studied, and last, though not least, no intoxicants will be allowed in the place. The house is expected to be opened in March or April, 1899. It should, perhaps, be made clear that these homes are not intended for families. The Corporation are doing much to provide the married poor with sanitary tenements; but so far no adequate effort has been made here to cater for the single lodger. The following is a short account of the accommodation provided:—The basement floor, which is kept well out of the ground and is well lighted, is arranged, with the lodgers' department, fronting Bevington Bush and Arden-street and in the centre quadrangle, the remainder being occupied by the manager's house and the administration, the latter including stores, kitchen, &c., with lift from same to the shop and office above. The lodgers' department includes a spacious lavatory, with thirty basins in slate tops and iron frames, with arrangements for towels; also five footpans and six baths, all enamelled and fitted with hot and cold water. Washhouse for men's own use, with drying and mending rooms adjoining; also boxroom, barbers' and tailors' shops. The ground floor is all set apart for the lodgers, excepting only the Nicholas-street frontage, which is occupied by the administration. The entrance is by an open archway and porch (lined with enamelled bricks), with glazed doors, &c., in an inner circle, giving access to a spacious vestibule, having on one side the principal staircase, on the other the glazed partitions fronting the office and shops. And at the end entrances to the dining-rooms, kitchens, scullery, &c., the latter occupy the centre of the quadrangle, and have light and ventilation from the roof as well as both sides, the frontage to Bevington Bush and Arden-street being occupied by the dining, reading, and smoking-rooms, each having large windows on both sides; and further smoking accommodation is provided on the flat roof over the low buildings in the quadrangle with access from the common kitchen. The kitchen will have two large stoves in the centre at which the men can prepare their own food, if they so desire, buying it either outside or at the shop in the vestibule, and using the cooking appliances kept ready in the adjoining scullery. Enamelled sinks are provided for the washing of vegetables, &c. Coals are provided by a lift to a store adjoining, and "lockers" in which a lodger may keep any surplus food, &c., a key being lent to him on a small deposit, which is

returned when the key is given up. The upper floors are entirely occupied by cubicles for the lodgers—450 in all in first building, each 7ft. 6in. by 5ft., having its own window—and will be fitted with an iron bed frame, steel spring mattress, and hair bed so arranged as to allow of the whole being turned up out of the way whilst the floor is washed: a chair will also be provided on somewhat similar lines, so doing away with all loose furniture, and enabling the floor to be got at for cleaning without difficulty of any kind. The plans are arranged so as to permit of extension to the extent of 200 beds (making 650) whenever the funds will permit. The work is being carried out by Messrs. Kelly Bros., Walton, Mr. Parsons acting as clerk of works.

## CHIPS.

Messrs. Kerley and Ellis, architects, of Exmouth, who have dissolved partnership, will in future each practise separately in that town.

Another of Sir Christopher Wren's City churches is about to be pulled down, that of St. Michael Bassishaw, which occupies an isolated site on the west side of Basinghall-street, just behind the Guildhall. It was built in 1679 by Wren, to replace a church destroyed by the Great Fire.

A suspension foot-bridge of steel has been placed across the River Wye at Hereford. The piers are of concrete, and there is a central span of 110ft. and two side spans each of 37ft. 6in. It has been built from designs by Mr. John Parker, the city engineer of Hereford, by Messrs. Findlay and Co., of Motherwell.

It is proposed to restore the western porch of the fine 13th-century church of Llantwit Major, at an estimated cost of £1,000. The architect is Mr. G. E. Halliday, of High-street, Cardiff.

On October 29 was opened a new Catholic school at Birtley. Accommodation has been provided for over 300 scholars. The works have been carried out by Messrs. J. Burnett and Son, to the design of Mr. Charles Walker, architect, of 26, Eldon-square, Newcastle-on-Tyne.

On Friday night, the Hon. Lyulph E. Stanley formally opened another board school in the Finsbury Division, situated at Rotherfield-street, Islington. It is one of the largest of the London board schools, and will accommodate 1,150 children—360 girls, 360 boys, and 430 infants. Each of the three departments has a separate hall, and in the same buildings are included a cookery centre and an art department. Mr. Stanley mentioned that the school was an exact reproduction of the one in Upper Kennington-lane, and yet had cost £2,000 more—this being due to the conditions of labour, the rate of wages, and the hours of work. There was another element to be considered in the cost—namely, the demand of the London School Board to have the very best materials and the most approved drainage.

The foundation-stone of a Diamond Jubilee memorial clock-tower was laid at Skegness last week. The site, given by Lord Scarborough, is between the North and South Parades at the seaward end of Lumley-road. Mr. Winter, whose design was selected in competition, is the architect, and the structure will be erected by Mr. H. W. Parker, of Boston, the total cost being estimated at about £350. For the basement Ancaster stone will be employed, and the remainder of the tower will be treated in red brick, and when completed will stand 60ft. high. The clock will have four dials (each 4ft. 6in. in diameter) and three bells, and will cost another £180.

On Thursday in last week, St. John's Church, Leicester, which has been closed for three months for internal restoration and completion, was reopened. St. John's was one of the first of the late Sir Gilbert Scott's churches, but until now has lacked internal decoration and beauty. The parishioners have spent upon the work about £1,500. The walls of the nave and the aisles have been repainted, and the chancel treated with rich decoration. The gas throughout the building is replaced with electric light, and several new windows have been added.

At the last meeting of the Staffordshire County Council the sanitary committee reported that they had considered a report of a sub-committee, and recommended that the council request them to require all local authorities within the administrative county to provide efficient isolation hospitals. The Earl of Lichfield said that the possession of isolation hospitals would contribute largely to the prolongation and saving of many lives, more especially among the poorer classes of the community. Hospitals could now be built at an estimated cost of £220 to £250 per bed, whereas three or four years ago the cost would have been £350 a bed. The recommendation was adopted.

## OBITUARY.

MR. JOHN GILLETT LIVESAY, architect and surveyor, of Cromartie House, Ventnor, I.W., died recently. Mr. Livesay joined the Royal Institute of British Architects in 1882 as an Associate, and had been a Fellow of the Surveyors' Institution since November, 1891, and was also an Associate Member of the Institution of Civil Engineers.

THE death is announced from Chicago of Mr. W. W. BOYINGTON, one of the most noted of the older generation of architects in that city. After the great Chicago fire, Mr. Boyington, who, as one of the pioneers, had a very large acquaintance, was busily employed, and designed many large buildings both in Chicago and other cities. His last important work was the Illinois State Building at the Exposition of 1893.

A Board of Trade inquiry was held at Redditch, on Thursday in last week, with respect to the proposed light railway for Redditch and district. Lord Jersey and Colonel Boughey were the Commissioners. Mr. Pritchett is the engineer of the scheme, which is estimated to cost £15,500. It is opposed by the Redditch Urban District Council, on the ground that one of the streets through which the line would pass is but 16ft. 10in. wide at one point.

To the great parish church of St. Nicholas, Yarmouth, new vestries are being added on the north and south sides of the chancel, and memorial-stones were laid on Thursday in last week. The buildings have been designed by Mr. Frank L. Pearson, of London, and will be executed in flint boulder work, with Weldon stone dressings, in harmony with the general appearance of the church. The contract for the erection of the vestries is for £2,000, and is being carried out by Mr. C. Wiseman, of Yarmouth. Mr. Newby will execute the carpenters' work, Mr. Woolverton the plumbing, and the stonemasons are Messrs. Stanley Bros.

The new Congregational church in Queen's-avenue, Muswell Hill, of which the foundation-stone was recently laid, is being built from plans by Mr. P. Morley Horder, of New Bond-street, W., at a cost of about £8,500; 850 sittings will be provided, and the style adopted is Late Gothic. Mr. Edmundson, the builder, gave the site.

A new Catholic church is to be erected at Stanley, Co. Durham. The designs show accommodation for about 700. The buildings of Early English style, stone and slated. The body of the church consists of single span nave and transept, with west-end gallery, and provision for possible galleries in both transepts. The architect is Mr. Charles Walker, of 26, Eldon-square, Newcastle-on-Tyne.

On Saturday a block of new board schools at West Tiverton, near Bath, were opened. The schools, built upon a high-lying site, are designed to accommodate 665 children in three departments. The style adopted by the architects, Messrs. Silcock and Read, of Bath, is that of the local 17th-century work.

At the Bootle Town Hall, on Saturday, a number of the officials representing the several departments of the corporation assembled to make a presentation to Mr. Thomas Harris, who has just resigned his position as building surveyor after six years' service, on appointment as surveyor to the Port-madoc Urban District Council. The presentation took the form of an American oak roll-top desk. The town-clerk, Mr. J. H. Farmer, presided, and Mr. J. A. Crowther, borough engineer, on behalf of the officials, presented the gift.

The Lancashire and Yorkshire Railway Company intend seeking powers in the coming session of Parliament to construct a branch line to run along the Irk Valley from Hendham Vale (Harpurhey), with stations at Heywood, Bowlee, Birch, and Blackley.

On Oct. 28 was opened a new Catholic school at Murton Village, Co. Durham. The buildings are to accommodate about 100 infants and 150 mixed children. They are of red pressed brick, slated. The works have been carried out by Mr. J. B. Stott, contractor, Sunderland, under the supervision of Mr. Charles Walker, of 26, Eldon-square, Newcastle-on-Tyne.

On the 13th ult. were opened extensive new schools, at St. Godric's, Durham. The material employed in the exterior is red pressed brick, with slated roof. The building consists of two stories. The works have been carried out by Mr. Francis Caldcleugh, of Durham, to the design of Mr. Charles Walker, architect, of 26, Eldon-square, Newcastle-on-Tyne.

A meeting of St. Paul's Ecclesiastical Society was held in the Chapter House, St. Paul's, last (Thursday) evening, when a paper was read by Mr. Edward Bell, F.S.A., on "The Mediaeval Monuments in Westminster Abbey."





PRINCE CONSORT WINDOW, ST. SAVIOUR'S, SOUTHWARK.

## THE "LUXFER" PATENTS.

MESSRS. HAYWARD BROTHERS AND ECKSTEIN, Limited, of Union-street, Borough, have sent us an advanced copy of their sectional catalogue of "Luxfer" prisms, which describes the many useful purposes to which these prisms can be applied. It is well known to all architects that the daylight entering a room through ordinary glass is limited to the angle at which the light strikes the window, or, in other words, by the width of street or area. The further end of the room, if a long one, is quite or almost dark in crowded city streets. By the use of the "Luxfer" prisms any available light from the sky is refracted horizontally to the end of the room, completely lighting every part of it. The prisms are 4in. square, and are made in a large variety of angle, so that the most varied conditions are satisfied. Each prism is smooth on one side, and has a series of prismatic ribs on the other, and the calculation of the angles of these prisms gives the necessary refraction of light for windows in wide or narrow streets, or which derive their light from light areas. The principle for calculating the degree of refraction required is explained. Another very important feature of this patent is that, instead of lead-glazing for uniting the plates together, which are defective in strength and obscure a portion of the light, the prisms are electro-glazed. The prisms are first ground to a template and laid together with a small ribbon of copper between them, and the whole sheet of prisms is then immersed in an electric bath and cemented together with a deposit of copper by a new electrolytic process. The plate is thus rendered stronger than plate-glass, and perfectly weather-tight. All kinds of ornamental glazing can be produced, several patterns of which are shown. The electro-glazed sheet is also proof against fire and water. We notice prism lens for wide and narrow

streets, canopies for narrow areas. The "Luxfer" prism plates can be made to any required size, preserving the unit of 4in., and can be fixed to wooden frames or stone jambs, and directions for measuring are given. For the upper sashes of windows, shop-fronts, the prism plate is a decided advantage over ordinary glass, and illustrations are given showing its adaptability to canopies or lean-to's over windows in deep areas and well-holes; as a "forilux" on the outer face of walls with recessed windows in deep reveals; and as a "lucidux" plate, fixed vertically below the ordinary pavement-lights of basements. The "Luxfer" prism pavement-lights are made 6in. by 3in. on the surface, and are wedge-shaped and are cut with refracting angles on the sides. Diagrams and sections are given, with standard sizes. Useful directions for ordering these lights are given.

The illustration we give shows the effect of the "Luxfer" prisms in lighting up stained-glass windows. It represents the "Prince Consort" window in the north transept of the collegiate church of St. Saviour's, Southwark, unveiled this year by the Duke of Connaught, presented by Mr. F. L. Bevan, and executed by Mr. C. E. Kempe, the eminent stained-glass artist. By placing the "Luxfer" prisms behind the window outside, the full light of the clear sky and the effect of colour has been realised in a marvellous manner. The window, obscured by a huge warehouse, was quite dark; the design and colour were lost, and the window was regarded as a failure till the prisms were fixed on the outside. Our illustration shows the effect produced. The three triangular pieces between the large circular octofoil and its side-lights are quite dark, and these are not lighted up by the "Luxfer" prisms, showing at once the difference of effect. The testimonial received by Messrs Hayward Bros. and Eckstein from the rector of St. Saviour's,

Canon W. Thompson, M.A., D.D., the donor, and Mr. Kempe, the artist, are convincing. Many costly painted windows in our cathedrals, as some of those at Canterbury in the choir aisle, are lost, owing to the direct light being obscured by trees or buildings; but by these Luxfer prisms their brilliancy and design may be restored most effectually.

At the Pontypridd Police-court on Wednesday week William Nicholas Gronow, commercial traveller, Llanbradach-street, Cardiff, was committed for trial on a charge of forging an endorsement on a cheque for £20, and also uttering it, the prosecutors being Messrs. Corfield, Son, and Co., builders' merchants, Cardiff, in whose employ defendant had been.

The Mersey Docks and Harbour Board have accepted the tender—amounting to over £250,000—of Mr. C. J. Wills, of Manchester, for the construction of a new dock, &c., in connection with the Queen's Dock, and the work will be commenced immediately.

The guardians of East Grinstead decided at their last meeting to consult Messrs. Clayton and Black, architects, of Brighton, as to the alterations necessary to the workhouse buildings, in order that they may fulfil the requirements of the Local Government Board.

In consequence of the death of Mr. Henry Allnutt, the executive committee of the National Footpath Preservation Society have appointed Mr. John Miller to act. All communications should be addressed to 42, Essex-street, Strand, or care of Mr. J. F. Torr, 1, Essex-court, Temple.

The Southampton Corporation received, at their last meeting, the award of Mr. Gutteridge, architect of that borough, the arbitrator in reference to Tudor House, St. Michael's-square, which was compulsorily acquired in connection with a working-classes housing scheme. The owners' claim was for over £300, and the sum awarded was £120.



## Building Intelligence.

**BELFAST.**—The question of erecting a cathedral in Belfast came before the Synod of Down, Connor, and Dromore on Wednesday. A Bill to constitute the cathedral is to be introduced at the next session of the Central Synod for the approval of the Diocesan Synod. Canon O'Hara said the necessity for the Bill had arisen from the fact that the late Countess of Shaftesbury left by her will a legacy of £7,000 for the building of a Protestant cathedral in the city of Belfast. That legacy was not available for building a church or for any purpose except for the erection of a legally constituted cathedral, and that cathedral could only be constituted by a Bill in the General Synod which must have received the approval of the Diocesan Synod. In addition to that, subscriptions had been given by friends of the movement; but Lady Shaftesbury provided that her money should not be given by the executors unless the cathedral were begun within five years of her death. Mr. R. Kyle Knox, LL.D., proposed:—"That the Synod approves of the provision of a Bill to be introduced at the General Synod of the Church of Ireland in 1899 for the establishment of a cathedral at Belfast." He pointed out the necessity for such a building in the diocese, and that if the Bill were not approved of almost £15,000 would be lost to the Church, for the money could not be applied to any other purpose. An amendment was proposed to the effect that the present was an inopportune time to build a cathedral, in view of the urgent need of church extension in the city. The bishop supported the resolution. The amendment was put to the meeting, and lost by a considerable majority. The original motion was then carried.

**BIRKENHEAD.**—A new Liberal Club in Cloughton-road was formally opened by the Marquis of Ripon, K.G., on Thursday in last week. The main elevation is faced with red Ruabon bricks, variety of colour being obtained by the plentiful use of cream-coloured terracotta, from the works of Mr. J. C. Edwards, Ruabon. The principal entrance opens into a hall, 15ft. by 12ft., the floor of which is laid with encaustic tiling, by Mr. Geo. Smith, of Liverpool. On the right are the secretary's office, the principal staircase, and the refreshment bar; on the left is the reading-room, 17ft. by 13ft., and at the end the billiard-room, 40ft. by 25ft., fitted with three tables. Beyond the billiard-room are situated the gentlemen's toilet-room, the committee-room, and a secondary staircase. A mezzanine floor contains a ladies' toilet-room and a cooking kitchen. The entire first floor is occupied by the lecture-hall, with its stage and two green-rooms. The lecture-hall is capable of accommodating about 400 persons. The stage, 20ft. by 12ft., and the green-rooms, each 11ft. by 9½ft., communicate directly with the hall and with the secondary staircase, and are provided with fireproof floors. From the lecture-hall access can be obtained to a small balcony, which, with the central window, forms a feature of the front elevation. Adjoining the club premises, and communicating with the same in the rear, is a residence for the keeper. The buildings have been erected from the designs of Mr. Thomas Cook, architect, of Liverpool, the sole contractor being Mr. Peter Rothwell, of Cloughton-road, Birkenhead.

**BIRMINGHAM.**—The Colmore trustees have granted a building lease for 150 years of the Christ Church site, which comprises 2,475 square yards, and is bounded by New-street, Paradise-street, Colmore-row, Waterloo-street, and Christ Church-passage. Possession of the site will be given at once, and the lessees will commence to remove the present church fabric forthwith, so that building operations may commence early next spring. The adopted scheme provides for shops in New-street and Colmore-row, while the ground-floor treatment in Waterloo-street and Christ Church-passage will be suitable for insurance and professional purposes. The upper floors will be devoted to professional and other offices. Owing to considerable difference in the levels surrounding the site, three distinct entrances are provided, which will be situated in New-street, Colmore-row, and Waterloo-street, each of which will enter the building on a different floor. The one from New-street will enter a large hexagonal courtyard, covered with a glass roof, and constituting a lower ground floor, the surrounding rooms being under the

shops, and serving as show and stock rooms. The basements to the shops are on a lower floor still, and approached by an inclined way from Christ Church-passage, forming an entrance into a lower courtyard. These store-rooms will be reached from the shops by staircases separated from, but passing through, the intermediate floor. The plans also provide for a restaurant at the corner of New-street and Christ Church-passage. A mezzanine floor is formed over the shops in New-street, which will be either available as show-rooms or offices. The building will be provided with two electric lifts, and with entrance-halls. The exterior design, which will be executed in stone, with grey granite base and red granite columns, will be Free Renaissance in style. The prominent features in the New-street and Colmore-row façades will be large central gables, supported by turrets finished with copper cupolas. The circular front facing Paradise-street will have a colonnade of granite pillars running through two stories above the shops, over which there are two other stories, the whole being surmounted by a dome. Stone bay windows will also be largely used in the principal elevations. Considering the importance of its position in proximity to the Council House and Town Hall, application will be made to the Public Works Committee to treat it as a special building as far as the projection of bay windows, cornices, and architectural features is concerned. These buildings, which, it is estimated, will cost upwards of £80,000, will be carried out under the superintendence of Messrs. Essex, Nicol, and Goodman, architects, of Birmingham.

**DUNASKEAGH.**—A new Roman Catholic church, replacing a small chapel, is being built at Dunaskeagh, near Dundrum, Co. Tipperary. The church, which is near completion, is faced with local stone, with dressings of chiselled limestone, the general treatment being a simple form of Romanesque. The church consists of nave, chancel, sacristy, and a south porch to the nave. On the north side of the west front is a square tower, which serves as a porch as well as a belfry, and is furnished with a saddle-back roof. Provision is made for an organ gallery at the west end. The nave is lighted by a pair of round arched windows and a circular rose window in the western gable, and by single lights to the side of the nave. The chancel is lighted by a three-light window over the altar. The roofs of nave and chancel are open-timbered to the ridge. The roofs will be covered with Killaloe grey-green slates. The windows will be glazed with cathedral glass of special design. The architect is Mr. W. G. Doolin, M.A., of Dublin, and the contractor Mr. John Bunyan, of Maryborough.

**LEEDS.**—The aspect of Briggate, the principal thoroughfare of Leeds, is about to be further improved. A limited liability company is about to develop some property covering an area of 4,900 square yards, and which includes the Bull and Mouth Hotel and three adjoining shops. To Briggate there will be a frontage of 120ft., and to Kirkgate one of 121ft. Backward from Briggate, the estate extends to within 40ft. of New Market-street. The buildings upon the ground are very old, and at the rear consist of dilapidated cottages and sheds. The whole is to be swept away, and entirely new buildings erected. The promoters are negotiating with the corporation to make a new street from Duncan-street to Kirkgate, 42ft. wide—a continuation of the recently constructed thoroughfare known as Central-road. For this purpose 1,900 yards of ground is offered by the company. This new thoroughfare would give the company a frontage at the rear of about 100ft. Plans of the new structures have already been prepared. The new buildings will comprise an hotel, an emporium, and twenty-one shops and warehouses. The Briggate frontage will be in the French Renaissance style, and will rise six stories. Marble and granite will be extensively used. This façade will be surmounted by a turret, with illuminated clock, 120ft. high from the street level. The main entrance to the hotel will be in Briggate. It will be approached through a colonnade 75ft. by 20ft. This will lead directly to a large central hall, 94ft. by 30ft., with a balcony running round the first-floor level, and a lantern roof. On the ground floor will be a buffet, 75ft. by 25ft. A ball-room, 90ft. by 45ft. and 25ft. high, will have an oriel window overlooking Briggate. In the basement will be a billiard-saloon, 90ft. by 45ft., with six tables. The public bedrooms will number 130. The emporium will have a frontage to Briggate of

74ft., an area of 95ft. by 75ft., and a large lantern roof. Four or five tiers of galleries will run round the interior. The basement will be constructed so that it can be flooded to a depth of 2ft., and that gondolas may sail hither and thither. The architects are Messrs. J. Holmes Groves and Co., of London, Leeds, Pontefract, and Castleford.

**MOSAICS IN ST. PAUL'S.**—A further portion of the extensive mosaic work which is being carried out in St. Paul's Cathedral, under Sir William B. Richmond, R.A., has just been completed, and it was unveiled on Saturday. The subject illustrated is "Christ Reigning from the Tree." The water of life issues from below the tree, making a silver flood. The holy women are on either side; and Adam and Eve, kneeling, are in the two corners. The world is represented as a harvest field. The work fills the concave quarter dome above the lectern, under the north-eastern portion of the dome; and the surrounding masonry has been decorated in the same style as the choir. The work is the gift of the Merchant Taylors' Company, whose arms appear in medallion form in the fine ornamental masonry below. Similar work is now being executed, at the cost of other City Livery Companies, in the three other quarter domes.

**NEWPORT, MON.**—The new church of All Saints, situate in the new district of Brynglas-road, was formally consecrated by the Bishop of Landaff on Tuesday week. This new structure is the gift of Mr. E. H. Watts, J.P., of Chiswick. It has been built from designs of Messrs. Graham, Hitchcox, and Co., by Mr. E. C. Jordan, in Early English style, of Rieca stone, with Bath stone dressings. It consists of nave and two aisles, with a tower, and has seating accommodation for about 600 worshippers. A stained-glass window has been placed in the east end, and a somewhat smaller window has been placed in the chancel, both as memorials. The reredos, pulpit, lectern, reading-desk, &c., are of carved oak, the reredos containing figures representing the scene of the Last Supper. An organ is about to be placed in the organ-chamber in the chancel. The contract for building was £6,500, but the extras for furnishing and laying out the ground have brought the total cost up to about £10,000.

**NORTHAMPTON.**—A Liberal clubhouse at the corner of St. Giles's-street and Castilian-street was formally opened by the Marquis of Northampton on Monday. It has been built at a total cost, including site, of approaching £6,000, from designs by Messrs. Mosley and Anderson, architects, Northampton. The exterior is in style a free treatment of English 17th-century Renaissance. On the ground floor of the main front are three lock-up shops, above which is the assembly hall. The angle of the two frontages, where is the entrance, is treated octagonally on plan, and finishes, above an open arcade on the first floor, in a tower and domical turret. The exterior of the building is of red bricks with yellow Weldon stone facings. Glazed and rubber bricks are used to relieve portions. All the windows are leaded with tinted glass. The roofs are covered with Penrhyn green slates, and the dome on the tower is covered with lead. On the ground floor are the entrance and staircase halls and corridors, reception-room, dining-room, library, buffet, &c. The halls and corridors are spanned by wide elliptical arches with heavy cornices. The halls are provided with panelled dados, with Fawkes' enriched mouldings. The first floor is reached by a stone staircase, with wrought-iron balustrade, lighted by a lofty window which is a feature of the Castilian-street front. On this floor are the reception-room, the dining-hall, refreshment buffet, and library. At the head of the main stairs is the entrance to the assembly-hall, capable of seating 250 people. It is provided with a platform and stage entrance and retiring-rooms. This hall can be let off apart from the club, a second staircase and exit being provided. Off the main landing is a card-room, and billiard-room. The apartments for the caretaker are at the rear. The contractors were Messrs. Wilson and Alright, of Northampton.

**RAYADER.**—The parish church was reopened last week, on the completion of restoration. The old north wall and the roof of the nave have been entirely taken down, the wall being replaced by an arcade of three arches; a new north aisle has been erected, together with a choir vestry, and entirely new roofs placed upon nave and aisle. The old boarded floors under the seats have been taken up, as well as a portion of the encaustic tile paving and floor of the nave, and part of the



chancel has been relaid with oak wood-block flooring. Two new heating apparatus have been put in, the lower part of the tower has been opened to the church by a freestone arch, and the wall plastered. The east window of the chancel, of the lancet lights, has been much improved by the insertion of moulded rear arches carried on coupled Irish marbled shafts with carved capitals. The floor level of the nave has been lowered so as to give increased elevation to the chancel. New seats have been provided for the choir and in the north aisle; the east window of the chancel and the west window of the north aisle have been filled with stained glass, the artists being Messrs. Burlison and Grylls, of London. The special gifts include an organ built by Mr. W. Kirkland, of London and Bradford; pulpit in stone, standard gas light for chancel, and font cover. The contractor was Mr. Morgan Lloyd, of Rhayader, and the stone carving has been carried out by his brother, Mr. Benjamin Lloyd.

**PETERBOROUGH CATHEDRAL.**—The Marquis of Exeter presided at a large and influential meeting at Peterborough on the 2nd inst. in aid of the Peterborough Cathedral restoration fund. The Bishop of Peterborough moved a resolution viewing with satisfaction the care and skill with which the work of the restoration of the fabric of Peterborough Cathedral had up to the present been carried out, and strongly supporting the appeal now made by the Dean and Chapter and the restoration committee for the necessary funds to complete the work. The Bishop of London (Dr. Creighton) in seconding the resolution, pointed out that the greater part of the money which had been raised for the restoration had been expended underground, and that the building itself had not been altered in any way whatever. The building had simply been put into substantial repair, and had been protected against the ravages which partly time and the works of man had threatened to work in the security of its tenure. The Dean of Peterborough said the present work of restoration commenced in 1883, and up to 1894 the sum of £32,464 was raised for the fabric itself. Then there came a lull, but the great storm of March compelled them to resume operations, and since that time a further sum of £9,357 had been raised. They were now engaged in completing the restoration of the west part and other parts of the fabric, to complete the whole of which about £10,000 would be required. Mr. G. F. Bodley, A.R.A., the architect, testified to the admirable manner in which the work had been done by Messrs. Thompson, from the late Mr. Pearson's plans. Upwards of £500 was promised at the meeting.

**STOKE DRY.**—The 13th-century parish church of St. Andrew, which has been restored at a cost of £750, was reopened last week by the Bishop of Peterborough. The works include the repair—almost the complete renewal—of the nave and south aisle roofs, including new boarding where required and new lead covering; the repair of gutters, down-pipes, and drainage; general restoration of the south porch; the repairs of the roofs of the Digby chapel and chancel; a considerable amount of underpinning—in some parts there appears to have been a total absence of foundations; and the repair and pointing of the walls of the church and tower. New louvres have been placed in the belfry windows and a boarded ceiling to the chancel. The floor of the chancel has been re-laid and partly renewed, and further repairs have been exhibited in connection with the parapets of the north aisle and north porch. In addition to the above the carved pulpit and lectern, placed in the church 25 years ago, have been refixed upon solid foundations of stone; and stone paving has been substituted in places for the wood which existed previously. A dossal of crimson Utrecht velvet and side hangings of tapestry complete, a new carpet of velvet pile for the sacarium, and a new Glastonbury chair have improved the appearance of the chancel. During the restoration some interesting frescoes were discovered on the north and south walls of the nave and on the east wall of the chancel. On the latter was a rude painting of the martyrdom of St. Andrew, probably belonging to the 13th century. The architect was Mr. J. Arthur Reeve, of London, the builder Mr. S. F. Halliday, of Stamford.

**SWANSEA.**—The parish church, having been rebuilt, was consecrated by the Archbishop of Canterbury on the 20th ult. The old church consisted of a nave, rebuilt in the middle of the

18th century, and an ancient chancel, with the Herbert Chapel on the north, and a tower and vestry on the south. The nave was rebuilt and reopened in August, 1897. Unfortunately, it was discovered, when the restoration commenced, that the foundations and walls of the whole of the chancel were in such a condition, owing to original bad construction, reckless alterations, and mutilations, and clumsy and injudicious repairs, that the whole must come down. Most of the arched recesses, &c., as to which ingenious theories and explanations had been offered, turned out to be of roughly-built rubble stonework, plastered over, and without a vestige of moulding or wrought stone by which any date could be assigned to them. The wrought stone, which still existed in the windows, had been so injured by ill-executed cement repairs, that they could not be re-used. Arrangements have, therefore, been made for their preservation unaltered in the space below the new nave. The new chancel is the same length as the old one—viz., 58ft.—the east wall stand exactly on the line of the former one. The north wall and those of the Herbert chancel also stand on the lines of old ones; but the south wall and those of the tower and vestries are new and broader lines. The width of the new chancel is 31ft.; that of the old one is 22ft. The height from the floor to the wall plate is 35ft., and to the ridge of the roof 56ft. The height of the tower when completed will be 92ft. Both in chancel and nave local stone has been employed for the walling and Bath stone dressings, and oak covered with slate for the roofs. In style the simple Early English character of the nave has been adhered to, with a slightly more elaborate treatment of details. The floor is of Rust's vitreous mosaic. The chancel stalls are in oak, as are also the vestry fittings. The monuments, both ancient and modern, have been retained, and as far as possible have been refixed in or near their old positions.

**UPTON, CHESTER.**—The opening took place last week of the new wing of the lunatic asylum at Upton, belonging to the Cheshire County Council. The extension has involved to a certain extent a reorganisation of the institution, as it includes an administrative block for the whole of the asylum. The new dining-hall is 100ft. by 60ft., with accommodation for 1,000, and has a stage at one end. Altogether the new wing will accommodate 404 patients in eight wards. Every apartment is completely furnished, the whole place is lighted with electricity generated on the premises, and, as a protection against an outbreak of fire, there are a fire-escape and 92 hydrants. The buildings are faced with Edwards' Ruabon bricks; the warming and ventilating is on the Plenum system, carried out by Messrs. Ashwell and Nesbit, of London; and the electric plant has been supplied by the Liverpool Gas and Electric Fittings Co. Messrs. Killick and Cochrane, Liverpool, have fitted up the kitchen ranges and steam-cooking apparatus; Messrs. Doulton and Co. have supplied the sanitary fittings, and the Chester Waterworks Co. the fire-hydrants. Mr. J. Beveridge has acted as clerk of the works, and Mr. J. Parker as contractors' foreman. The extension is costing £90,000, but deducting from that half the cost of the administrative block and apportioning it to the old wing of the institution, the cost per bed works out at £187. The architects have been Messrs. Grayson and Ould, Liverpool and Chester, and the builders Messrs. Jones and Son, Liverpool.

**WAKEFIELD.**—The first formal steps were taken on Friday towards carrying out the plans for enlarging Wakefield Cathedral as a memorial of the late Bishop Walsham How. At a meeting held in the vestry, the vicar explained that the amount which had actually been promised was about £7,000, and it was proposed to undertake as the first work the removal of a portion of the east end of the cathedral for the erection of a chapter-house with a vestibule and boys' and men's vestries. The meeting approved of the plans submitted, and the consequent alterations to the graveyard, and a faculty will be applied for in due course.

A new stained-glass window has just been placed in Maker parish church, Mount Edgcumbe. The theme is praise and glory to the Almighty, symbolised by the musicians of the Holy Scriptures, and the window contains three lights. The author is Mr. T. Cartes, of the firm of Messrs. Ward and Hughes, Frith-street, Soho.

## Engineering Notes.

**ABERDEEN.**—At a special meeting of the Harbour Board, last week, the works committee recommended that, in the Bill for which the Commissioners are to apply in the ensuing session power should be taken to borrow for the purposes of the harbour, including the reconstruction of the graving dock, the sum of £200,000. Amongst the works which Mr. Gordon Nicol, the engineer, considers it might be desirable to undertake during the next ten years are: deepening the navigation channel to 30ft. at high water of spring tides, including the removal of rock, £54,000; deepening the Albert Basin, tidal harbour, River Dee, and dock, £9,000; improvement of Poca Harbour, £9,500; improvement of Point Law, £17,000; improvement of River Dee £13,000; reconstruction of part of Provost Blaikie's quay, £12,000; reconstruction of part of Provost Matthews' quay, £2,500; reconstruction of goods-sheds, new houses for officials, and extension of workshops, £4,500; strengthening the quays for steam haulage, £1,800; extension and renewal of rails, £16,000; causewaying of roads and quays, £12,000; hydraulic machinery for lock-gates, £2,800; new cranes and steelyards, £5,500; electric light fittings for buildings and sheds, £1,100; additions to plant, £14,000; contingent allowance for repairs to sea works, £6,000; engineering expenses, £7,000; new sea-lock, £40,000—total amount, £227,700. The adoption of the report having been proposed and seconded, an amendment was moved and seconded that the Board seek borrowing powers for only £150,000. The report was carried by twenty votes to two. The finance committee were empowered to proceed with the Bill.

**CUDWORTH AND STAIRFOOT RAILWAY EXTENSION.**—The extension of the Midland line from Cudworth to Stairfoot is proceeding apace. The contractors are Messrs. Walter Scott and Co., of Newcastle-on-Tyne, the same engineers who carried out the making of the new line between Chapeltown and Barnsley. The present extension, which is in connection with the new route to Bradford, branches off the Chapeltown line one and a half miles south of Barnsley, and crosses over the Great Central Railway on the west side of Stairfoot Station, and then passes through the Dearne Valley. Branching off the Chapeltown line, the South Yorkshire Canal has to be crossed, which, on the Stairfoot side, is 10ft. above the level of the road. The Great Central Railway, Doncaster-road, and Wombwell-road are crossed by a skew viaduct 323 yards long. In this viaduct there are twelve arches having 33ft. spans, and five other greater spans of from 40ft. to 90ft. After crossing the viaduct the route is continued through a tunnel 209 yards long, and after going through a cutting 300 yards long is carried over the Dearne Valley on a viaduct 200 yards in length. At present there are 500 workmen employed, the majority of which have been found house accommodation by Messrs. Walter Scott and Co. Mr. C. T. Scott, a partner of the firm, superintends the work; and Mr. P. Riach is the contractor's resident engineer, assisted by Mr. E. D. Davies. The Midland Railway's resident engineer is Mr. A. E. Ainsworth, assisted by Mr. A. Charles.

**DEPTFORD.**—The City Corporation having obtained an Act of Parliament authorising it to extend considerably the Foreign Cattle Market at Deptford, and connect it by means of a railway with the London, Brighton, and South Coast Railway, the work, which will involve an expenditure of £100,000, will be carried out without delay. The services of Sir J. Wolfe Barry, K.C.B., have been secured as engineer, and, from a report he has made, it would appear that the railway and tramway outside the market will cost £32,250. For the purpose of extending the market, property in the near vicinity will be bought up at a cost of £22,000. Increased accommodation will be also provided in the shape of additional slaughter-houses, cooling-rooms, increased lairage, and an extended river frontage. The estimated outlay on these works are as follows:—Slaughter-houses (a first instalment), £5,000; lairage, £21,000; a junction of the three jetties (providing a continuous river frontage of 880ft.), £16,000; and property required, £22,000. The extension of the market has been rendered necessary owing to the great pressure which has been put upon the existing accommodation.

**EXETER RAILWAY.**—This undertaking, origin-



ally known as the Exeter, Teign Valley, and Chagford Railway, is well advanced, and will be opened next autumn. It is intended to be a connecting link between Exeter and the rail-head of the old Teign Valley Railway, at Teign House sidings, two and a half miles north of the Ashton Station of that line. The company which is constructing the present railway is an independent one, and the capital—some £216,000—has been nearly all found locally. The line—a single one—will start by a junction with the Great Western at St. Thomas Station, and proceeding past Alphington Cross come to its first station at Ide, two miles distant. Leaving Ide, the railway is carried through successive deep cuttings and lofty embankments to the Perridge Tunnel, half a mile in length, through a hard spar. This is succeeded by the Culver Tunnel, a quarter of a mile long, at the entrance to which will be situated Longdown Station. Thence the line goes along the shoulders of the hill, with deep cuttings in the shale. Sawton cutting is the longest and deepest of these, and 65,000c yds. of shale have been taken out. At the junction of the Exeter Railway and the Teign Valley, at Teign House Sidings, the Christow Station will be placed. Messrs. J. and J. Dickson are the contractors. When completed, the line will provide an alteration and slightly shorter route to that of the Great Western between Exeter and Newton Abbot, and the gradients will be easier than the existing railway.

**THE RAILWAY TO KHARTOUM.**—Lord Kitchener was busy in London on Monday in connection with the extension of the Soudan Railway to Khartoum. The construction of the additional 180 miles has been definitely decided upon, and the orders for the bridges are being placed with British firms. Most of these bridges will be on the lattice girder principle, and all will be constructed of wrought iron. The principal one will be that spanning the Atbara near its confluence with the Nile, and this will be over 1,200ft. in length. There will be in addition between 50 and 60 smaller bridges, some of them spanning channels which are merely dry gullies at certain seasons of the year, but which have to be reckoned with in view of the periodical flooding of all watercourses connected with the Nile.

**THE REBUILDING OF KEW BRIDGE.**—A special meeting of the Middlesex County Council took place on Monday to consider a further report presented by the Kew Bridge Joint Committee of Surrey and Middlesex. The further report renewed the former recommendation that a Bill should be introduced to give fresh spending powers, as the cost of rebuilding would be more than £50,000 over Sir John Wolfe Barry's estimate, and it was impossible to reduce the price within the authorised limits. Mr. Littler, Q.C., the chairman of the council, and also chairman of the joint committee, in moving the adoption of the report, said the county surveyors of the two counties had told the committee that the tendered price was very moderate, and in some cases decidedly low. Sir John Wolfe Barry had assured them that had the work been done at the time his estimate was given that estimate would probably have been nearly accurate; but the price of granite had gone up 100 per cent. since then. By 21 votes to 13, the council decided to adjourn consideration of the matter until the 14th inst. Mr. Littler thereupon resigned his position as chairman of the joint committee. At a meeting of the Surrey County Council, on Tuesday, an animated discussion took place respecting the proposed rebuilding of the bridge. General regret was expressed that the amount of the lowest tender for the work and contingent expenses was about £40,000 above the amount the two councils were authorised to borrow. It was decided, as far as Surrey was concerned, to accept the tender of Mr. Easton Gibb, of Skipton, Yorkshire, at a sum not exceeding £150,000, and that Parliament be asked to sanction a further loan.

The Saltburn Urban District Council have appointed Mr. G. S. Baynes, of Jarrow, surveyor, at a commencing salary of £125 per annum. There were 99 applicants for the appointment.

A bust of the late Dr. Charles Mitchell, presented to Aberdeen University, was unveiled in the Mitchell Hall, Marischal College, on Tuesday. The bust is in bronze and of life size, and represents Dr. Mitchell wearing the robes of an LL.D. It has been placed on a base of dark green marble, and rests on a carved oak bracket, designed by Mr. A. Marshall Mackenzie, A.R.S.A.

## PROFESSIONAL AND TRADE SOCIETIES.

**AUCTIONEERS' INSTITUTE.**—The session of this institute was opened on Tuesday in the Lecture-hall, Chancery-lane, Mr. E. Dobson, the president, in the chair. Mr. Alexander Macmorran, Q.C., read a paper on "The Effect of Recent Decisions on the Liabilities and Rights of Owners in Respect of the Drainage of Buildings." Under the Public Health Act, 1875, a drain might be said to consist of a channel for the conveyance of drainage or sewage from buildings within the same curtilage or inclosure in which a house stood. If a drain from neighbouring premises were let into it this channel would become a sewer. The duty of repairing a drain was upon the owner or occupier of the premises drained; a sewer, on the other hand, was vested in the local authority. It was a curious fact that, while a local authority had ample authority over private persons with reference to the making of drains from private houses, they had little or none in respect of the making of sewers except under private streets. To the general rule that a sewer became vested in a district council there were three statutory exceptions—sewers made by a person or company for profit, sewers for land drainage or irrigation under a local Act, and sewers under the authority of the Commissioners of Sewers. Where persons were damaged by floods caused by insufficiency of sewers and no negligence could be shown on the part of the local authority, they had no remedy, and could only complain to the Local Government Board. In the discussion which followed the lecture, a general opinion was expressed in favour of amendment and codification of the law in relation to drainage.

**EDINBURGH ARCHITECTURAL SOCIETY.**—This Society met on November 2, when Mr. John Kinross gave his address as hon. president of the Society. Mr. P. E. Noble presided. Mr. Kinross confined his remarks to the architecture of the city and suburbs of Edinburgh, and contrasted the munificence of men such as Mr. Usher, Mr. Findlay, and Mr. McEwan in beautifying the city by the erection of handsome buildings, with that of the landowning and speculative classes, who were doing their utmost to destroy its amenity. He insisted on wide streets, with ample light, being necessary to the health of the community.

**SANITARY INSPECTORS' ASSOCIATION.**—An extraordinary general meeting of this association was held on Saturday evening at Carpenters' Hall, London Wall, Mr. T. J. M. Flower, the newly-elected chairman of council, presiding. Mr. E. Tidman (hon. secretary) announced that the council had met that afternoon and appointed a committee to consider the general financial position of the association. They would probably be able to present their report at the next meeting. With regard to the discussion which took place recently on the balance-sheet, it was felt that some misunderstanding was likely to result, and it had therefore been decided to publish a letter pointing out that the association was far from being on the verge of bankruptcy, as had been suggested. As a matter of fact, they had £3,000 invested. Mr. Foote stated that one-sixth of their income last year was expended on travelling expenses, and, after criticising other items in the balance-sheet, he contended that, if they went on at the same rate as at present, the association would very soon be bankrupt. Further debate on the balance-sheet was adjourned to the usual private members' conference. The chairman then delivered his inaugural address, in the course of which he gave an account of the origin and growth of the association. In 1883-84, he said, their income was £92 and their total membership 171, while in 1897-98 the figures were £631 and 668 respectively. He strongly advocated the amalgamation of the different sanitary associations in the United Kingdom, and said if they set about it in the right way success would attend any efforts they might make to obtain such a result. It was the earnest wish of them all, he believed, that there should be one organisation representing the whole of the sanitary inspectors in the country. Speaking of their finances, he remarked that it was absurd to suppose that they were nearing bankruptcy, having regard to their invested funds. The association was doing all in its power to obtain for sanitary inspectors a respectable superannuation allowance, and he hoped that the Bill promoted with this object would in the near future pass through Parliament.

Security of tenure was another matter of great importance. A short discussion followed.

**SHEFFIELD SOCIETY OF ARCHITECTS AND SURVEYORS.**—The monthly meeting of the above society was held at the School of Art, Sheffield, on Tuesday evening, Messrs. J. Smith, vice-president, in the chair. Mr. T. Swaffield Brown delivered a lecture on "Ecclesiastical and Domestic Art Metal-Work." He said that he had chosen his subject partly because he knew something about it, partly because it was the principal concern of that city, but chiefly because architects are, of all people, those to whom the public look for guidance. Ignorance of principles constituted the most serious damage in the modern revival, and he advocated a closer relationship between the men of principles and the men of practice for the better understanding of both by each. If right principles, special skill, and subtle feeling are united, we get artistic work, not otherwise; no one or two of them will produce it. He protested against the modern distinction between "art" and other metal-work, and pointed out that the only difference in the past between, say, ecclesiastical and domestic art was due to the purpose of the work, the only other distinction being that between good and bad. The materials were the same, the men the same, even the prevailing period of execution the same. The great value of old work, if good, was that it was the expression of the mind and impulse of its makers. It was done as well as their means and skill allowed, and we wanted ours done as well as our means (which are surely equal to theirs) and skill will allow, not by copying work done under totally different conditions to those we live under. By doing so we should only produce anachronisms and incongruities, stultify our skill, and record unerringly to posterity our sterility of imagination and even lack of common-sense. He was keenly sensible to the beauty of much old work, but more concerned with the new; that which we have to live with and be remembered by. He remarked as curious that the metals now used in this connection were substantially the same as those used in the remotest times. Iron, copper, tin, lead, silver, and gold, and in some forms zinc, platinum, aluminium, and others have been discovered, but are not in general use. Nickel certainly is an exception, and a very mischievous one. The principles which should govern the use of these metals are common to most of our affairs: fitness for purpose and sincerity in application of these principles. Iron, for instance, was the strongest, lightest, hardest, and cheapest of the metals. He indicated the uses to which it should be put, subject to its limitations, which are that it is practically black, is liable to damage by rust, and must be manipulated at great heat. The principles of careful selection of material and of craftsmanship in sincerity should govern the treatment. Whatever the material and process, that it should appear to be. Whatever the purpose, the design should fit it for and point to. Whatever the character of the material, its manipulation should develop and not destroy it. Consciously or involuntarily actuated by these principles, and hammer in hand, the smith will do good work, and without them he will not, whether he is an art-worker or no. The lecture was well illustrated by drawings, diagrams, and examples of art metal-work. A vote of thanks was given to Mr. Swaffield Brown, on the motion of Mr. E. M. E. Gibbs, seconded by Mr. J. B. Mitchell-Withers, and supported by Mr. A. H. Holland, Mr. W. C. Fenton, and the Chairman.

A dull tone prevailed at the Auction Mart last week, a great proportion of the properties offered having failed to find purchasers; but for some large reversionary interests, shares, and other kindred securities, the returns would have been the smallest registered for some time. As it is, the aggregate falls considerably below that recorded for the corresponding week last year, the respective figures being £92,991 and £119,586.

Special services were held at All Saints' Church, Oakham, on Tuesday week, for the dedication, by the Bishop of Leicester, of a new reredos, altar-rails, and steps. The work is of white and coloured alabaster, the figures being in white and the architectural part in pink. The central figure represents "The Resurrection" and on either side, in niches, are angels in the attitude of prayer. In the side panels are the Four Evangelists. The whole of the new work has been carried out by Mr. James Forsyth, sculptor, Finchley-road, Hampstead, N.W., assisted by Mr. W. A. Forsyth, A.R.I.B.A.



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MOND ROAD CONGREGATIONAL CHURCH AND SCHOOLS,  
CARDIFF.—AN HOTEL FOR THE ISLE OF WIGHT.—PROPOSED  
TECHNICAL SCHOOLS, BARROW-IN-FURNESS.—OLD HOUSES  
AT EXETER.—FURNITURE FROM THE JONES COLLECTION,  
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## Our Illustrations.

THE PASSMORE EDWARDS PUBLIC LIBRARY,  
EAST HAM.

THIS is one of the latest library buildings that Mr. J. Passmore Edwards intends erecting in the neighbourhood of the Metropolis, and is presented to the community of East Ham. The plans show the dimensions, style, and arrangements of the structure, which have been designed so far as possible to meet the local wishes and requirements. The librarian's residence and the work-room are located on the first floor. The building will be erected of best Ruabon red facing bricks, with Bath stone dressings, and the roofs will be covered with Belgian green slates, and the clock turret with copper. The heating will be by steam, and the lighting by electricity. Mr. Silvanus Trevail, F.R.I.B.A., of Truro and Westminster, is the architect, and Mr. James W. Jerram, of Forest Gate, E., is the contractor for the whole of the works. The foundation-stone was laid last Saturday by Mr. T. McKinnon Wood, the Chairman of the London County Council. The site is on the Recreation Ground at Plashet.

BEVINGTON HOUSE, LIVERPOOL.

[For description see page 674.]

RICHMOND CONGREGATIONAL CHURCH AND  
SCHOOLS, CARDIFF.

THESE buildings, which are just completed, occupy a prominent site in the midst of a thickly-populated neighbourhood. The schools, which are at the rear, were erected eleven years ago, and until now have served for church purposes also. The school hall affording accommodation for 300, with eight classrooms. The church, including the chancel, is 90ft. in length, and 53ft. in width, and has been designed in the First Period of the Decorated Period of English Gothic, the front facade being flanked by a massive square tower, surmounted by a spire reaching to a height of 117ft. Owing to the tower abutting the side road, buttresses had to be avoided, the loss of effect being compensated to some extent by the addition of porches to the main entrances. A total accommodation of 750 sittings is provided. Internally, the church is divided into nave and aisles by timber arcading, supported on narrow columns, from which spring the trusses supporting the roof. The ceiling is octagonal in form, and lined with felt and match-boarding. Pitch-pine is used throughout for joinery. Ward and Co.'s wood-block paving is laid in the entrance vestibules and corridors. The effect of the interior is enhanced by the stained glass in the windows, which, owing to the generosity of a lady member, is more elaborate than

provided in the contract, and has been designed and executed by Mr. T. H. Yates, of Birmingham. The church is to be warmed with hot water, the lighting being effected with electricity. These sections have been executed by Messrs. W. A. Baker, of Newport. The contractor for the building is Mr. David Davies, of Cardiff (who also built the schools), the amount of his contract (including warming and lighting) being £4,495. The architects are Messrs. Habershon and Fawckner, of Cardiff and Newport.

## AN HOTEL IN THE ISLE OF WIGHT.

THIS private hotel occupies a beautiful site commanding an uninterrupted view of the Channel. The stonework of the walling comes from a quarry on the estate, and is finished with a rough-cast face. Red brick is used for the chimney-stacks, and the roofs are to be covered with stone slates. The whole of the external woodwork, &c., will be finished white. Mr. F. Steward Taylor, A.R.I.B.A., is the architect. The drawing which we have reproduced was exhibited at the Royal Academy this year.

## BARROW-IN-FURNESS TECHNICAL AND ART SCHOOLS.

WE illustrate in this week's number the ground and first-floor plans and the perspective view of the first premiated and accepted design for the above, which was obtained in open competition (25 competitors) in March last, under motto "Hematite," by the authors, Messrs. Woodhouse and Willoughby, F.F.R.I.B.A., of Manchester. The Corporation engaged Mr. Henry Lord, F.R.I.B.A., architect for the Salford Technical School, to assist them in arriving at a decision, and his selection was confirmed by the Council. The general arrangement of the scheme is based on lines supplied to each competitor by the borough engineer, Mr. W. H. Fox. The plans illustrated clearly explain the accommodation provided—some portion of which is already erected. It is proposed to face the principal facades with an approved red stock brick, having "Golden Buff" terracotta for all enriched work, dressings, &c., the roofs to be covered either with a non-porous brindled tile or Westmoreland slate. The architects have received instructions to proceed with the work.

## SKETCHES OF OLD HOUSES, EXETER.

EXETER contains several fine examples of Mediæval Architecture of which the Cathedral holds its own. The College Hall in South-street, however, is a good specimen of the Decorated Period. It was built by Bishop Branlyngham, who occupied the See of Exeter between the years 1370 and 1391. The interior is rich in oak furniture, and has some very good linen panelling around the walls. There is also a gallery of later date, containing many portraits of bishops and other important persons who were connected with the see. The windows contain good specimens of stained glass, and the roof is an open-timber one. The hall is all that remains of the college of the vicars choral of the Cathedral. No. 67, South-street, is an interesting example of the many old houses that Exeter contains. Bamfylde House, situated in a narrow thoroughfare close to the High-street, although greatly altered, is still curious. It was once the town house of the Bamfyldes, the ancestors of Lord Poltimore, but is now entirely used as offices. It contains a fine plastered ceiling, and in the quadrangle or courtyard can be seen a well-preserved lead cistern of quaint design. Many of the windows still hold the original leaded lights, and the porch is worth noticing.

G. J. F. H.

## CONSERVATIVE CLUB, BARNOLDSWICK, YORKS.

THIS building, which was recently opened by Lord Wenlock, was designed by Mr. J. W. Broughton, architect, of Skipton, whose plans were selected in a limited competition. The general design is a Free Gothic, and the building comprises the usual club-rooms (all of which are on the ground floor), a large assembly hall, 72ft. by 37ft. 6in., called "Queen's Hall," two lock-up shops, and cellaring under the whole, most of which is let as an aerated water manufactory. A feature is a supper-room, 28ft. by 15ft., between the shop ceilings and the stage floor. The Queen's Hall has an open-timber roof, and its acoustical properties are said to be most satisfactory. For use in connection with this hall are provided retiring-rooms and lavatories, and the supper-room serves as a retiring-room for dramatic performances. The stage is fitted up

with fire-hydrants, &c., to comply with the requirements of the West Riding County Council. The exterior is faced with excellent local (Tupper Hill) stone, though part of the front is of Yorks parpoints, and the roofs are covered with Burlington slate from the Duke of Devonshire's quarry. The heating is by hot water (low pressure). The principal contractor was Mr. W. Sagar, of Barnoldswick, and the clerk of works Mr. Thos. Briggs.

## CHIPS.

At Dawsbury a new three-storied goods warehouse of stone is being built for the London and North-Western Railway Co. Messrs. Gates and Thomas are the contractors.

An institute has been erected in connection with St. Paul's Church, Lower Teams, Gateshead, at a cost of £630. It has been built by Mr. John Anderson, of Newcastle, from designs by Messrs. Oliver and Leeson, of that city.

The certificate of the freedom of the Fishmongers' Company, to which Lord Kitchener has been admitted, is to be presented to the Sirdar in a silver casket, designed by Mr. G. F. Bodley, A.R.A., who is a member of the Fishmongers' Company.

Early on Tuesday a destructive fire broke out from an unknown cause at 158, Manor-street, Clapham, on the premises of Messrs. Lavender and Sons, builders. It first appeared in a range of buildings of one and two floors, covering an area of about 90ft. by 30ft., and used as builders' workshops and stores. This large area was speedily a mass of fire from end to end. A large private house belonging to Messrs. Lavender was next involved, and surrounding premises were threatened. Messrs. Lavender's premises were totally destroyed, and fell in. The damage to the stock is covered by insurance. A good many hands will be thrown out of employment.

Abraham Baker, a builder, was, at Lambeth Police-court, on Tuesday, charged, on his own confession, with setting fire to a house in Victoria-road, Peckham, persons being therein at the time. He surrendered at the police-station, and accused himself of the crime. Before the magistrate he said he had no reason for setting the place on fire. He was remanded.

The Wakefield and District Master Builders' Association met at the Brunswick Hotel on Thursday in last week, upwards of twenty members being present. The president (Mr. J. Bignall) reported upon the business transacted, and eight new members were elected.

Alterations are being made at the grammar school, Batley, and special consideration has been given to the ventilation, which will be carried out on the Boyle system.

The London and North-Western Railway Company have decided to apply to Parliament in the coming session for power to construct a new line from Wilmslow to Longsight, with the object of shortening the express route from Manchester to London. The branch will leave the company's main line a little south of Longsight station, and thence take a practically straight course to Wilmslow, rejoining the Stockport and Crewe line north of the viaduct. The River Mersey will be crossed near Cheadle village.

At a special meeting of the Llandudno District Council, on Friday, the tender of Mr. S. Warburton, Manchester, amounting to £13,874, was accepted for the erection of municipal buildings, which are to be completed by May 1, 1900.

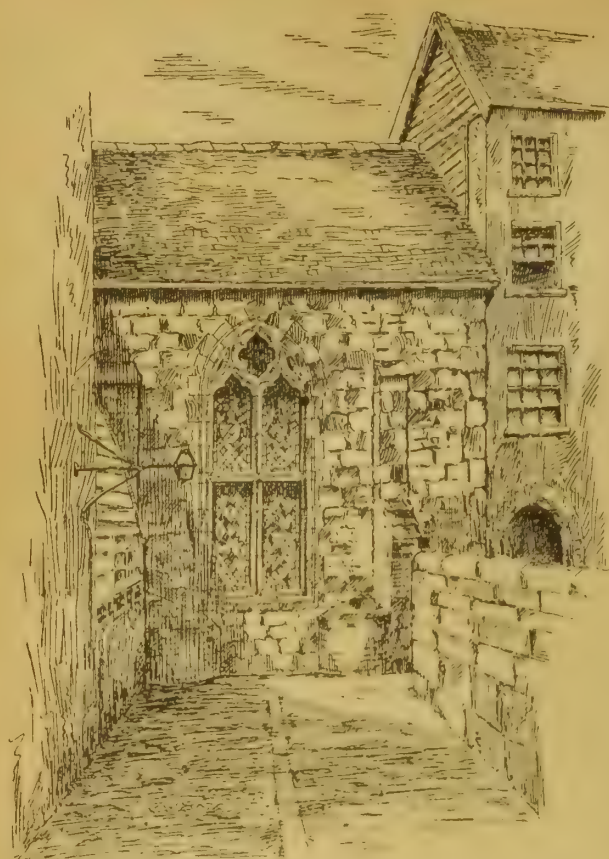
The then Lord Mayor proceeded to Dalston on Saturday, and laid the foundation-stone of the new mission buildings in connection with St. Mark's Church, Dalston.

The bridge which is to span the L. and N.W. Railway at Sandycroft, with which the contractors, Messrs. Gates and Thomas, have made good progress, is now awaiting the fixing of the large girders, which are 70ft. long, and weigh 20 tons each.

Dr. Dewar applied to the Magistrate at the South-Western Police-court on Saturday for summonses against the Southwark and Vauxhall Water Company for cutting off the supply of water to some of his houses in Grafton-square, Clapham. He stated that the company asserted that the water fittings were in a faulty condition, whereas he had gone to considerable expense in providing new ones. Mr. Francis granted two summonses, one for cutting off the supply, and another for not renewing it.

At the last meeting of the City Court of Common Council, a committee submitted plans of the proposed Lombard-street and Moorgate-street Stations of the City and South London Railway, which the Court approved, subject to certain alterations in the booking-offices at Moorgate-street, and to an undertaking by the company to enlarge the exit into Finsbury-pavement if hereafter found desirable.





North Side of College Hall.



No. 67 South St.

# SKETCHES OF OLD HOUSES.

March 1827.

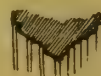
EXETER.

Sketched by  
G. J. E. Hookway.

## Bampfylde House.



Detail of Carved Frieze on Window over Porch.



Moulding of Mullion in Windows.



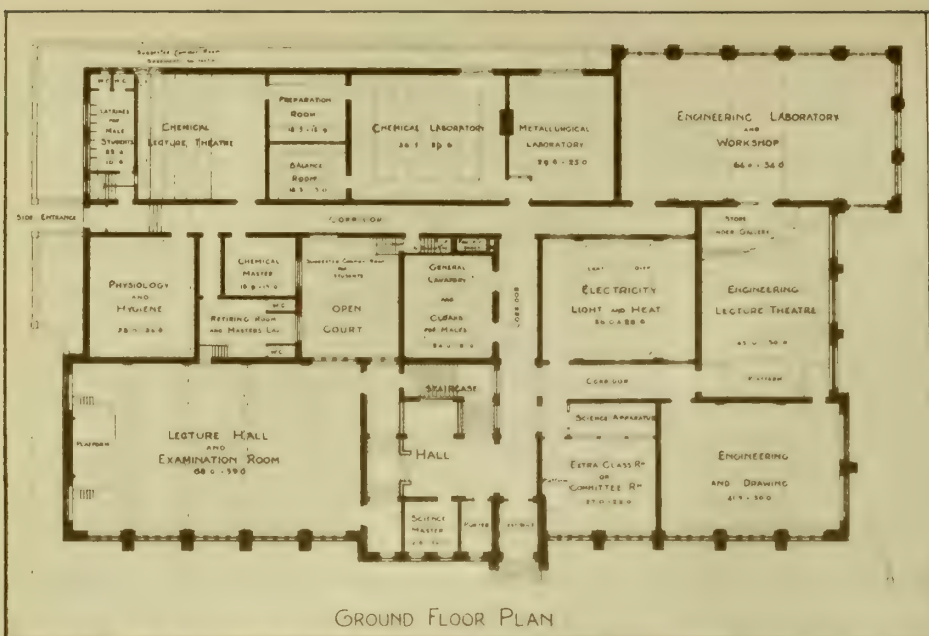
Detail of Bracket and Angle of Window over Porch.

Details from  
Bampfylde House.









PROPOSED  
SCHOOL  
IN-FV

SELECTED BY  
WOODHOUSE & W.

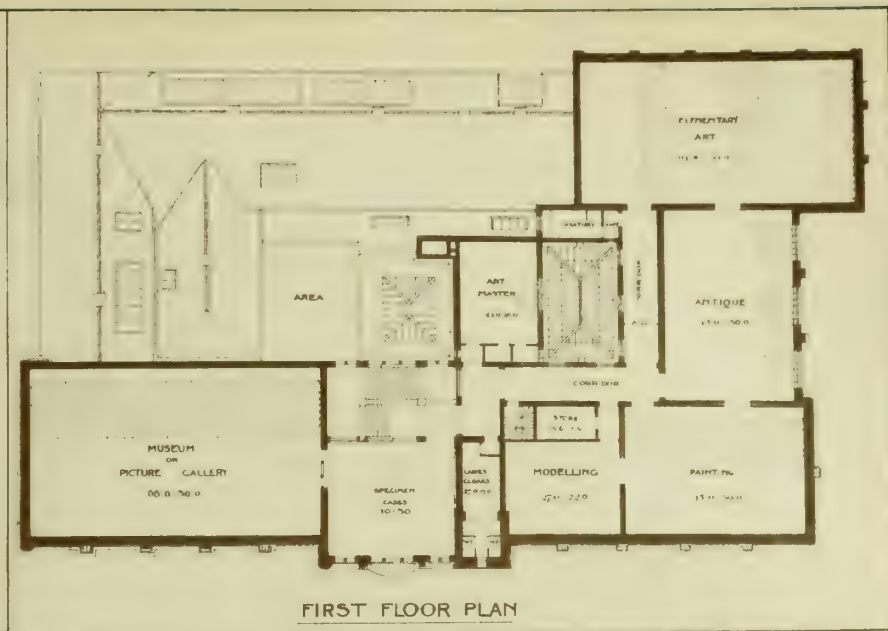




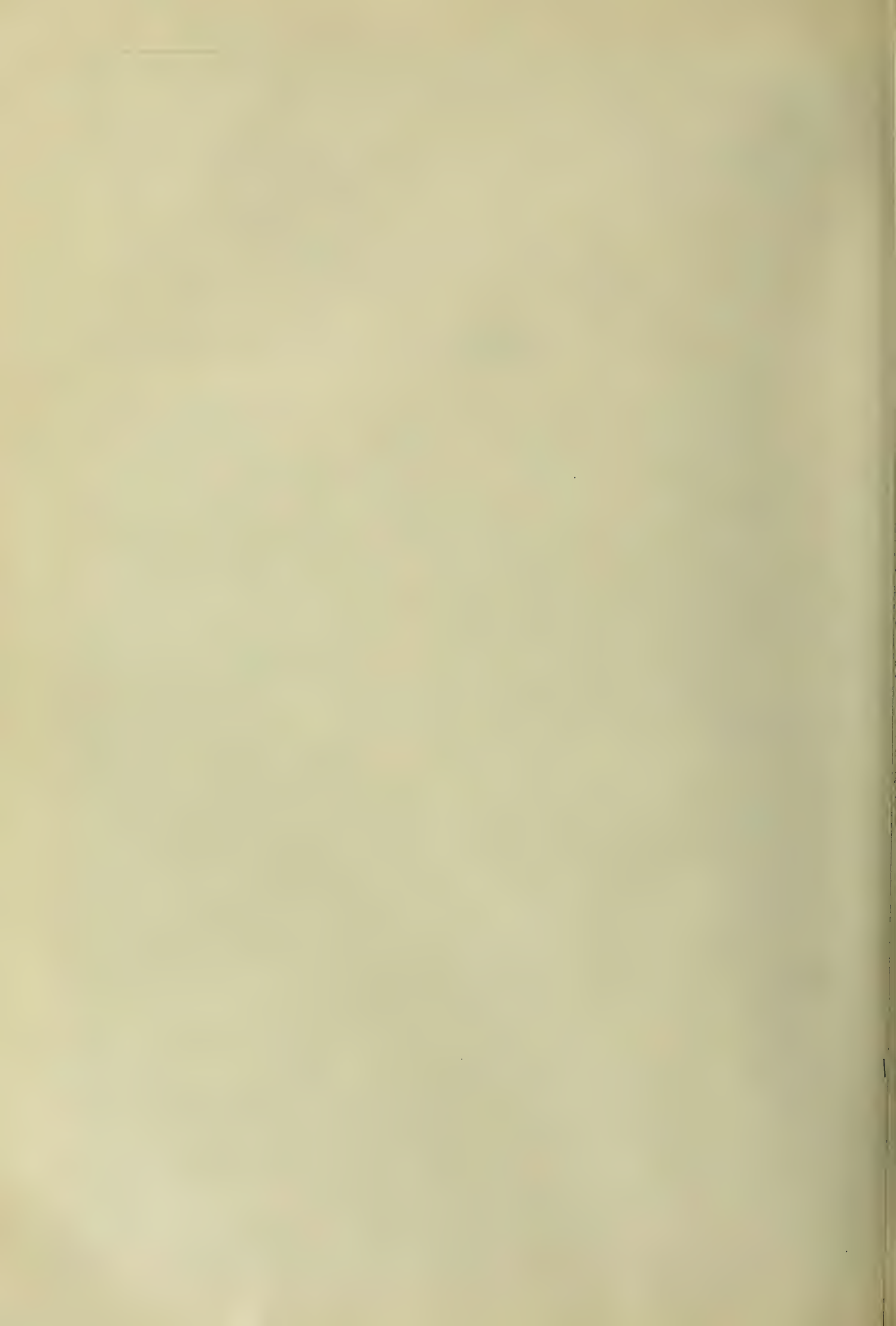
# ED & TECHNICAL BARROW HESS

ED DESIGN.

DOUGBY, ARCHITECTS



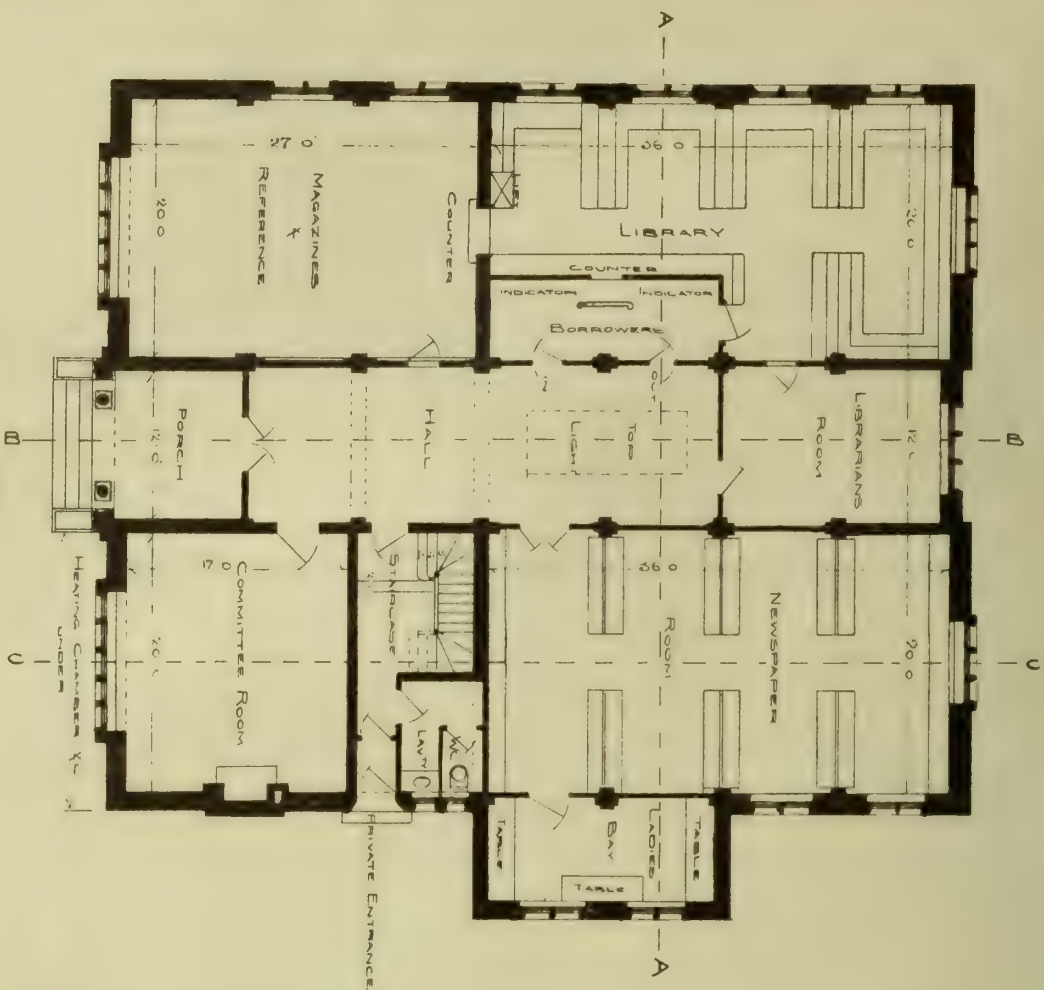




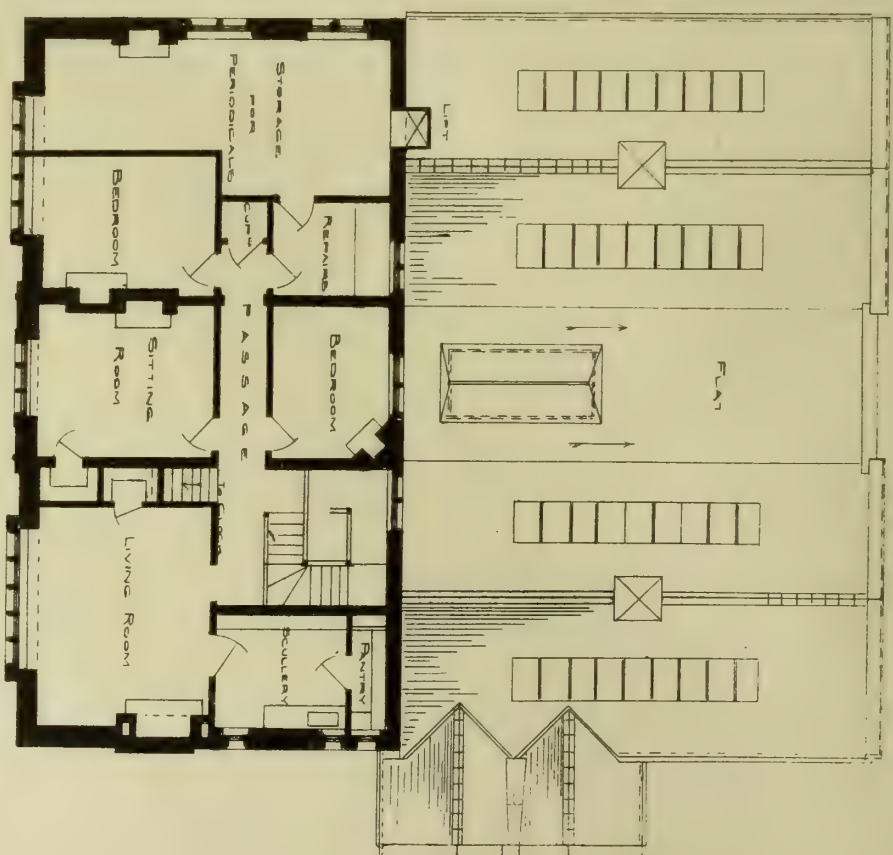








GROUND PLAN.



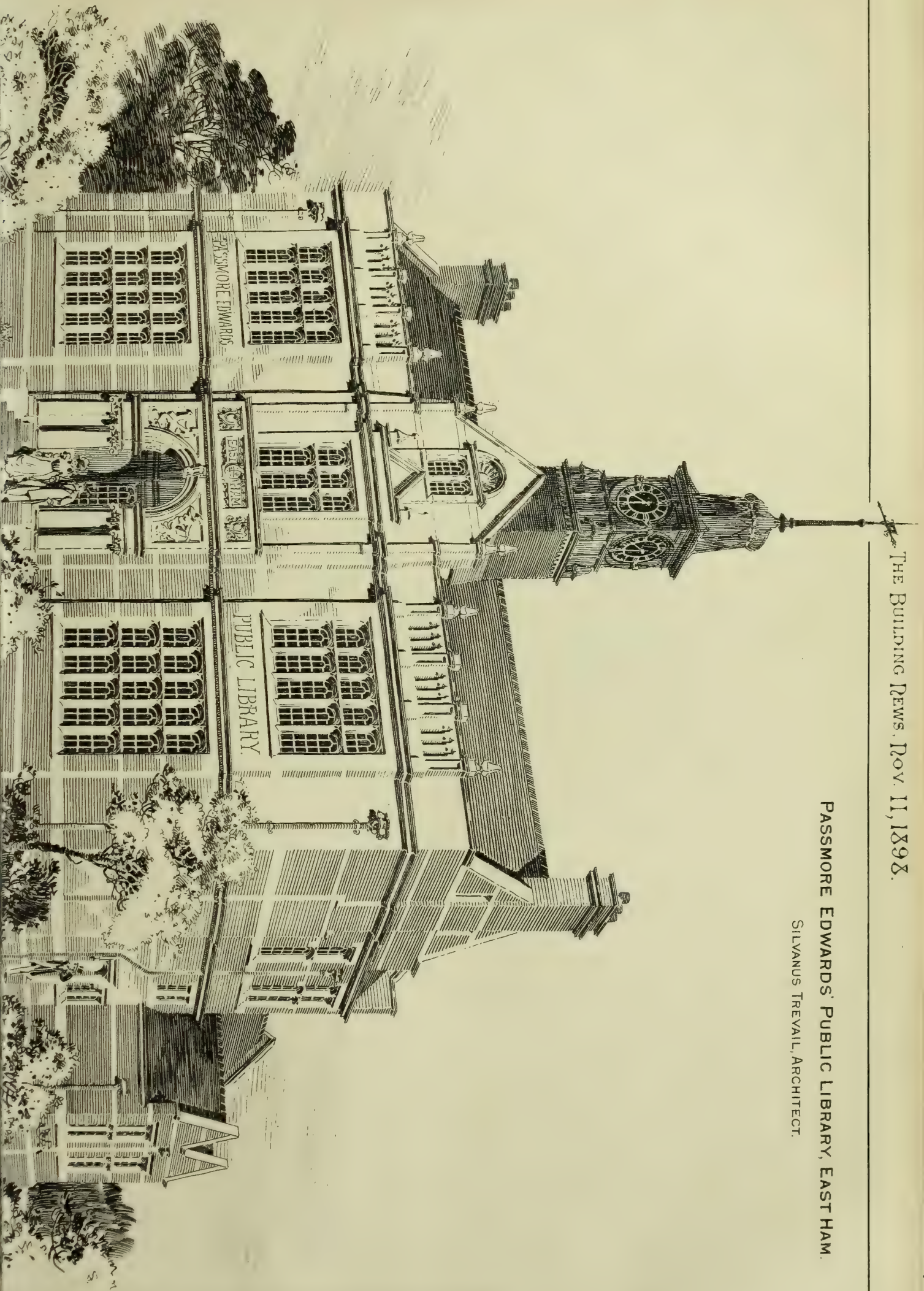
FIRST FLOOR PLAN.



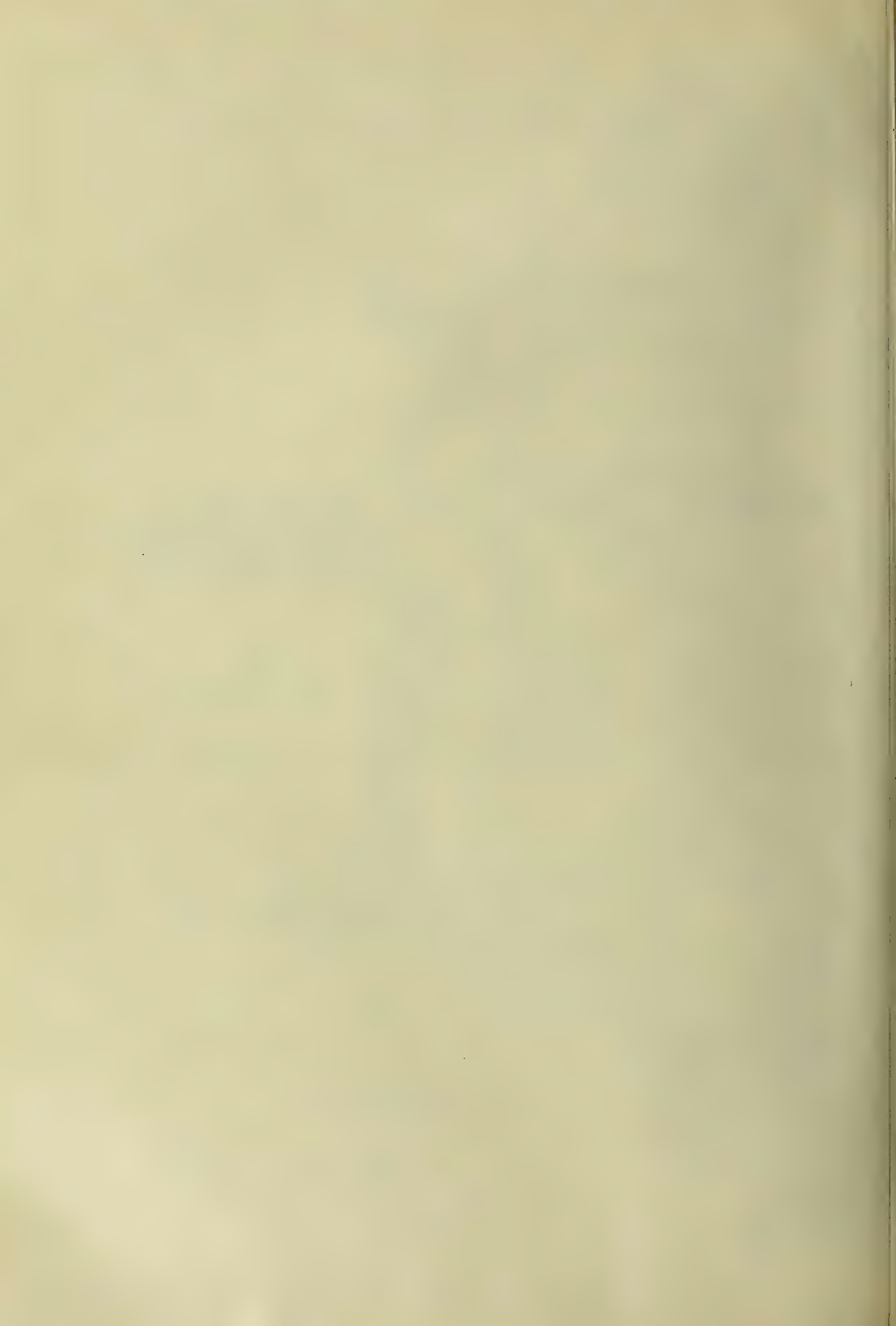
THE BUILDING NEWS, NOV. 11, 1898.

PASSMORE EDWARDS' PUBLIC LIBRARY, EAST HAM.

SILVANUS TREVAIL, ARCHITECT.





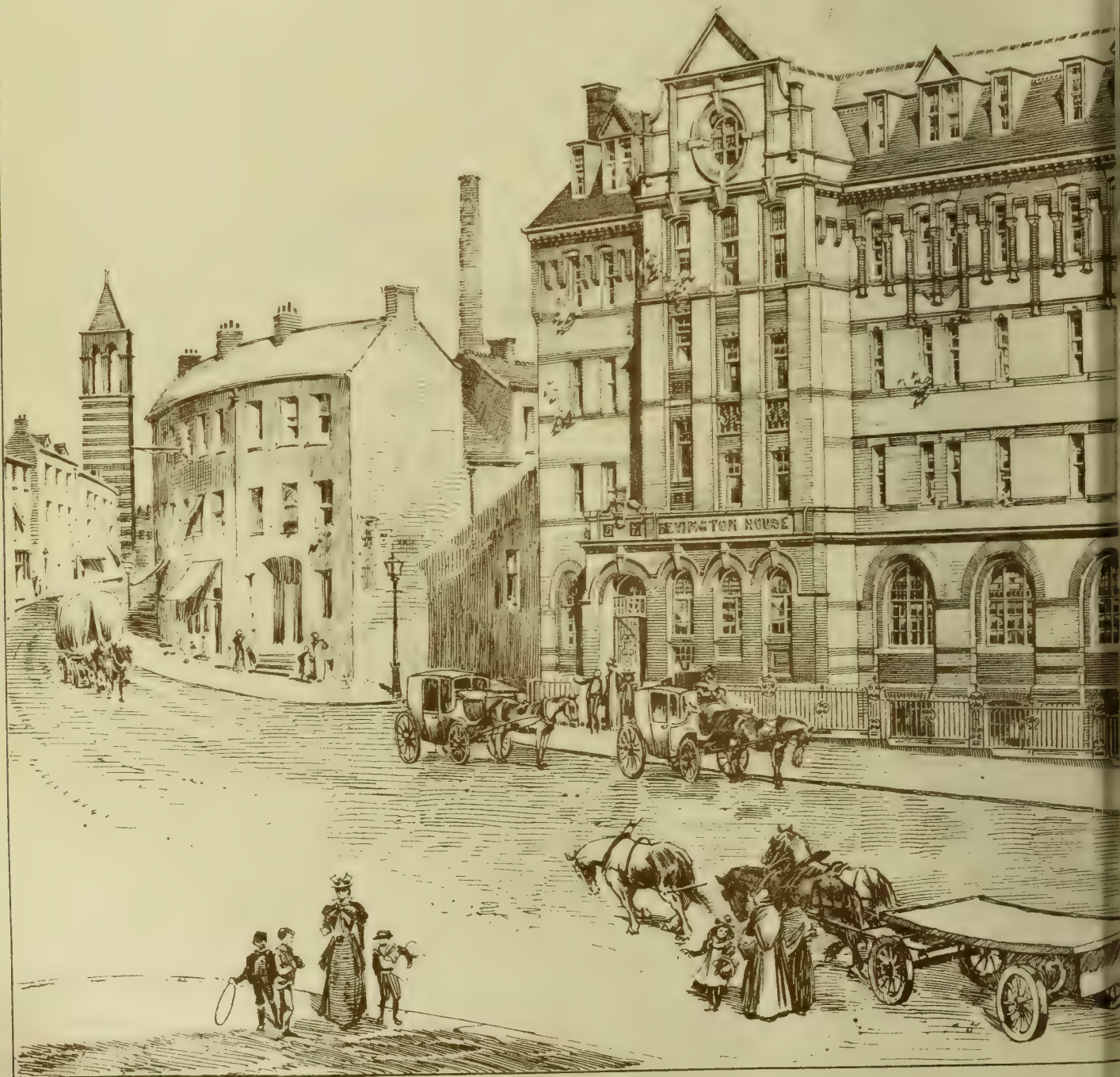
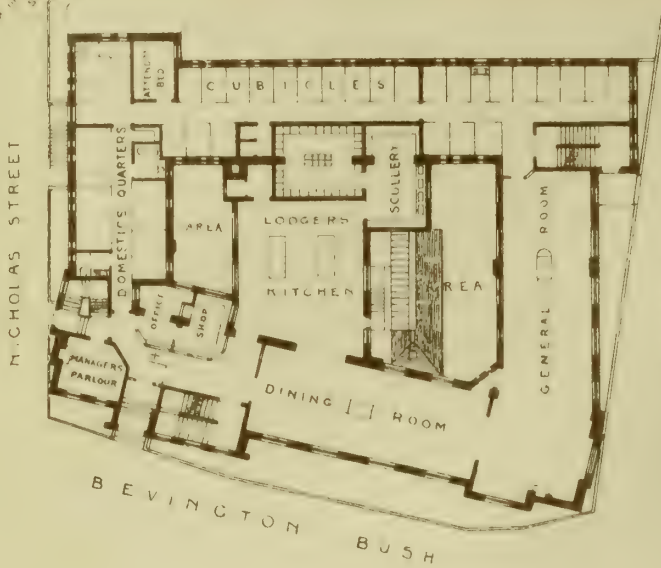








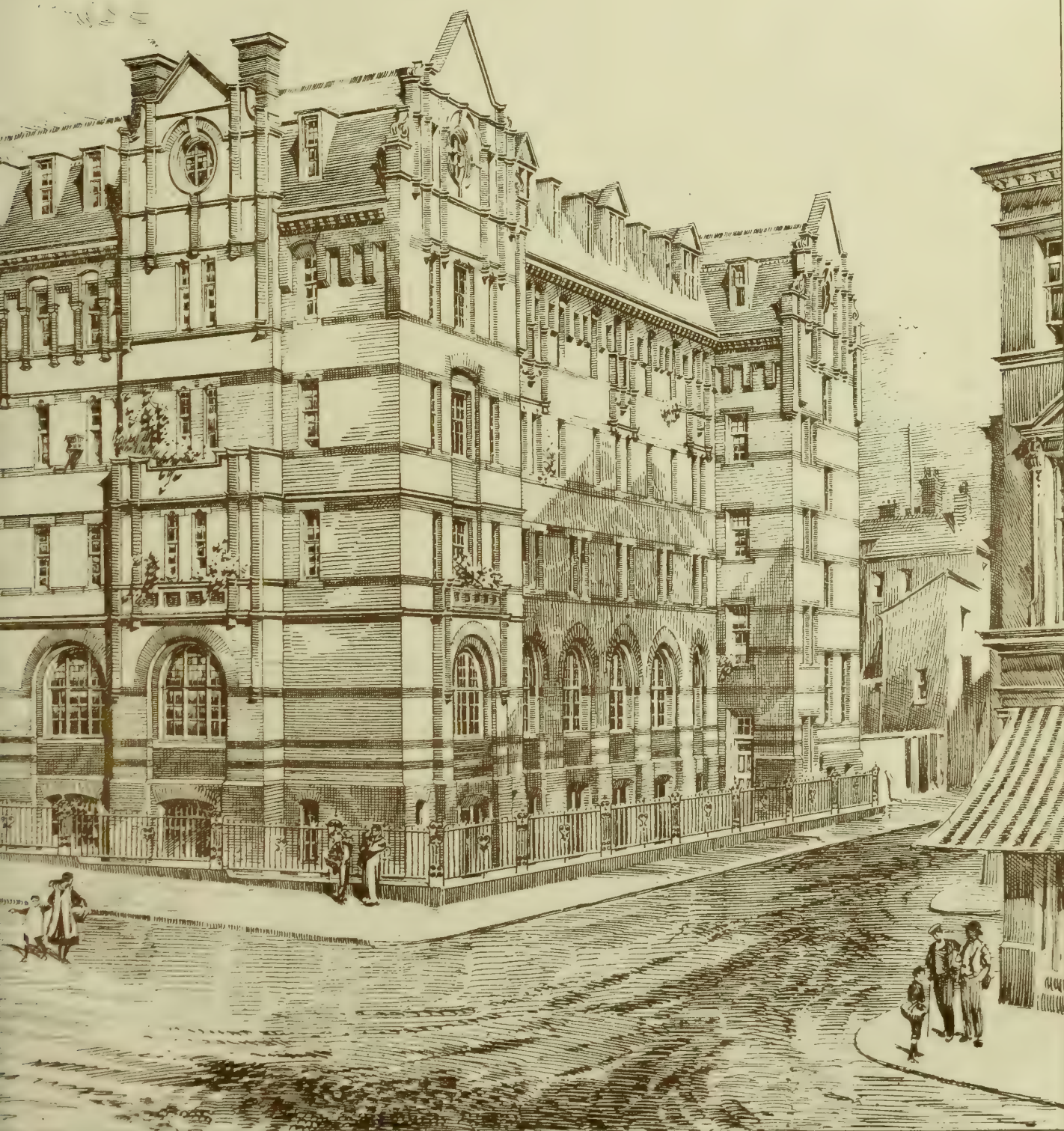
GROVND FLOOR  
PLAN.



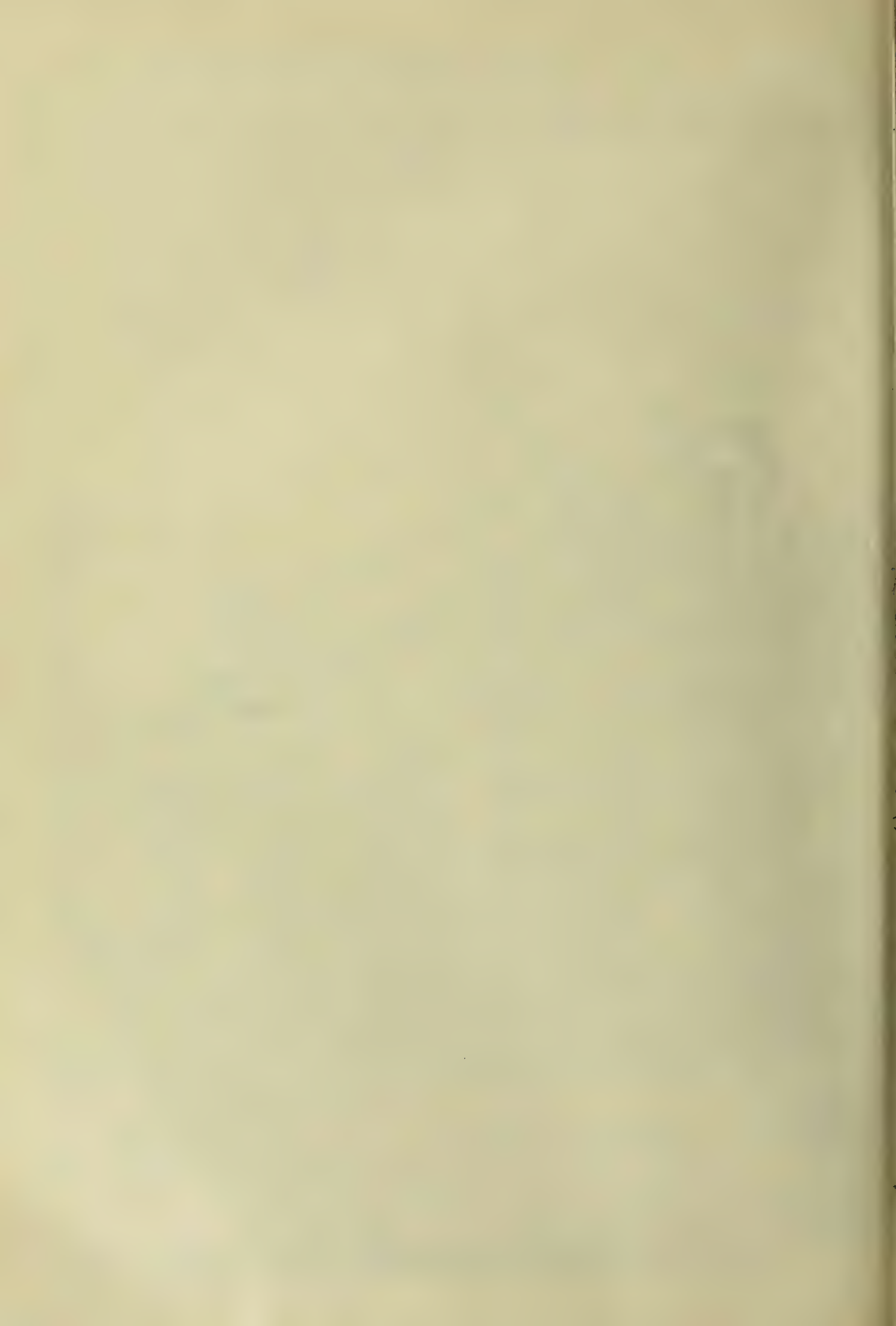


# PEOPLES HOMES, BEVINGTON BVSH LIVERPOOL.

C. O. ELLISON & SON,  
ARCHITECTS, LIVERPOOL.





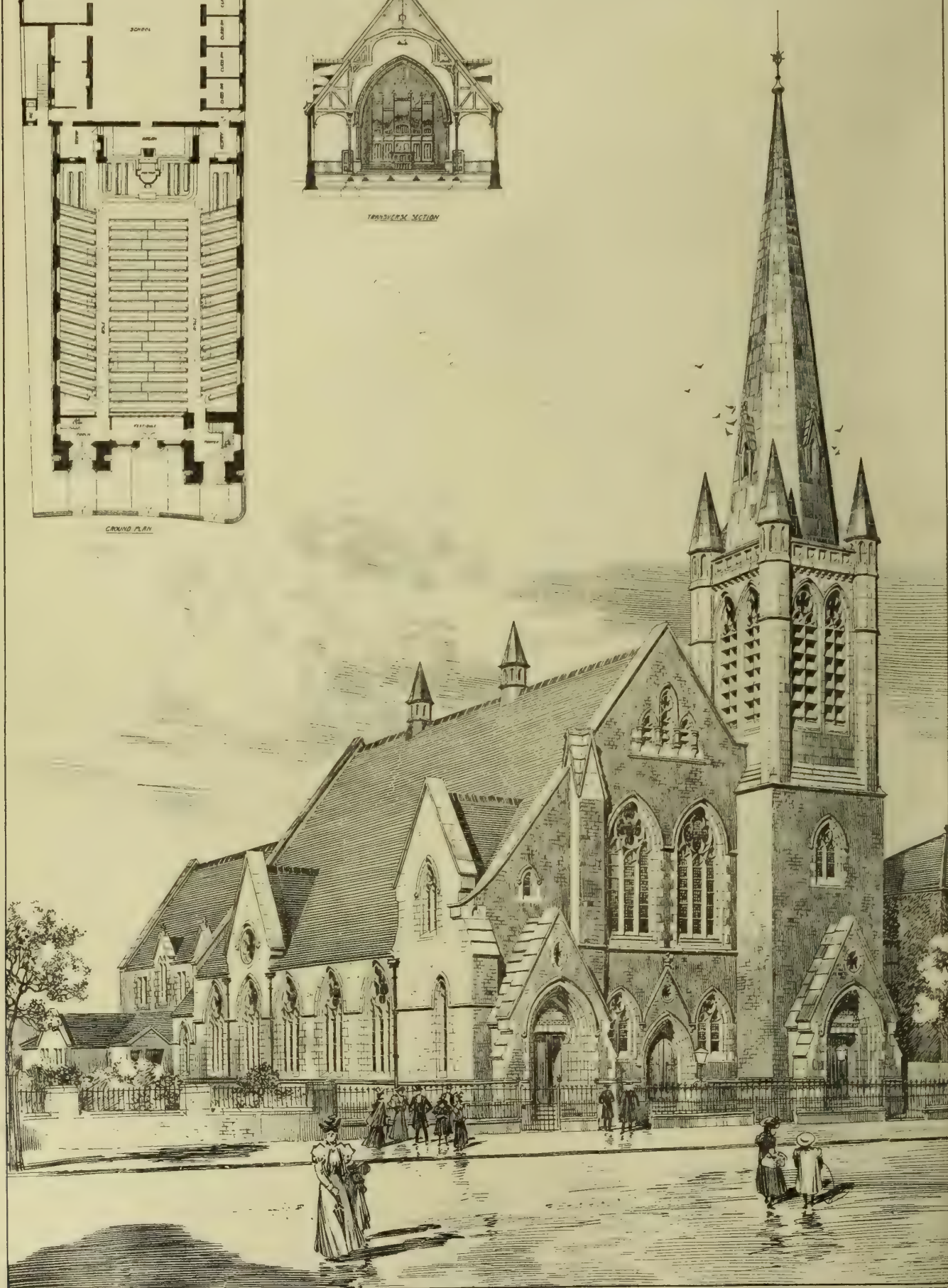
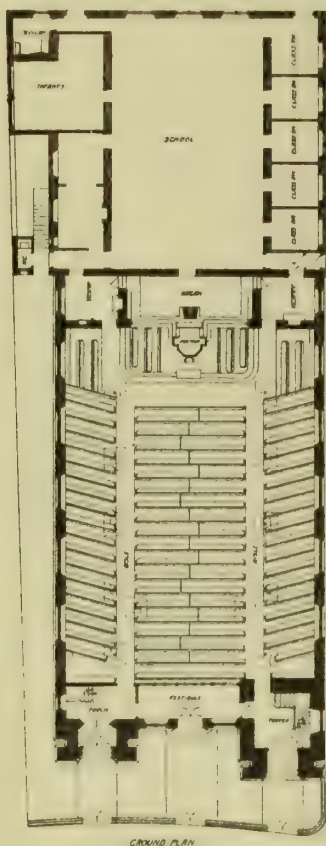






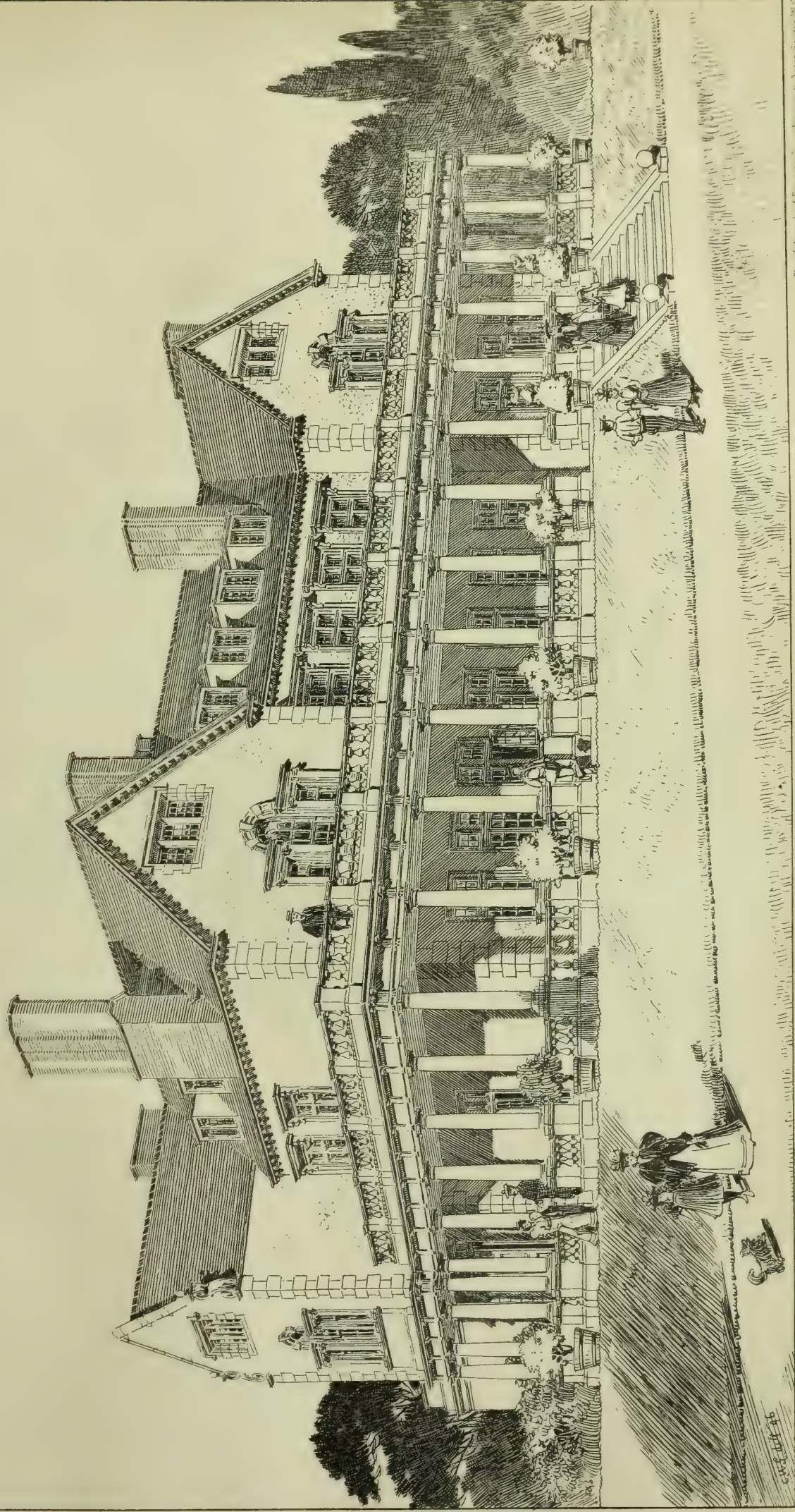


THE RICHMOND ROAD CONGREGATIONAL CHURCH & SCHOOLS · CARDIFF ·



Mr David Dames · Builder · Cardiff · Habershon & Fawcper Architects · Cardiff





AN HOTEL IN THE ISLE OF WIGHT. FRANK S. TAYLOR, ARCHITECT.

Photo Lithographed & Engraved by Messrs. Agnew & Sons, Limited, 15, Abchurch Lane, London, E.C. 4.

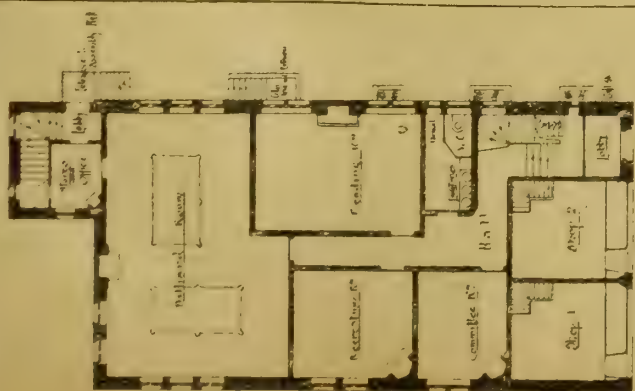






: CONSERVATIVE CLUB : BARNOLDSWICK :

: J. W. Broughton : Architect.





## COMPETITIONS.

**ST. PANCRAS.**—The competition for the new baths and washhouses at St. Pancras has reached a further stage, and the local papers give some account of the matter. The president of the Royal Institute of British Architects was requested by the parochial authorities to nominate a professional assessor to assist in the selection of the designs from the six architects invited to compete. The council of the Institute nominated four gentlemen as suitable referees—viz., Mr. John Slater, Mr. Aston Webb, Professor T. Roger Smith, and Mr. A. Hessel Tiltman—with the result that the last-named architect has been elected, and we understand from what has transpired that he is now preparing the conditions. Mr. Tiltman's knowledge of bath-construction and his experience in such matters are the highest guarantees of his capability for such a task, and we can but think the best choice has been made.

**SWINDON.**—The guardians of the poor in the Highworth and Swindon Union have issued a "model" set of conditions for the guidance of their possible architect. He is to provide a men's hospital for 50 beds, including a separate ward for special cases, and a boys' ward; a women's hospital ward for 80 beds, a special ward, girls' ward and lying-in ward, besides accommodation for four nurses, and a dispensary; a covered way between the old and new buildings, and provision (whatever that may mean) for a cooking-range; the whole to comply with the latest rules of the Local Government Board, and the whole cost must not exceed £3,000. If it does, the architect will only be paid on that amount, and, to begin with, he will have gratuitously to measure up the existing building. He is to make a complete set of drawings to  $\frac{1}{4}$  in. scale, a complete specification, priced bills of quantities, and estimate of the whole thing, and all these documents are to become the absolute property of the guardians. The plans must show the exact means of heating and ventilation, and outside means of exit in case of fire. The chosen architect is to attend Local Government Board inquiries, make all sets of tracings, all detailed drawings (necessary for the inspector also), superintendence, travelling and other out-of-pocket expenses, the architect being likewise required to visit the job at least once every fortnight. Beyond this he is to make a plan on completion, showing all drains, water and gas pipes, suitable for framing to hang in the Board-room, for the benefit of future generations. The whole remuneration to be strictly limited to £5 per cent. on the sum of £3,000. The guardians do not bind themselves to accept any or either of the plans, and the drawings will only be returned to competitors at their own risk. The plans go in (evidently also at the competitor's own risk) on Jan. 16, 1899. We mention the date in time, so that any enterprising competitor may utilise his Christmas holidays!

The committee of the Welshpool Conservative Club have secured premises in High-street, having entered into possession of the building formerly known as the Bear Hotel. The alterations have been carried out from the designs and under the superintendence of Mr. F. D. Ward, of Welshpool.

At the annual distribution of prizes at the drill-hall, Bedford-circus, Exeter, of the 1st E.V., on Friday, a replica of the portrait bust in the Volunteer memorial on Northernhay, in that city, was formally unveiled. It is of terracotta, of heroic size, and was modelled from life at Bournemouth a year or so before the death of the veteran volunteer. It is the work of Mr. H. Turner Hems, of the family of Messrs. Harry Hems and Sons, sculptors, of Exeter.

A cottage hospital, erected as a Diamond Jubilee memorial, was opened at Thetford last week. It has been built from plans by Mr. Herbert J. Green, of Norwich, the hon. architect, the contractors being Messrs. Boughton and Son, of Thetford.

The new church of All Saints, Stechford, Birmingham, erected to take the place of an iron structure which has been in use for the last 21 years, was dedicated on Friday by the Bishop of Worcester. The building, of red brick with stone facings, consists of nave and chancel, with north and south aisles, and it is intended in the future to add a baptistery and tower. Seating accommodation is provided for 504 persons. The contracts at present running amount to something like £4,300. The church has been erected by Messrs. Collins and Godfrey, of Tewkesbury, from the designs of Mr. J. A. Chatwin, of Birmingham.

## Correspondence.

## MODEL SPECIFICATIONS.

To the Editor of the BUILDING NEWS.

SIR,—The article on the above in your issue of last week refers to fireproof floor specifications, and under the head of "32. Fireproof Floors," we find the following:—"The joists to be placed 2ft. apart centres, and upon the lower flanges well-burnt tubular lintel bricks of  $\Delta$  section are to be laid (or made by Messrs. Doulton). Fill in the spaces over and between the brick lintels and steel joists with cement concrete made of coke-breeze, ballast, and cement in proper proportions."

We think the author of the article was probably not aware that anyone carrying out the above (without license from us) would be infringing our patent rights, and that we have recently claimed, and are receiving, heavy damages for such an infringement. Messrs. Doulton have no license from us, and we think their name must have been inserted without their knowledge.—We are, &c.,

MARK FAWCETT AND CO.

[The statement was entirely our own, and apparently an error. We need hardly say we had no intention of recommending readers to go to one firm to infringe the patent of another.—Ed.]

## Intercommunication.

## QUESTIONS.

[12094.]—**Higher Grade Board Schools.**—Can any of your readers furnish me with the name and publisher of a good book on higher grade board schools, or particulars of any articles that have appeared?—H. W. T.

[12095.]—**Sea-green Slates.**—I am about to use some American "sea-green" slates. Would any reader who has experience of them kindly inform me in your next issue what faults he has discovered in them, if any? Will these slates stand the exposure to severe frosts and damp?—ARCHITECTUS.

[12096.]—**Gable.**—How can I construct satisfactorily, to keep out wet, a gable under the following difficulties? An 11in. hollow cavity wall runs up at the back to the apex of gable. Seven inches in front and away from this, outside exposed to the weather, I want to put black and white work of 1½ in. strips and cement.—ENQUIRER.

[12097.]—**Casements.**—Are there any iron casements made that will open both ways, inside and out? Should be glad to hear if there are such in the market.—A. L.

[12098.]—**Sanitary Apparatus.**—Are there any moderate-priced closet-traps, of earthenware or lead, that are self-cleansing and durable? I should like, if anyone will recommend, a good closet for ordinary dwellings of from £40 to £50 rent.—SANITARY.

[12099.]—**Tile Roofs.**—A roof having a rise of about half the span, with open south-west winds, I want to tile. Will any practical tiler tell me what are the best weatherproof tiles, and the lap required? Is it necessary to board and batten, or would a layer of felt be better?—ANATEUR.

[12100.]—**Window Frames.**—Is there any rule in the London Building Act requiring window frames to be set back half a brick? If so, how is it one sees a number of new houses built with the frames nearly flush with the brickwork? Is permission given in some cases, and how is this obtained?—S. O.

[12101.]—**Liquid Indian Ink.**—Will any draughtsman tell me how I can thin the liquid ink sold in bottles? Or is there any liquid ink sold which does not fur up the drawing pen? I have tried Reeves and Winsor, and Newton's, both of which thicken in the pen, and make it difficult to draw.—OLD CORRESPONDENT.

## REPLIES.

[12081.]—**Bedding Girders.**—Some architects prefer lead; but I believe there is a kind of bituminous felt sold adapted for the purpose, and sold in pads. Callender and Montgomery supply pure bitumen sheeting, and, I believe, this is a good material. If lead is used, 4lb. is hardly thick enough; 8lb. lead gives a better thickness.—G. H. G.

[12083.]—**Lift-Pump.**—Any treatise on hydraulics will give "Apprentice" what he requires. A little work on "Pumps, and their Construction," by J. Wright Clarke (B. T. Batsford), will be found of service, and gives the mode of finding the lifting power.—G.

[12084.]—**Bricks.**—Those made of clay obtained from under the sea may give trouble in the way you mention; but the process of burning, I should think, would render them innocuous of all dampness.—A. W.

[12084.]—**Bricks.**—The clay is one in which I should expect to find salt in such a proportion as to render the clay unfit for brickmaking. Salt, when present in even small quantities, forms a very powerful flux, but it becomes volatilised on being subjected to the heat of the kiln or clamp, and in that condition carries away various metallic compounds, such as those of iron, which exist in all brickmaking clays. If, however, the clay on experimenting proves suitable for making bricks, the salt

in the clay will not have the property of attracting moisture after the bricks have been burnt.—L. E.

[12085.]—**Dilapidations.**—The covenant to paint does not extend to graining and decorative painting, which can hardly be intended by the words, "Will paint with two coats at least of good oil colour, &c." If decorative repair was intended, it would have been so stated.—A. LESSEE.

[12086.]—**Damp.**—The dampness J. Feacy complains of is no doubt due to the saline nature of the brick earth or sea-sand used. During damp weather the moisture would make itself apparent. The only remedy is to batten, or cover the wall with a lining of lead foil.—G.

[12086.]—**Damp.**—As the clay was obtained ten miles from the sea, it probably contained little salt, and what it might contain would only form a flux. I am inclined to think that very likely some heavy driving rain on the exterior walls was the cause of the dampness you complain of, or else the bricks may possibly be very porous, in which case the appearance of the damp is easily explained. If this is the case, about the only practical remedy is to coat the exterior with  $\frac{1}{4}$  in. of Portland cement and sand.—LOUIS EWOLD.

[12087.]—**Hip and Valley Rafters.**—The functions of the hip and valley rafters are to carry the jack rafters, or short rafters necessary on account of the roof being, as it were, mitred at the angles. The sizes of these members are generally 2 or 3 in. thick, and deep enough to take the jack rafters, enough being allowed above the level of the common rafters to stand level with the slates or tiles for the purpose of having the lead or slate hips fixed to them. Any good work on construction gives details of these members; for good examples see Newland's "Carpenters and Joiners' Assistant."—L. E.

[12087.]—**Hip and Valley Rafters.**—A hip rafter's function is to (first) form a rib at the angle of roof; second, to form a surface against which the common rafters can abut. A hip rafter does not support any load, nor is it subject to transverse strain, as the planes of the roof surfaces which abut at the angles rather tend to compress the hip rafter. Its depth is not determined by any formula, but by the bevels of the rafters. A valley rafter performs a similar function, though reversed; it is an abutting surface. It is really subject to more cross-strain, as it has to support the weight of the triangular pieces of roof which abut against it on each side, and its depth should therefore be more. Both hip and valley rafters must be deep enough to take the bevelled ends of the rafters, and be an inch or two deeper. See any treatise on carpentry.—STUDENT.

[12083.]—**Green Moor Stone.**—Rivington's "Notes," Vol. III. p. 43, gives the following:—"Greenstone, near to Sheffield in Yorkshire; colour of stone, bluish-grey; very hard stone for steps and landings. Laxton's 'Price-Book' has probably more information on this stone; but I have not my copy handy, so cannot refer to it."—L. E.

[12088.]—**Green Moor Stone.**—Green Moor stone is quarried at Green Moor, near Wortley, a small place of a thousand souls or so, not far from Sheffield. The quarries belong to Mr. Benjamin Brodie Booth.—HARRY HEMS.

[12089.]—**Floor of Hall.**—It is usual to construct springy floors, by putting in very few supports, such as sleeper walls. Wood binders or girders of pitch-pine could be put right across the hall at 16ft. apart; on these the joists could be fixed, and the boards nailed in the usual way. The binders would have to be about 15in. square.—L. E.

[12091.]—**Bedding Ironwork.**—It is not absolutely necessary to place lead or felt between stone templates and iron girders, though doing so is supposed to provide a better bedding, as the intervening material is calculated to adapt itself to inequalities in the face of the stone or bottom of the girder.—L. E.

[12092.]—**Fluting and Tiling.**—I do not understand what fluting is. Perhaps it is a misprint for slating. If so, Rivington's "Notes," Vol. II, gives description of slating and tiling; Vol. III. of the same work describes manufacture of tiles. Seddon's "Builders' Work" has a practical description of slating. Dobson's "Art of Building" has a few words on the subject; while Dobson's "Manufacture of Bricks and Tiles" deals with their manufacture. Hammond's "Practical Bricklaying" has something to say on the subject; but Rivington's "Notes" has nearly all the information contained in all the other works I have mentioned.—L. E.

[12093.]—**Plumbing Work in Large Hotels.**—Many of the large London hotels have excellent arrangements in plumbing. Among the most prominent I remember the Grand Hotel and the Hotel Cecil. There is hardly any doubt but that any large public establishment must, of necessity contain much that would be of value to any young plumber.—LOUIS EWOLD.

The foundation-stone of new schools for St. Mary's parish, Aston Brook, Birmingham, was laid last week. The buildings will be Early Renaissance in style, will accommodate 400 children, and cost about £3,000. The walls are of local brick, with Heather Mill facings. Mr. E. David Holmes, of Birmingham, is the architect, and Messrs. Lee and Son, Avenue-road, Aston, are the contractors.

Mr. F. Douglas Fox and Mr. H. J. Foord, who are going out to represent the consulting engineers and contractors respectively in the construction of the Syria-Ottoman Railway, left for Haifa on Friday evening. The first section of this railway, extending from Haifa to the Jordan, will be completed in the early part of the coming year, when the next section to Damascus will be proceeded with. The Thames Ironworks and Shipbuilding Company (Limited) are carrying out this contract for the Syria-Ottoman Railway Company, of which Mr. Arnold F. Hills is chairman and Sir Douglas Fox consulting engineer.



## LEGAL INTELLIGENCE.

**ARBITRATION CASE FROM STOKE NEWINGTON.**—Mr. Under-Sheriff Burchell and a special jury at Red Lion-square, Holborn, heard, on Friday, the case of "Tilley v. The School Board for London," a claim for about £6,500 as compensation in respect of the compulsory sale of the premises Nos. 51, 53, and 55, Stoke Newington-road, N., required for the purposes of a school. The claim as originally sent in was for £6,070. It was submitted that the premises in question were exceptionally suitable for the erection of shops for the claimant's business as a gasfitter, as they were immediately opposite the offices of the Gas Light and Coke Company. The experts engaged in the case on behalf of the claimant were Mr. James Green (Weatherall and Green), Mr. Eison (Reynolds and Eison), and Mr. William Eve (Eve and Sons), and their valuations averaged £6,500. For the school board, the principal surveyors were Mr. Daniel Watney (Daniel Watney and Sons), Mr. Samuel Walker (S. Walker and Son), and Mr. W. S. Cooke. The jury awarded the claimant the sum of £4,750 with costs and interest since date of the notice to treat.

**COMPULSORY REPAIRS TO SEWERS.**—**NORTH AND MILLHOUSE V. WALTHAMSTOW URBAN DISTRICT COUNCIL.**—The plaintiff in this case (heard by Mr. Justice Channell last week), Miss Sarah Ellen North, the owner of seven houses in Cambridge-road, Walthamstow, and Mr. Charles Millhouse, her builder and agent, sued the defendant council to recover £35 for work and labour done, and materials supplied, in executing sanitary work upon what they alleged was a public sewer in connection with the houses of the first-named plaintiff, at the request of the defendants. The defendants denied indebtedness, or that they gave any order for the work to be done; but it appeared that in November last the inspector of nuisances appointed by them caused to be served upon Millhouse a notice to abate a nuisance arising from defective drains on the premises in question, and specifying the works necessary for that purpose. It was not now argued on behalf of the council that the pipe in regard to which the work was done was a drain repairable by the owner, and not a sewer maintainable by themselves; but the point taken was that the plaintiff were not bound, under the notice given, to do the work, and as they acted as volunteers in the matter, they could not recover. For the plaintiffs, "Andrews v. St. Olave's Board of Works" and the Public Health Act, 1875, sections 41, 94, and 104 were cited, while the defendants relied on "Gebhardt v. Sanders" and "Selfe v. Hove Commissioners," the latter one which the learned judge declared to be about as unsatisfactory a decision as ever came into court. Mr. Justice Channell, in delivering judgment, said that as there had been no argument upon the point that the pipe in respect of which the expenses sought to be recovered were incurred was not a sewer, he must take it that in fact it was the duty of the defendant council to do anything which was necessary to the pipe. Somebody else had, however, done the work, and if that somebody else were a mere volunteer, he could not recover because, although it was a person's duty to do a thing, nobody else had any right to come and do it and charge him with the expense of it. The question was what degree of compulsion was necessary in order to make an individual who did the work not a volunteer, so as to enable him to recover. He did not think that the compulsion must be irresistible, or that if the man who was asked to do it had a defence to the proceedings he became a volunteer. Under these circumstances he gave judgment for the plaintiffs with costs, and certified that the case was a proper one to be brought in the High Court. Judgment for the plaintiffs accordingly.

**HEAVY PENALTY FOR BREACH OF BUILDING REGULATIONS.**—At the Salford Police-court, last week, John Ward, builder, Barrfield-road, Pendleton, was summoned for a breach of the Salford Improvement Act, 1871, by building half-brick partition walls in the construction of six dwelling-houses in Barrfield-road without placing a course of hoop-iron in every story. The offence was proved by Mr. William Young, building inspector for the corporation, and the defendant was fined £30 and costs, with the option of two months' imprisonment.

**LANDLORDS' V. TENANTS' RESPONSIBILITIES FOR FACTORY ACT REQUIREMENTS.**—**ARDING AND OTHERS V. ECONOMIC PRINTING AND PUBLISHING COMPANY.**—In the Queen's Bench Division recently the Lord Chief Justice and Mr. Justice Wills gave judgment in an appeal from the City of London Court. The plaintiffs, the respondents in the appeal, were the statutory "owners" of a factory in Bouverie-street, Fleet-street, and the defendants were their tenants under a lease dated October 30, 1891, for a term of 21 years, terminable at the option of the lessees at the expiry of seven or 14 years, at a rent of £700 a year. The plaintiffs, as such owners of the factory, had been compelled by the London County Council, under section 7 (2) of the Factory and Workshop Act, 1891, to provide in the factory means of escape from fire at a cost of £710, and the present action was brought to recover

that sum from the defendants under the lease, which contained covenants on the lessees' part that they would during the term bear, pay, and discharge all rates and taxes, sewers rate and main drainage rate, parish dues, and all other rates, taxes, and impositions and outgoings whatsoever which were then or should at any time thereafter be assessed, charged, or in anywise imposed upon or in respect of the demised premises or any part thereof or upon the landlord or tenant in respect thereof by authority of Parliament or otherwise howsoever; and that they would bear and pay a fair share and proportion of all costs and expenses which the plaintiffs in respect of being the owners or lessors of the premises demised or any part thereof during the continuance of the said term might be called upon to bear, pay, or contribute, or would be liable to in or about every or any reparation, pulling down, rebuilding, or raising of every or any party-wall, party fence wall, timber partition, or party-arch, or incidental thereto, or in or about any drainage or sewerage or otherwise by virtue of any Act or Acts of Parliament already made or thereafter at any time during the said term to be made. The plaintiffs contended that they were entitled to recover the whole sum under the first of these covenants; and the defendants contended that the expenses came within the second of the covenants, and that they (the defendants) were accordingly liable for a fair share or proportion of the expenses only. The learned Judge at the trial gave judgment for the plaintiffs for the full amount under the first covenant. The defendants appealed. The cases of "Aldridge v. Ferne" (L.R. 17 Q.B.D. 212), "Smith v. Robinson" (L.R. 1893, 2 Q.B. 53), "Baylis v. Jiggins" (L.R. 1898, 2 Q.B. 315), and "Hill v. Edward" (W.N. 1885, p. 32) were cited in the course of the argument. The Court allowed the appeal. The Lord Chief Justice said that, upon the whole, he was inclined to the conclusion that the liability for the expenses in question was a liability of so exceptional a nature that, it being in the first instance cast upon the landlord, it must, under the lease, be borne in fair shares by the landlord and tenant. In 1891, shortly before the date of the lease, was passed the Factory and Workshop Act, 1891, which came into operation in January, 1892. Under the powers given by Section 7 of that Act, the landlords were called upon to provide facilities for escape in case of fire, and they did so between January and April, 1897, at a cost of £710. Having done so they brought this action against the lessees, and called upon the lessees to indemnify them against this expense under the contract contained in the lease. The question was whether that was an obligation the lessees had taken upon themselves. His Lordship read section 7 of the Factory and Workshop Act, 1891. It was to be observed, his Lordship said, that the Act in the clearest way cast the obligation of executing the works upon the owner. There was no provision that the local authority, in default of the owner, should themselves execute the works. And there was no provision making the expenses a charge on the premises. The obligation was directly cast upon the owner, subject only to the provision in the section that if the owner alleged that the occupier of the factory ought to bear or contribute to the expenses he might apply to the County Court, whereupon the County Court, after hearing the occupier, might make such order as appeared to the Court just and equitable. The question was whether the owners, the onus being upon them, had made out that this obligation had been taken off their shoulders by the covenants in the lease. The first covenant was a covenant that the lessees would bear, pay, and discharge certain specified rates, and all other rates, taxes, and impositions and outgoings whatsoever which were, or should be, assessed, charged, or in anywise imposed on the premises or upon the landlord or tenant in respect thereof by authority of Parliament or otherwise. The expenses now in question were not charged or imposed on the premises. It was, however, on the latter words of the covenant that counsel for the plaintiffs relied. His contention was that the expenses were a charge or an outgoing imposed in respect of the premises. His Lordship had great doubt as to the construction of the covenant; but, upon the whole, he thought the expenses were not within it; he doubted whether they were a charge, and he doubted whether they were an outgoing. The covenant was intended to deal with recurrent payments such as rates, taxes, and assessments, or with payments that did not in some sense constitute a charge on or in respect of the premises. The cases cited were not of great assistance. In "Aldridge v. Ferne" the payment was a charge on the premises. Moreover, against that case was to be set the decision of Mr. Justice Mathew in "Hill v. Edward," where a covenant which was indistinguishable in principle from that in the present case was held not to cover paying expenses. On the whole, therefore, he thought that the words of the covenant were not sufficiently explicit to cover this exceptional charge created by a recent Act. It was necessary to consider also the second covenant, which must, in his opinion, be read as a proviso to the first covenant. That also was a covenant as to the construction of

which his Lordship felt no great certainty; but he thought, on the whole, that the words "costs and expenses," which the lessors, in respect of being owners or lessors, were called upon to bear or pay by virtue of an Act of Parliament, not inaptly met this case. On this ground also he therefore thought that the appeal must be allowed. Even if this decision was not right in law, certainly it was a decision which would work equitably and justly. Mr. Justice Wills delivered judgment to the like effect.

**MORLEY GAS ARBITRATION: UMPIRE'S AWARD.**—Mr. James Mansergh, C.E., of Westminster, the umpire appointed in the arbitration between the Morley Corporation and the Morley Gas Company to fix the price to be paid for the undertaking of the Morley Gas Company, has now made his award. The arbitration was held last month at the Hotel Victoria, London. The amount of the claim, as made out by the witnesses for the gas company, was about £133,650, and the witnesses for the corporation put the value at about £30,000, which latter amount, however, did not include any allowance for compulsory purchase, or cost of reinvestment, these matters being left by the corporation witnesses to be dealt with by the umpire. The amount of the award is £109,866 2s. In addition, however, to the gas undertaking, the corporation will be entitled to the balance of various insurance and contingent funds, which amount to about £10,000, after the payment thereof of certain costs of the Morley Gas Company. The corporation will also acquire some freehold property in the centre of the town which belongs to the gas company, and some other land purchased by the company, but not at present used for the purpose of the gasworks.

**SURVEYORS' FEES IN LEGAL CASES.**—**HUDSON V. MILLER.**—This action, lately heard by Mr. Justice Ridley, was brought by Mr. Hudson, of Messrs. Wigg, Oliver, and Hudson, surveyors, for £80 7s., fees alleged to be due for professional services. The fees were claimed in respect of attendances and evidence given by the plaintiff in the course of litigation between the defendant and the London County Council which took place in 1895. The defendant's claim in that litigation was in respect of damage done to premises owned by him in Stoke Newington in consequence of the removal of adjoining buildings by the London County Council. The amount claimed was £250, afterwards reduced to £110. The matter was referred to arbitration, and in the result the defendant recovered £17 10s., with costs on the County Court scale. The defendant's case was that plaintiff's charges were grossly excessive; and, further, that an agreement was made by which the plaintiff consented to identify himself with the claim in respect to the extent of his fees, a minimum fee of ten guineas being guaranteed him. Mr. Justice Ridley found that no such agreement was made as was alleged by the defendant, but he reduced the claim to £70 on the ground that some of the attendances were charged for twice, and on the further ground that the bill bore an undue proportion to the amount claimed.

**ARBITRATION CASES FROM TORQUAY.**—A series of important arbitration cases has been heard at Exeter this week. There were some nine cases dealt with under the recent Torquay Water Act, which gave the corporation power to acquire the whole of the watershed of their water supply, covering some 2,300 acres and seven farms. About one-fifth of this area has already been purchased by private agreement, but several owners have declined to treat in this manner. Hence arbitration became necessary. Mr. A. S. Rendell, of Newton Abbot, is the arbitrator on behalf of the Torquay Corporation in all the cases, and Messrs. A. C. Loveys, of Moreton, and Ellis and Drew, of Exeter, are the arbitrators for the respective vendors. Mr. Squirey, land agent, is the agreed umpire, and Mr. Balfour Brown, Q.C., was retained on behalf of the Corporation, whilst Mr. H. E. Duke represented the other side. About half the watershed is affected by these cases, and the total sum allowed under the Act for the purchase of the properties and laying out the land is £40,000. Of this only about one-sixth has been so far expended. The witnesses included, for the claimants, Messrs. A. E. Ellis, F.S.I., Exeter; J. Bowerman, timber merchant, Bridgewater; Arthur C. Loveys, F.S.I., Moretonhampstead; J. Bellamy, C.E., consulting water engineer to the Plymouth Corporation; E. Osmond, sen., land surveyor; and for the Torquay Corporation, A. S. Rendell, F.S.I.; Arthur Body, A.R.I.B.A., Plymouth; E. J. Sawdys, surveyor, Ashburton; J. Ingham, water engineer to the Torquay Corporation; and Mr. H. Hoskings.

**IS AN OLD LANE A "NEW STREET"?**—In the Queen's Bench Division, on Tuesday, before the Lord Chief Justice and Mr. Justice Wills, Mr. Mattinson, Q.C., moved, on behalf of the Wandsworth District Board of Works, for a rule nisi in the nature of a mandamus directed to the magistrate of the South-West London Police-court to state a case. The object of the application was, the learned counsel stated, to raise the question of whether Putney Heath-lane within the district of



the board was a new street within the meaning of the Act dealing with the question. The Wandsworth Board of Works had determined that the lane was a new street; their surveyor apportioned the cost of the necessary work upon the adjoining owners, and then an application was made by summons to enforce the apportionment. The magistrate was, however, of opinion that Putney Heath-lane was not a new street so decided; and upon an application being made to him declined to state a case. Hence the present application. The facts were not in dispute, and the learned counsel submitted that, having regard to the number of houses in the lane, it had become a new street. It was right that he should mention that there was a case decided in that Court in which it was held that the question of new street or not was a question of fact. Lord Russell: Do you go so far as to say that the magistrate could only find that it was a new street? Mr. Mattinson said he put the matter as high as this, that upon the admitted facts the magistrate most certainly ought to have found that it was a new street. Lord Russell said he could quite understand that the local authority wished to raise this question in this fashion, especially as there was no appeal; but, under the statute dealing with the stating of cases, it was perfectly clear that it only applied where the complaint was that the decision of the magistrate was wrong in law. This was a pure question of fact, and the rule would be refused. Mr. Justice Wills concurred. Rule refused accordingly.

#### CHIPS.

At Chart Sutton Parish Church, Kent, on Wednesday, recently reopened after restoration, a stained-glass window was unveiled last week. It is of two lights, represents the building of Solomon's Temple, and has been executed by Messrs. Lavers and Westlake, of Bloomsbury.

A new wing, which has been added to the Municipal School of Art, Cavendish-street, Manchester, as a Diamond Jubilee memorial, was formally opened last week. It has been built from designs by Mr. J. Gibbons Sankey, of Manchester, the contractors being Messrs. William Southern and Sons, of that city.

At the public offices, New Ferry, Birkenhead, on Friday, Colonel W. R. Slacke, R.E., held an inquiry on behalf of the Local Government Board respecting an application by the Lower Bebington District Council to borrow £10,000 for a sewerage scheme, £5,000 for new public offices, and £3,000 for recreation grounds. It was explained that the sewerage scheme, by which all the drainage will be discharged direct into the Mersey, has been prepared by Messrs. Beloe and Priest, whose plans were selected in competition.

A special meeting of the Leeds City Council will be held next Wednesday for the purpose of considering the expediency of promoting a Bill authorising the carrying out of several improvement schemes in various parts of the city, including the extension of Kirkgate Market and the widening of its approaches, the erection of an exhibition building on North-street Recreation Ground, the construction of a new road between East-street and Marsh-lane, and the widening of several streets.

The warming, ventilation, and hot-water supply of Portrane, the largest asylum in Ireland, has received careful and lengthy consideration, so as to secure the best and most improved appliances. Leading engineers submitted schemes, and the plans and estimates of John King, Limited, engineers, Liverpool, have been accepted for their improved mechanical system, employing their Rajah ventilating radiators, Rex electric air propellers, and patent tubular exhaust ventilators, involving a cost of nearly £20,000.

The foundation-stone of a new Presbyterian church was laid on Friday in Mansfield-road, Nottingham. The edifice is being built from plans by Mr. A. W. Brewill, F.R.I.B.A., of Nottingham.

The Hon. Lyulph Stanley, vice-chairman of the London School Board, on Friday, formally opened a new school erected by the board at St. George's-row, Ebury-road, Pimlico. The site was purchased at a cost of upwards of £9,000, and the building cost £16,000, the total outlay being £25,725. Accommodation has been provided for upwards of 600 pupils—boys, girls, and infants—and it is proposed to add another room to the accommodation of infants.

The contractor for Buckpool Harbour extension, under the Scottish Fishery Board, has ceased work. Mr. Anderson, Aberchirder, secured the contract to conclude the work by Sept. 14 last, but was subsequently granted an extension of time till the end of December. The work is about three-fourths finished, and a small part of the extra concrete wall has been built. No progress having been made for several days, Captain Andrews, Public Works Office, Oban, inspected the harbour this week, and it is expected that the Scottish Fishery Board will complete the work themselves.

#### STATUES, MEMORIALS, &c.

**THE BOADICEA STATUE.**—The London County Council having by its General Powers Bill of this year obtained power "to erect and maintain or contribute towards the provision, erection, and maintenance of works of art in London," has considered the proposal to erect on a site at the extreme end of the Victoria Embankment wall, by the corner of Westminster Bridge, the Boadicea statuary group by the late Mr. Thomas Thornycroft, which has been presented to the Council by Mr. J. I. Thornycroft. At Tuesday's meeting of the Council, the recommendation of the Highways Committee that the sum of £1,100 to be voted to cover the cost of placing the group in position and the expense already incurred in putting up and removing the temporary platform upon which a plaster cast of the group was recently exhibited, was, however, withdrawn. Mr. T. G. Jackson, R.A., who had been in communication with the Council's architect (Mr. T. Blashill) on the matter, has submitted a sketch, which had been approved by the Highways Committee, of a pedestal for the group. The height of the base of the group is shown upon this sketch to be about 11ft. 2in. above the top of the Embankment steps—that is, 5ft. higher than the temporary platform for the plaster model. A joint report from the Council's engineer (Sir A. R. Binnie) and architect suggested that the inner portion of the pedestal should be constructed of brickwork, and the upper part faced with Portland stone and the lower part with granite, as this mode of construction would be less expensive than the use of granite throughout; and that the cover of the pedestal upon which the group will stand should be bronze. The estimated cost of this mode of construction would be £1,000.

#### WATER SUPPLY AND SANITARY MATTERS.

**LONDON WATER SUPPLY.**—The Royal Commission on the London water question resumed its sittings at the Westminster Guildhall on Monday. Lord Llandaff, who presided, said he proposed to deal first with the separate question of inter-connection between the undertakings of the different companies. Mr. Pope, Q.C., on behalf of the companies, said they were prepared to promote a Bill next session, enabling them to consider what works were necessary to carry out intercommunication, and to submit proposals to the Local Government Board, which was to be empowered to approve, with or without modification, to authorise and order other works, and also to authorise any of the companies, in cases of emergency and for temporary purposes, to get more water from the Thames than they were now empowered to take. The expenditure under the Bill was to be deemed capital expenditure, and the issue of additional debenture stock authorised by the Local Government Board. Mr. E. Collins, engineer to the New River Company, was examined, and said the connection of the systems of all the companies was practicable from an engineering point of view; but at the times of greatest pressure scarcely any of the companies had water to spare. At present the East London Company were receiving from other companies about 1½ million gallons per day. A scheme for inter-connection had been drawn up by the engineers of the different companies in October, 1897, but it would only meet the case of a temporary emergency. The witness explained a larger scheme that would facilitate interchange, resting on the assumption that more water might be taken from the Thames. The chairman observed that the effect of the witness's evidence was that nobody wanted the proposed works; and in cross-examination the witness admitted that in his opinion they would be superfluous. Mr. W. Bryan, engineer to the East London Company, examined, said he was not at present prepared to say on what connections his company relied to insure a proper supply next year in the event of another scarcity. Mr. Hollams, legal adviser to the associated companies, said in their opinion the proposed works were unnecessary, but they were prepared to carry them out as a measure of precaution. At Tuesday's sitting of the Commission, Mr. Hollams gave further evidence on the scheme for connecting the systems of the different companies. Sir H. E. Knight, chairman of the Southwark and Vauxhall Company, who was next examined, gave a general approval of the scheme as practicable, and as necessary to satisfy the public outcry, but was quite certain that if the works were carried out they would never or seldom be used. The present supply was quite sufficient to meet another drought. He estimated that the companies, with their present powers and without any trouble whatever, had a surplus of 24,000,000 gals. per day which they might place at the disposal of the East London Company. It was not the East London Company which had broken down; the trouble was due to the ridiculous system of building houses without cisterns. He complained strongly of the opposition which the water companies met with from the London County Council. After evidence had been given by Mr. W. Hunter, engineering

director of the Grand Junction Company, Mr. T. F. Parkes, engineer to the Lambeth Company, and Mr. Restler, engineer to the South and Vauxhall Company, the Commission adjourned till next Monday, when Mr. Bryan, the engineer to the East London Company, will be the first witness examined.

**ANDERTON.**—At the town hall, Manchester, on Tuesday week, Major-General H. D. Crozier and Dr. Theodore Thompson, inspectors under the Local Government Board, commenced an inquiry concerning the application of the Manchester and Chorlton Joint Asylums Committee for permission to purchase land and premises known as the Anderton Hall and Park Estate, in the township of Anderton, for the purpose of providing an asylum for imbeciles and epileptics. Opposition was offered to the application on behalf of numerous local authorities, the majority of these being in the vicinity of Liverpool. During the inquiry some extraordinary allegations were made. It was stated that the sewage from an inn was draining straight into one of the lakes, and that it was not until the inspectors of the Local Government Board had called attention to the pollution that steps were taken by the Liverpool Corporation to remedy this state of affairs.

**MADELEY WATER SUPPLY.**—At the last meeting of the Madeley Town Council a committee reported that the work at Hanington had been completed, and that the boring and testing had proved successful. Ample water was found, enough, in fact, to supply other districts. The boring and testing operations had cost £882 2s. 6d., £400 more than estimated, therefore £400 was required to be raised by a loan, which was decided upon. The engineer, Mr. Stroke, of Shrewsbury, said the water was described by Mr. Blunt, the analyst, as excellent, and of moderate hardness. The Mayor proposed that the report be adopted, and said they could raise one million gallons every twenty-four hours. The motion was carried. A sub-committee was appointed to proceed with the work, and the engineer was instructed to make out an estimate and provide a plant that would supply 250,000 gallons every twelve hours.

At Llandudno, on Saturday, a system of electric lighting for the town was successfully switched on for the first time. Mr. A. H. Preece was the electrical engineer, and the scheme has been carried out at an outlay of £25,000.

The Congregational church which has been built at Topcroft, Norfolk, was formally opened last week. The building, which has been designed by Messrs. Edward Boardman and Son, of Norwich, consists of church, porch, and vestry, erected in red brick, with Cossey moulded windows and dressings, the style being Late Gothic. The size of the church is 38ft. by 23ft. 6in. The floor is of yellow deal. The roof, covered with green slate, is waggon-headed, and supported by three framed principals plastered between. The benches accommodate 150 persons. The contractors were Messrs. S. Y. Brock and Sons, of Alburgh, the amount of whose tender was £545.

The opening of a new bridge at Southwold in the place of the old Knight's bridge over Buss creek, took place on Monday week. The work has been undertaken by the corporation themselves, as they were of opinion that they could build the bridge at less cost than the lowest tender received—£1,050. The new bridge has brick abutments and retaining walls, the superstructure being formed of steel trough girders. The parapets over the span are of wrought-iron lattice work; the width across the bridge is 26ft., and the waterway 20ft. The plans were prepared by Mr. Henry Miller, of Ipswich, the county surveyor for East Suffolk.

At the last meeting of the Metropolitan Asylums Board it was agreed, after a long discussion, to insert the following clause relative to the stipulations to be observed by contractors as to rates of wages of workmen in all contracts entered into by the managers—viz.: "The contractor shall on all work executed for the managers pay the rates of wages and observe the hours of labour agreed upon by the association of employers and the representatives of the workmen; but in the case of any trade where no such agreement exists, then the rate of wages and the hours of labour must be those current in the district where the work is executed."

At the parish church of St. Leonard's, Semley, on Sunday, there was unveiled a stained-glass window. The window is of two lights, with tracery in the head, and contains figures of St. Joseph of Arimathea and St. Elizabeth of Hungary, on a background of roundels, and surrounded by a wide border of foliage, with birds and beasts playing among the branches. At the feet of the saints kneel figures of the donors' father and mother, whom the window is designed to commemorate. The Annunciation is represented in the tracery lights—the Blessed Virgin Mary and St. Gabriel occupying the side openings. The window is the work of Mr. J. Fisher, of Fulham, the designing having been carried out by Mr. J. Eden, of Staple Inn.



## Our Office Table.

An exhibition of drawings and prints showing the rise and development of popular illustration was opened on Monday at the South London Art Gallery, Peckham-road. The exhibits, which number between 300 and 400, have been well arranged by Mr. Cecil L. Burns, the curator of the gallery, and the exhibition shows at a glance the successive stages through which the art of popular illustration has passed from the days of Albrecht Dürer down to those of Du Maurier and Phil May. The collections of prints lent by the authorities of the South Kensington Museum and Sir Philip Burne-Jones cover the earlier history of the art, and Mr. Burns points out, in his introduction to the illustrated catalogue, the manner in which copper engraving supplemented wood-cutting during the 17th and 18th centuries and was in turn displaced by the boxwood engraving in which Thomas Bewick excelled. There are many examples of the work of George Cruikshank and John Leech, and, commencing with Sir John Gilbert, there are numerous examples of the work of contemporary and recently-deceased English artists.

THE first meeting of the one hundred and forty-fifth session of the Society of Arts will be held on Wednesday evening next, when an address will be delivered by Sir John Wolfe Barry, K.C.B., M.Inst.C.E., F.R.S., Chairman of the Council, who will take as his topic the internal traffic of London. Among papers to be read before the society next session are "The Preservation of Timber," by S. B. Boulton; "Electric Traction and Its Application to Railway Work," by Philip Dawson; "Wireless Telegraphy," by W. H. Preece, C.B., F.R.S.; and "Leadless Glazes," by Wilton P. Rix. Professor Vivian B. Lewis will deliver a course of four Cantor lectures on "Acetylene," commencing on Monday week, the 21st inst., and in January next a similar Cantor series of four lectures will be given by Dr. Samuel Rideal on "Bacterial Purification of Sewage."

THE museums and galleries committee of Glasgow Town Council has received on loan from Mr. Robert Ramsey an interesting series of water-colour drawings of Old Glasgow by W. R. Maids. The collection, which comprises views of many of the quaintest bits of the Old City, particularly in the neighbourhood of the Rottenrow and Saltmarket, has been hung in the east picture gallery at the People's Palace. Noteworthy are two sketches of the historic building at the corner of Castle-street and Macleod-street, which caused so much discussion among local archaeologists at the end of last year, and a view of the house in which the poet Campbell was born, and which stood at the corner of Nicholas-street and High-street. In addition to these, there are on view a series of East-end sketches by R. Meadows and W. M. Lockhart, lent by Mr. John Tullis, as well as the large collection of drawings of Old Glasgow by D. Small, recently acquired by the corporation, and the large oil-painting of "Glasgow from the Necropolis," by J. R. Houston, R.A. The collection is probably the most complete set of illustrations of Old Glasgow yet brought together.

THE Housing of the Working Classes Committee of the London County Council, in a report dealing with the question of an extension in the near future of the housing policy of the Council, state that they are strongly of opinion that all clearances involving rehousing should be done at the sole cost of the Council. Hitherto the Council, whether operating under Part I. or Part II. of the Housing Act, had in many cases felt itself justified in securing the provision of dwellings slightly in excess of half of those displaced. Having regard, however, to the need of dwellings so acutely felt at the present time, they thought the Council should no longer be satisfied with this minimum, and that housing accommodation should be provided for a number of persons equal to that of the working classes displaced by any scheme under the Housing Act. It was not always possible to provide accommodation for all the persons displaced on the actual improvement area. It would frequently happen that, owing to the absence of vacant sites, sufficient accommodation could not be provided even in the immediate neighbourhood. They accordingly proposed that housing accommodation for persons displaced should be provided in the County of London, but not necessarily in the immediate neighbourhood

of the displacement, due consideration being given to the needs of those living in any particular area.

THE Cardiff Museum and Art Gallery has received a gift of pictures, prints, and porcelain, valued at £4,000. The donors are Mr. Charles Thompson and Mr. Herbert Thompson, of Cardiff, executors of the late Mr. James Pyke Thompson, founder of the Turner Gallery at Penarth. The collection now handed over to the museum consists of 88 water-colour drawings, 12 oil paintings, 8 pastels, 43 etchings and engravings, and 64 pieces of porcelain. Most of these have been on exhibition at the Cardiff Museum for several years, as a loan collection. To this collection the executors have added a number of valuable drawings and etchings from Mr. Pyke Thompson's private gallery, which have been selected at their request for this purpose by Mr. W. M. Rossetti, Mr. Frederic Wedmore, and Mr. T. H. Thomas. The intention of the original owner of this collection was to bring together a series of examples illustrating the development of British art in several departments during the last 100 years. The oil paintings include an example of George Romney's work, entitled "The Bleaching Ground"; "Cardigan Bay," by David Cox; and "Gipsies Resting," by P. F. Poole, R.A. Among the water-colours are eight sketches by Cox, and a fine drawing of "Ewenny Priory," by J. M. W. Turner. The collection of porcelain includes several beautiful examples of Nantgarw and Swansea ware, on which the best art of Billingsley has been expended, and will considerably strengthen the exhibit of local pottery which already constitutes an important feature of the Cardiff Museum.

An examination of master and operative plumbers applying for registration under the National Registration of Plumbers was held on Saturday by the Worshipful Company of Plumbers at King's College. Twenty-one candidates presented themselves for examination from various parts of London, also from Cambridge, Carmarthen, Guildford, Maidstone, Ramsgate, Windsor, and Worthing. The tests in workmanship included lead-bossing, pipe bending, and joint making, and the examination questions included the subjects of roof covering, contamination of drinking-water from faulty connections, arrangement of bath, sink, and closet wastes, drainage of town houses, and disconnection with sewers. Nine succeeded in passing the examination in practical workmanship.

### MEETINGS FOR THE ENSUING WEEK.

MONDAY.—Surveyors' Institution. Opening Address by Robert Vigers, President. 8 p.m.

TUESDAY.—Institution of Civil Engineers. "Electrical Transmission of Power in Mining," by William Beedie Esson, M.Inst.C.E. 8 p.m.

WEDNESDAY.—Society of Arts. Opening Address by the President, Sir J. Wolfe Barry, K.C.B., LL.D., F.R.S., on "The Internal Traffic of London." 8 p.m.

Northern Architectural Association. Opening Meeting. Inaugural Address by the President, Frank W. Rich, F.R.I.B.A. 7.30 p.m.

Edinburgh Architectural Society. Address by J. A. Morris. 8 p.m.

### BUILDERS' CLERKS' BENEVOLENT

INSTITUTION.—A PENSION for the WIDOW of a BUILDERS' CLERK is VACANT.—Applications for forms to be made to the SECRETARY, 21, New Bridge-street, E.C., before the 29th inst.

At Boxley Church, Maidstone, mosaics on either side of the east window have just been dedicated. The mosaics represent the Nativity and the Presentation of the Wise Men. They are in opus sectile work, and were executed by Messrs. Powell, of Whitefriars, London, under the direction of Mr. Gambier Parry.

A stained-glass window, from the studio of Mr. Kempe, has been placed in the chancel of St. Mary's Church, Wootton (Oxon), and was dedicated on Sunday week. The Nativity forms the central subject, the tracery above being filled with the choir of angels, while in the two side-lights, under canopies, are the figures of SS. Peter and Paul.

The opening of the new Baptist chapel in Adnitt-road, Monk's Park, Northampton, has been fixed for Jan. 19 next. The chapel is being erected by Mr. A. J. Chown, from designs by Messrs. Mosley and Anderson, architects, on a site in Adnitt-road, exactly opposite Allen-road, while the school, on an adjoining site, will have a frontage to Lea-road. About 400 persons may be seated in the chapel, which has a floor space of 75ft. by 42ft., and 40 will be accommodated in the choir gallery.

## LATEST PRICES.

IRON, &c.			
	Per ton.	Per ton.	
Rolled-Iron Joists, Belgian.....	£8 0 0	to	£8 10 0
Rolled-Steel Joists, English.....	8 10 0	"	7 0 0
Wrought-Iron Girder Plates.....	5 15 0	"	6 10 0
Bar Iron, good Stuffs.....	7 0 0	"	8 0 0
Do., Lowmoor, Flat, Round, or Square.....	17 0 0	"	17 5 0
Do., Welsh.....	5 15 0	"	5 17 6
Boiler Plates, Iron—			
South Staffs.....	7 17 6	"	8 5 0
Best Sleds.....	10 0 0	"	10 10 0
Angles 10s., Tees 20s. per ton extra.			
Builders' Hoop Iron, for bonding, &c., £6 15s.			
Builders' Hoop Iron, galvanised, £15 10s. 0d. per ton.			
Galvanised Corrugated Sheet Iron—			
No. 18 to 20.	No. 22 to 24.		
6ft. to 8ft. long, inclusive gauge.....	£10 15 0	to	£11 0 0
Best ditto.....	11 5 0	"	11 10 0
Cast-Iron Columns.....	£8 5 0	to	£8 15 0
Cast-Iron Stanchions.....	6 5 0	"	8 15 0
Rolled-Iron Fencing Wire.....	7 0 0	"	8 0 0
Rolled-Steel Fencing Wire.....	7 0 0	"	7 10 0
Galvanised.....	10 10 0	"	11 10 0
Cast-Iron Sash Weights.....	4 2 6	"	4 5 0
Cut Clasp Nails, 3in. to 6in.	8 15 0	"	9 15 0
Cut Floor Brads.....	8 10 0	"	9 10 0
Wire Nails (Points de Paris)—			
0 to 7 8 9 10 11 12 13 14 15 B.W.G.			
9/0 9/6 10/10 10/9 11/6 12/6 13/6 15/3 17/3			per cwt.
Cast-Iron Socket Pipes—			
3in. diameter.....	£5 10 0	to	£5 15 0
4in. to 6in.....	5 5 0	"	5 10 0
7in. to 24in. (all sizes).....	4 15 0	"	5 0 0
[Coated with composition, 2s. 6d. per ton extra; turned and bored joints, 6s. per ton extra.]			
Pig Iron—			
Cold Blast, Lilleshall.....	105s.	to	110s.
Hot Blast, ditto.....	57s. 6d.	to	62s. 6d.
Wrought-Iron Tubes and Fittings—Discount off Standard Lists f.o.b.—			
Gas-Tubes.....			75p.c.
Water-Tubes.....			70
Steam-Tubes.....			62½
Galvanised Gas-Tubes.....			80
Galvanised Water-Tubes.....			55
Galvanised Steam-Tubes.....			45
10cwt. casks. 5cwt. casks.			
Per ton.	Per ton.		
Zinc, English.....	£27 0 0	to	£27 5 0
Do., Vieille Montagne.....	28 5 0	"	28 10 0
Sheet Lead, 3lb. per sq. ft. super.	15 10 0	"	16 10 0
Pig Lead, in 1cwt. bags.....	14 15 0	"	15 15 0
Lead Shot, in 28lb. bags.....	18 7 6	"	19 7 6
Copper Sheets, sheathing and rods.....	65 0 0	"	66 0 0
Copper, British Cake and Ingots.....	55 10 0	"	56 0 0
Tin, Straits.....	82 2 6	"	83 2 6
Do., English Ingots.....	86 5 0	"	87 5 0
Spelter, Silesian.....	21 0 0	"	22 0 0
TIMBER.			
Teak, Burmah.....per load	£13 0 0	to	£15 10 0
" Bangkok.....	10 10 0	"	14 10 0
Quebec Pine, yellow.....	4 2 6	"	6 0 0
" Oak.....	4 2 6	"	6 0 0
" Birch.....	3 10 0	"	5 10 0
" Elm.....	4 10 0	"	5 10 0
" Ash.....	3 15 0	"	5 0 0
Dantsic and Memel Oak.....	2 2 6	"	4 2 6
Fir.....	2 15 0	"	4 15 0
Waincoat, Riga p. log.....	4 15 0	"	6 5 0
Lath, Dantsic, p.f.....	4 10 0	"	5 10 0
St. Petersburg.....	4 0 0	"	6 10 0
Greenheart.....	8 0 0	"	8 10 0
Box.....	4 5 0	"	15 0 0
Sequoia, U.S.A., per cubic foot	0 1 8	"	0 1 10
Mahogany, Cuba, per super foot			
lin. thick.....	0 0 5	"	0 0 6
" Honduras.....	0 0 4½	"	0 0 6½
" Mexican.....	0 0 4	"	0 0 5
Cedar, Cuba.....	0 0 4	"	0 0 4½
" Honduras.....	0 0 3½	"	0 0 4½
Satinwood.....	0 0 9	"	0 1 6
Walnut, Italian.....	0 0 8	"	0 0 7
Deals, per St. Petersburg Standard, 120—12ft. by 1½in. by 11in.—			
Quebec, Pine, 1st.....	£18 0 0	to	£24 10 0
" 2nd.....	13 0 0	"	16 10 0
" 3rd.....	6 0 0	"	9 10 0
Canada Spruce, 1st.....	8 10 0	"	10 10 0
" 2nd and 3rd.....	7 0 0	"	8 10 0
New Brunswick.....	7 0 0	"	8 0 0
Riga.....	7 15 0	"	8 15 0
St. Petersburg.....	9 5 0	"	13 15 0
Swedish.....	9 5 0	"	16 5 0
Finland.....	9 5 0	"	9 15 0
White Sea.....	10 5 0	"	17 10 0
Battens, all sorts.....	5 0 0	"	16 0 0
Flooring Boards, per square of lin.—			
1st prepared.....	£0 9 9	"	£0 16 3
2nd ditto.....	0 8 3	"	0 13 3
Other qualities.....	0 6 6	"	0 7 6
Staves, per standard M:—			
Quebec pipe.....	—		—
U.S. ditto.....	£35 0 0	"	£42 10 0
Memel, cr. pipe.....	210 0 0	"	220 0 0
Memel, brack.....	180 0 0	"	190 0 0
OILS.			
Linseed.....per ton	£17 10 0	to	£18 10 0
Rapeseed, English pale.....	23 5 0	"	23 10 0
Do., brown.....	22 0 0	"	22 10 0
Cottonseed, refined.....	15 0 0	"	15 5 0
Olive, Spanish.....	23 15 0	"	23 0 0
Seal, pale.....	21 5 0	"	21 10 0
Coccanut, Cochian.....	27 10 0	"	28 0 0
Do., Ceylon.....	24 15 0	"	25 0 0
Palm, Lagos.....	22 10 0	"	22 15 0
Oleum.....	18 15 0	"	19 15 0
Lubricating U.S.....per gal.	0 6 3	"	0 7 3
Petroleum, refined.....	0 6 6	"	0 6 6½
Tar, Stockholm.....per barrel	1 0 0	"	1 5 0
Do., Archangel.....	0 12 6	"	0 15 0
Turpentine, American.....per ton	23 15 0	"	24 0 0



## LIST OF COMPETITIONS OPEN.

Sheffield—Board School	J. Moss, School Board Offices, Sheffield	Nov. 18
Brightwell, near Wallingford—Isolation Hospital at Hadden Hill (16 beds)	Francis R. Hedges, Clerk to Urban District Council, Wallingford	" 24
Preston—Small-pox Hospital	James Clarke, Clerk, Union Offices, Preston	" 23
Aberavon—Market Extension (£5,000 limit)	The Borough Surveyor, Aberavon	Dec. 1
Morley—Schools, Victoria-road and Gildersome-road	The Clerk, School Board Offices, Morley	" 13
Chertsey—Sewerage Schemes	Arthur W. Smith, Surveyor U.D.C., Eastworth-road, Chertsey	" 23
Stockholm—New Stations, &c.	Secretary, Royal Administration Swedish State Railways	" 31
Kingston-upon-Hull Central Public Library, Albion-street (Sidney R. J. Smith, F.R.I.B.A., F.S.I., Assessor)	E. Laverack, Town Clerk, Town Hall, Hull	(1899) Jan. 1
Hull—Central Free Library (Sidney R. J. Smith, F.R.I.B.A., Assessor)	Edwin Laverock, Town Clerk, Town Hall, Hull	" 1
Harrogate—New Royal Pump Room (£8,000 limit)	Samuel Stead, Boro' Surveyor, Municipal Offices, Harrogate	" 2
Bradford—Central Fire Brigade Station	The City Surveyor's Office, Bradford	" 2
Harrogate—Alterations to Old Pump Room	Samuel Stead, Boro' Surveyor, Municipal Offices, Harrogate	" 2
Burnley—Higher Grade School, &c., Ormerod-road (limited to Architects within 60 miles of Burnley)	The School Board Office, Burnley	" 14
Bristol—Restoration of Colston Hall (Assessor)	Arthur E. Riseley, Secretary, 33, Corn Exchange, Bristol	" —

## LIST OF TENDERS OPEN.

## BUILDINGS.

Launceston—Cattle, Sheep, and Pig Market	Town Council	Otho B. Peter, F.R.I.B.A., Architect, Launceston	Nov. 12
Coventry—Two New Pumping Stations	Corporation	James Mansergh, 5, Victoria-street, Westminster	" 12
Brierley—Additions to Infectious Diseases Hospital	Hemsworth Rural District Council	T. H. Richardson, Architect, Hemsworth	" 12
Coverack—Hotel	Joint Hospital Board	A. Pengilly, Solicitor, Helston	" 12
Bromley—Additions to Fever Hospital, Skym Corner	Thomas Radford	John Ladda, Architect, 7, Doughty-street, London, W.C.	" 12
Exmouth—Rebuilding the White Hart Inn, Back-street	Walton (U.D.) School Board	Proctor Sherwin, Architect, Manchester-street, Exmouth	" 12
Filey—House and Shop in Mitford-street	R. Danby	James Petch, Architect, Victoria Chambers, Scarborough	" 12
Felixstowe—School, Ferry-road	Urban District Council	Edward Fernley Bishopp, Architect, 32, Museum-street, Ipswich	" 12
Bridlington Quay—Additions to 11, North View Terrace	Ystradgynodwg School Board	J. Earnshaw, Architect, Bridlington Quay	" 12
Altrincham—Offices, Council Chamber, Fire Station, &c.	H.M. Commissioners of Works	Handle and Davenport, Architects, Manchester	" 12
Dunmore East—House at Coastguard Station	Electric Tramway Company	The Assistant Surveyor's Office, Waterford	" 14
Pentre—Alterations, &c., at School	London County Council	Jacob Rees, Architect, Hillside Cottage, Pentre	" 14
Torquay—Central Hotel, Abbey-place	Corporation	E. Appleton and Son, Architects, Torquay	" 14
Arbroath—Post Office	Corporation	H.M. Office of Works, Edinburgh	" 14
Fochabers—Workmen's Cottages at Castle-row	London County Council	A. and W. Reid and Wittet, Architects, Elgin	" 14
Cork—Offices, Albert-street	Corporation	Robert Walker, P.P.S.A., Architect, 17, South Mall, Cork	" 14
Lossiemouth—Dining Hall, &c., Stotfield Hotel	London County Council	R. B. Pratt, A.R.I.B.A., Architect, County Bank House, Elgin	" 14
Bexley—Fourteen Shelters at Health Asylum	Corporation	R. W. Partridge, Clerk, 21, Whitehall-place, S.W.	" 14
Lisburn—Additions to House	H.M. Commissioners of Works	Greene-Watt and Tulloch, Architects, 77A, Victoria-street, Belfast	" 14
Birkenhead—Public Baths	London County Council	Charles Brownridge, A.M.I.C.E., Town Hall, Birkenhead	" 14
Longwood—Villa, Botham Hall-road	Corporation	J. Berry, Architect, 9, Queen-street, Huddersfield	" 14
Wigan—County Court and Inland Revenue Offices	H.M. Commissioners of Works	Hon. Reginald B. Brett, Sec., H.M. Office of Works, Storey's Gate	" 14
Darton—Additions, Malt Shovel Inn	London County Council	Wade and Turner, Architects, 10, Pitt-street, Barnsley	" 14
Paddington, W.—Coroner's Court Building, Manor-place	Ruabon (U.D.) School Board	Architect's Department, General Branch, 13, Spring Gardens, S.W.	" 15
Rhoslanerchrogog—Master's Residence at Board Schools	Murgatroyd and Lister	J. Morison and Son, Architects, King-street, Wrexham	" 15
Bradford—Stabling for 17 Horses, Gordon-street Dyeworks	Corporation	Joshua Robertshaw and Son, Architects, 55, Tyrral-street, Bradford	" 15
Cardiff—Fish Market and Offices at the Hayes	North-Eastern Railway Co.	W. Harpur, Borough Engineer, Town Hall, Cardiff	" 15
Selby—House	Urban District Council	William Bell, Company's Architect, York	" 16
Holbrook—Works at Schools	Corporation	Edward Fernley Bishopp, Architect, 32, Museum-street, Ipswich	" 16
Bridlington—Alterations, Victoria Rooms	Charles Bayer and Co.	Chas. Gray, Clerk, Bridlington	" 16
Cardiff—Alteration of Borough Treasurer's Offices	Bucklow Board of Guardians	J. L. Wheatley, Town Clerk, Town Hall, Cardiff	" 16
Londonderry—Factory	North-Eastern Railway Co.	D. Conroy, Architect, 2, Bishop-street, Derry	" 16
Knaresborough—Temporary Fever Hospital	School Board	R. J. McBeath, M.S.A., Birnam House, Sale	" 16
West Hartlepool—Chimney (150ft. high)	Hollingbourn Rural Dist. Council	William Bell, Company's Architect, York	" 16
Driffield—St. John's Church	Style and Gerrish	W. R. Sharrock, Driffield, Yorks	" 17
Monk Bretton—Additions to School	Midland Railway Co.	Wade and Turner, Architects, 10, Pitt-street, Barnsley	" 17
Keith—Additions to Distillery Warehouse	Maryport Brewery, Ltd.	C. C. Doig, Architect, Elgin	" 17
Sutton Valence—Excavating Headings in Well at Waterworks	Lady Gordon Cumming	H. J. Bracker, Clerk, 33, Earl-street, Maidstone	" 17
Salisbury—Additions, Shopfront, &c., Blue Boar-row	Corporation	F. Bath, F.R.I.B.A., Architect, Crown Chambers, Salisbury	" 17
Morecambe—Four Houses, Fairfield-road	H.M. Commissioners of Works	Jas. Hartley, Architect, Exchange Buildings, Skipton	" 17
Bristol—Buildings for Hydraulic Machinery at Avonside	Bulgarian Government	The Company's Architect, Cavendish House, Derby	" 17
Pitlochry—Public Hall	United District School Board	John Bruce and Son, Architects, Dundee	" 18
Maryport—Rebuilding of Victoria Vaults and Royal Oak Inn	Gelligaer School Board	Chas. Eaglesfield, Architect, Maryport	" 18
Barnsford—Alterations, &c., Parochial Schools	H.M. Commissioners of Works	Armstrong and Knowles, 38, Grainger-st., W., Newcastle-on-Tyne	" 18
Elgin—Building in Lossiewynd	United District School Board	A. and W. Reid and Wittet, Architects, Elgin	" 18
Kingston-on-Thames—Cottage, Portland-road	Gelligaer School Board	Vincent Davison, Architect, Bartley Lodge, New Malden	" 19
Lancaster—Small-Pox Hospital	H.M. Commissioners of Works	T. Cann Hughes, Town Clerk, Lancaster	" 19
Armsley—United Free Methodist Chapel	Department of Public Works, Sophia, Bulgaria	Walter Hanstock and Son, Architects, Branch-road, Batley	" 19
Edinburgh—Extension of Local Government Board Offices	Alfred Price, Architect, Elworth, Sandbach	George Morham, 39, George-street, Edinburgh	" 21
Sophia—Eight Public Offices	Arthur Wells, F.R.I.B.A., Queen's Chambers, Hastings	Department of Public Works, Sophia, Bulgaria	" 21
Cobridge—Additional Rooms at the School and Almshouse	James and Morgam, Architects, Charles-street Chambers, Cardiff	Alfred Price, Architect, Elworth, Sandbach	" 21
Hastings—Additions to Hollington School	G. Sutherland, A.R.I.B.A., Rothes	Arthur Wells, F.R.I.B.A., Queen's Chambers, Hastings	" 21
Pontlottyn—Infants' School	Hon. Reginald B. Brett, Sec., H.M. Office of Works, Storey's Gate	James and Morgam, Architects, Charles-street Chambers, Cardiff	" 21
Rothes—Hotel	Metropolitan Asylums Board	G. Sutherland, A.R.I.B.A., Rothes	" 22
Oldham—Enlargement of Post-Office	Uxbridge Joint Hospital Board	Hon. Reginald B. Brett, Sec., H.M. Office of Works, Storey's Gate	" 22
Fulham, S.W.—Laundry Receiving Room at Western Hospital, Segrove-road	School Board	A. and C. Harston, Architects, 15, Leadenhall-street, E.C.	" 23
Hillingdon East—Mortuary at Joint Hospital, Kingston-lane	Visiting Committee	Bertram Freeman, 24, New Windsor-street, Uxbridge	" 23
Bushley—Enlargement of Board School, Chalk Hill	Guardians	W. H. Syme, F.R.I.B.A., 4, High-street, Watford	" 23
Windermere—Additions to Lancaster Bank	Guardians	Robert Walker, F.R.I.B.A., Archt., Public Buildings, Windermere	" 23
Bridgend—New Chapel at Parc Gwyllt Asylum	Guardians	Giles, Gough, & Trollope, Archts., 28, Craven-st., Charing Cross, W.C.	" 24
Hertford—Vagrant Wards at Workhouse	Guardians	Russell Austin, 13, Villiers-street, Hertford	" 25
Clifden—Extension of Workhouse Infirmary	Guardians	James Perry, County Surveyor, Galway	" 25
Baldon—Country House, Stabling, &c.	Guardians	Isit, Adkin, and Hill, Architects, Prudential Buildings, Bradford	" 30
Rhiwfaer—School, near Gwys Station	Guardians	W. W. Williams, Archt., Island Chambers, 63, Wind-st., Swansea	" 30
Pontyberem—New Infant School and Additions	Guardians	J. B. Morgan, M.S.A., Architect, Llanelly	" 31
Dulwich, S.E.—Additions and Alterations to School Premises	Governors of Allen's Schools	Arthur J. Gale, 4, Sergeant's-inn, Fleet-street, E.C.	Dec. 1
Hastings—Coastguard Buildings	J. S. Ducksbury	Director of Works Dept., Admiralty, 21, Northumberland-av., W.C.	" 2
Morecambe—New Wing to Elms Hotel	Metropolitan Asylums Board	Lawson, Roper, and Proctor, Lancaster	" —
Walton-on-Thames—Four Cottages and Pair of Semi-Detached Houses	Uxbridge Joint Hospital Board	T. M. Garrod, Architect, 172, Fenchurch-street, E.C.	" —
Lees Moor—Branch Store	School Board	Holton and Fox, Architects, Westgate, Dewsbury	" —
Cheadle—Villas	Visiting Committee	Arthur Young, Architect, 3, Idlesleigh Mansions, Westminster	" —
Bramley—New Schools	Guardians	W. S. Braithwaite, Architect, School Board Offices, Leeds	" —
Newport—Congregational Church, London-street	Guardians	Habershon and Fawcner, Architects, 41, High-street, Newport	" —
Perth—New Offices, Tay and High Streets	Guardians	George P. K. Young, Architect, 42, Tay-street, Perth	" —
Morecambe—Hotel, Regent-road	Guardians	Harrison, Hall, and Moore, Architects, 36, Albert-road, Morecambe	" —
Scarborough—Excavations, Concrete Foundations, & Boundary Walls	Guardians	Hall, Cooper, and Davis, Architects, 24, Westborough, Scarborough	" —
Iford—Five Houses and Shops, Loxford Hall Estate	Guardians	A. W. Hudson, Surveyor, 42, Bishopgate-street Within, E.C.	" —
Ryhope Colliery—Twenty-five Cottages	Guardians	The Engineer, Ryhope Colliery, near Sunderland	" —
Auchtergaven—Alterations to Parish Church, Bankfoot	Guardians	William Constable, Architect, 20, George-street, Edinburgh	" —
Harrogate—Business Premises, Princes-street	Guardians	Bland and Bown, Architects, Harrogate	" —
Lis—Residence in New Forest	Guardians	H. T. Keates, M.S.A., Architect, Petersfield	" —
Ulverston—Additions to House, Cavendish-street	Guardians	Settle and Farmer, Architects, Ulverston	" —
Leeds—Warehouse, Nelson-street	Guardians	T. Dyers, Architect, 114, Spencer-place, Leeds	" —
Belfast—Stores and Stabling, Queen's Bridge	Guardians	W. J. Moore, Architect, Whitehall Buildings, Ann-street, Belfast	" —
Bustby Bank—Alteration for Shop and Outbuilding	Guardians	Mrs. E. Wilson, Burnopfield	" —
Moorgate—Alterations, &c., Business Premises	Guardians	H. L. Tacon, F.I.H.S., Architect, 11, Westgate, Rotherham	" —
Anghton—Renovation of Wesleyan Chapel	Guardians	Rev. J. Woolleton, Westley-place, Howden	" —
Belfast—Alterations to Shandon Bar, York-street	Guardians	W. J. Moore, Architect, Whitehall Buildings, Ann-street, Belfast	" —
Balham, S.W.—Fifty to Sixty Flats	Guardians	Tompkins and Barker, Surveyors, 41, St. Margaret's-rd., Brockley	" —
Leeds—Two Shops, Land's-lane	Guardians	Wm. Hill and Son, Architects, 25, Park-square, Leeds	" —
Nunhead, S.E.—Pulling Down and Rebuilding Two Houses	Guardians	Dr. S. D. Bhabha, 8, Drakefell-rd., St. Catherine's Park, Dulwich	" —



# THE BUILDING NEWS

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### IDEALS OF ARCHITECTURAL TEACHING.

AS in most of the opening addresses we have heard lately, that delivered at the Institute by Professor Aitchison, R.A., dwelt upon a variety of topics of architectural interest, to which we must refer our readers in our last issue. Through all these addresses we have heard a great deal about the education of architects—what it should be like—necessary qualifications and defects, but very little about questions of more practical moment, or our advancement as gauged by the architectural progress of other civilised countries. A great many platitudes have been indulged in. Men are never tired of talking about the beauty and proportions of ancient buildings like the Parthenon or Erechtheum, and of holding them up to the architect—of how much we can learn from Nature; but they seldom show how these models or theories can be applied to everyday buildings of our modern cities.

We have not far to go for instances. The London County Council have just been considering a report from one of their committees as to the best means of providing houses for the working classes in the central part of London, and the problem that besets the architect is how best to accommodate the largest number of families in a crowded area. The genius capable of designing a great monumental edifice would be hopelessly lost on such a task. Grand proportions and subtle mouldings would be thrown away upon buildings in which ingenious planning and fire-resisting and sanitary construction are chiefly required. A large city warehouse is to be built facing a narrow, gloomy street and surrounded by lofty buildings of the same class. Of what use is it to talk of marbles or Venetian colour, of architecture that will create a sense of sublimity or create a sensation in the beholder, or of striving to emulate the Greek or Renaissance artists in the employment of craftsmen of genius, where everything is dictated by commercial requirements? In these buildings light is of more importance than pleasing proportions or elegant mouldings, and it must be obtained by the introduction of large windows, so that all surface ornament and solidity are quite out of the question. Device and mechanical skill have to take their place. Imagine anything more hopeless than to attempt to apply the canons of Greek or Classical architecture to a row of street shops! Where columns are used decoratively, it is ridiculous to insist on the Vitruvian rules of intercolumniation in a building of the kind we are discussing. The academical ideal, in short, is not possible to-day. The ratio of strength to use is in most cases more necessary than the proportions of solid to void laid down by Classical authors. For the modern architect, the question is rather how he can invest every-day building with meaning, and the materials he uses with agreeable proportions;—to dismiss from the mind any idea of bringing modern architecture into line with the ancient; it is not so much ideal beauty that is aimed at, as agreeable building. The architectural teacher is prone to put the ideal before the student, the antique forms instead of intellectual perception. Quite as fatal a mistake is to think that architectural education is the means of making architects, or that by promoting art culture we can produce artists. It is this dilettante view that has kept our architecture behind the

age. We want architecture *made*, not learnedly criticised. Culture may be useful as a complementary study, but will never produce architecture. No doubt it is quite true that our great poets were well-educated men, and that a well-taught genius is better than an ill-taught one. At the same time, no one will for a moment contend that an expertness in grammar or the study of the best models of literature make the only preparation for a poet or novelist. Artistically conceived buildings have seldom been produced by men who have been learned in the "Five Orders," or in the delineation or history of architecture.

Much, of course, may be accepted of those who proclaim the ideal and transcendental view of architecture, though there are not many buildings erected now for high transcendental purposes, and, when they are, the cost stands in the way. Even churches are erected on a large scale, and at a low cost, in many of our newer districts; there is little money for any dignified proportions, towers and spires, carved work and frescoes. Professor Aitchison was right when he said no beauty would wholly compensate for a building which did not answer the purpose for which it was built, or even if it had a beauty, if it were incongruous with its use. A great deal of discordance is due to the methods pursued by art instructors. We see, for instance, buildings with ornament and mouldings quite unsuitable; the details are copied from buildings in Tropical or sunny climates, owing to the archaeological teaching of Styles. Even a great deal of the Italian Renaissance which we now see reproduced in every street is not in accord with our climate. Our sunlight falls in more slanting directions than it does in Florence, Venice, or Rome, and we have longer and deeper shadows that ill-agree with small enrichment and deep-cut carving. Nor will our system of teaching help towards that expressiveness which we have unfortunately lost to a large extent—namely, that of being able to mark the particular portions of a building which distinguish it from others; in short, to emphasise just those parts of a building that ought to indicate its purpose. Thus the civic building ought to proclaim its purpose in its dignified hall or mayor's reception-rooms; a theatre ought to proclaim the auditorium, the church its sanctuary, the market or exchange its great area for merchandise, and the roof, as well as the façades, play a great part in pronouncing or accentuating by height or dignified proportion. We have advanced a little in this direction, but the progress is slow. The public like an embellished façade to a building, no matter what it represents;—the "man in the street" is slow to differentiate. No doubt, too, we ought to consult the strains and stresses of materials to restore true and honest proportions to our buildings; but a mere knowledge of stresses will not make us better designers, unless we keep our mind's eye on what we want. The most expert mathematician may live in a world of abstractions and be unable to apply a single theorem; while the architect of our time lives in a world of old styles, and cannot think in any other.

We might say a great deal more on the impossibility of making men architects by merely filling their heads with miscellaneous knowledge; we can endorse the President's remark that "We must endeavour not to teach that which is dead nor that which is useless, but confine ourselves to the necessary and the useful," a dictum which of itself largely disposes of half our modern architectural courses or curriculums. A class of well-directed design can do a great deal more than copying drawings or learning dates and features if conducted by men who have not only designed, but executed, buildings—artists and craftsmen combined. We have spoken before of the evil practice of cramming for ex-

aminations. There are only one or two things an ordinary man can do well, and if he is set to cultivate these particular faculties he will succeed. Other things can only be successfully accomplished by co-operation, by combining with men having other talents, and this is the only explanation of the success of the great masters of Greece and Rome of the Mediæval and Renaissance ages. We plume ourselves upon having such a number of new materials to use, of new problems to solve, as if it was our fortune to have so many things to undertake; but is not this diversity the cause of our slow appreciation of those qualities which the President has mentioned, and our want of progress in artistic construction? When we have so much to do in settling points in construction and planning, in determining the right treatment and details of ironwork, concrete construction, and other materials; in devising the best modes of lighting, of rendering our buildings fireproof, and of complying with the numerous conditions of the Building Act, it is hardly possible to attend to such matters as subtle proportions, or those modes of composition which raise emotions of pleasure, of dignity, reverence, or awe. Agreement with ourselves and our co-workers in the arts and honest construction will accomplish more in this direction than appeals to ancient art realised under different conditions.

### MODEL SPECIFICATIONS.—XXXIX.

BOILERS AND RADIATORS—MISCELLANEOUS CASTINGS, ETC.—SLATER.

IN concluding "Founder and Smith," we may briefly give a few particulars and clauses about boilers, radiators, referring the student to treatises on heating and apparatus. As a rule, most specifications are very deficient in details of this sort, and much is consequently left to the honesty and reputation of the manufacturer. We refer our readers to the articles on "Warming Buildings by Hot Water," by Fredk. Dye, which appeared in these pages during 1896, which dealt practically with the subject. A very useful and economical mode of warming buildings has been used of late years, known as the "one pipe" or simple-circuit system, where the radiators are placed on one or two floors. In private residences, offices, and banks, and public buildings this system is desirable. But the two-pipe system is that generally adopted, where all the connections are flow and return, whether mains or branches. In this system the heated water rises up the flow-pipe, and passes all the radiators in succession, and then joins the return-pipe to the boiler. In specifying, the service-pipe may be graduated in size and be reduced as it passes each branch. Tables are published giving the reduction of branches to serve certain areas or radiators. According to one of these tables we find that for radiators having, say, 40ft. of surface, 1in. pipe will do, and they should be tapped for this size both flow and return, also the stop-valve and union. For radiators with 40ft. to 100ft. surface, 1½in. pipe for radiator connection, service-pipe, and stop-cock; over 100ft. to 150ft., 1¾in. pipe. If there are two or more radiators to serve, the service becomes a main. It may be useful to remark as to sizes of main services, that a 1in. main will serve two ¾in. branches; 1½in. will serve three 1in. branches, and also five ¾in. branches; a 1¾in. main will serve three 1½in. branches or four 1in.; a 2in. main will serve three 1¾in. branches, and so on. Many engineers prefer the "overhead" system of arranging the mains, these being carried on the top floor of building instead of the basement, and having vertical descending branches through which the water circulates to the several floors. It is uniform in operation, each descending pipe passing through the radiators, and finally reaching the return



horizontal pipe to boiler. For buildings of several floors this system is suited. It has been described as a vertical one-pipe system. For this system the horizontal main return should be graduated in size, being largest next the boiler, as in the flow-pipe.

The one-pipe method referred to above has many advantages, and is chiefly an American system. It has been fully described in these pages. The mains are duplicated and graduated. The horizontal mains are carried round in the basement; the flow-pipe having a slight rise all the way to the furthest vertical branch; from these rise vertical branches of 2in. and 1½in. wherever required; each vertical flow-pipe and radiator should have a stop valve. Other modes of warming are used, as that by hot air. Constantine's convoluted stove placed in a cellar or basement can be usefully employed to warm large buildings, churches, halls, private houses, schools, &c. The low-pressure system of heating by hot water with pipes of 3in. or 4in. diameter connected to boiler raised to a temperature of 185° to 200° Fahr. is generally used. For ordinary buildings 8ft. to 12ft. run of 4in. pipes will warm 1,000c.ft. of space, double the length of 2in. pipes being required for the same space.

Boilers are of several types, as the saddle boilers, the "Chatsworth," and the "Cornish." The latter is cylindrical. In every case specify that the setting is to be done under the direction of the manufacturer, and that the flues are properly formed, so as to encompass the boiler and obtain as much heat from it as possible. They must be built in firebrick set in fireclay, and the top should be arched over, or flat fire-lump, supported on wrought-iron bars, be used.

Saddle boilers are made from 18in. to 5ft. in length, and are good for circuits up to about 800ft.

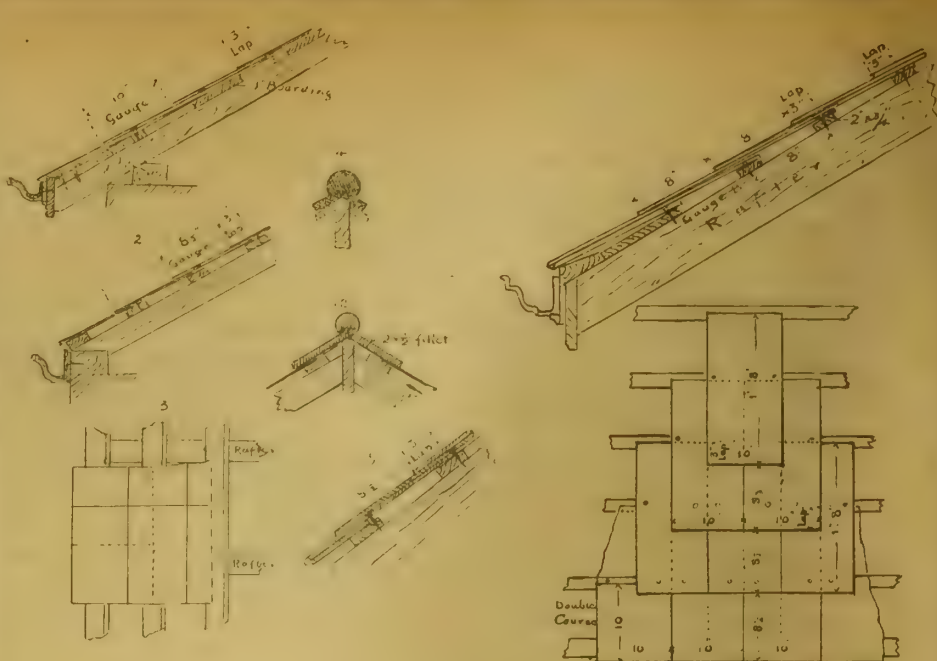
Coils of pipe arranged in a rectangular, circular, or conical form are used for heating pipes up to 1,500ft. run. These coils are surrounded by a wrought-iron casing or furnace.

A good radiator should have at least 1c.ft. of water or steam space behind each superficial inch of outside surface. Those up to 50ft. super. require 1in. connections, 50ft. to 150ft. 1½in., and 150 to 200 super. feet 2in. On the highest part of circulating pipes, air pipes or cocks should be provided. Residences, offices, and schoolrooms require from 8½ to 10 super. feet of surface of hot-water pipes and radiators to each 1,000ft. of space; for churches and concert halls 5 super. feet may be sufficient.

A plan showing arrangement of flow and return-pipes, branches and position of radiators, &c., should accompany the specification.

All pipes should be properly jointed, and cast-iron pipes to be jointed with rings of gaskin fitted in with Portland cement, and the wrought-iron pipes to be jointed with red-lead cement, and screwed together.

The size of range boiler is adjusted by width and depth of fire—usually 8in. high for close-fire ranges up to 48in. in width, or 10in. high beyond that width. Bath boilers, according to one authority, should be, for fires measuring 8in. wide 10in., for fires 10in. wide 12in., for 12in. fires 14in., for 14in. fires 16in. high. Bath boilers are made in several forms. A bath boiler with arched flue 12in. wide, 10in. high, slightly diminishing in depth at top, should be ¾in. thick, though sometimes they are 1-16in. less. There is a manhole at top. The "boot" boiler, or L-shaped in section, has two manholes; these should be with steel covers; the height at back may be 21in., and depth of bottom 15in. The eel-shaped boiler (on plan) is made also with two manholes, but is less common. With the "Eagle" patent adjustable fire, special ¾in. boilers, of sizes varying according to width of fire, are supplied. For a 14in. wide fire a boot boiler must be 16in. wide, 4in. thick in the toe, 18in. high, and 17in. in depth of bottom.



Register-stove boilers are also made about 12in. high by width of fire.

Register grates and "sham fronts" are got up in three styles of finish. "Best finish," has the inner metal finely filed, and the front best Berlin-black; "second finish," ground front, inner metal extra dressed and Berlin-black; "third quality," fine cast and blacked. Slow-combustion stoves are largely specified, many of them tiled, from 24in. to 48in.; others on the market are entirely of tiles, with firebrick backs, from 34in. to 42in., and are made in great variety of forms and sizes.

We have already named E. H. Shorland's "Manchester Grates." His patent combustion open-fire and warm-air generating stove, with pedestal and tee-piece for ascending or down-draught pipe for descending smoke-flue, double doors, and ashpan, are made from 26in. wide by 27in. deep to 36in. wide by 30in. deep, capable of warming from 12,000 to 40,000c.ft. of space, and are suitable for large rooms, halls, and the like.

67. *Hot-Water Apparatus.*—All tubes to be of wrought-iron, screw-jointed, lap-welded, steam quality; all pipes to be of a size the best suited to their requirements, and all the workmanship to be of the best quality. Provide all bends, tees, connections, and rounded elbows. Provide a . . . gallon cylinder of riveted ½in. wrought plate-iron, well riveted, galvanised in and out, with flanged and bolted connections for pipes, and bolted manhole, and fit same on wrought T-iron bearers, and fix an approved safety-valve on cylinder.

68. *Flow and Return Pipes.*—The flow and return pipes to be 1½in. diameter from cylinder to kitchen boiler, with short branch, and a ¾in. gunmetal draw-off tap. A 3gal. cast-iron galvanised feed cistern on top floor, and run service from same in 1in. steam-pipe. Run service from cistern in 1in. (or 1½in.) diameter steam-pipe; also flow and return service 1½in. (or 2in.) to bath and sink from cylinder on first floor, and take ¾in. branches to lavatories. Provide all valves with proper seatings for hot water, gunmetal screw-down caps, and 1in. steam-pipe or expansion-pipe over top of cistern.

69. *Saddle Boiler.*—Provide a wrought-iron saddle (or Cornish) boiler in the basement, of the size shown in plan (or 48in. by 16in. by 16in.), the plates ¾in. welded together (or of riveted steel plates), with fire-bars, damper, soot-doors, fire-doors, emptying pipes, and set the same in firebrick lining, half-brick thick, with flues and returns into main shaft, and the top to be arched in firebrick 4in. thick, or formed with fire lumps supported on T-irons. Provide cocks, cleaning, fire-bars, &c., complete. Or—

Provide and fix in basement a wrought-iron welded cylindrical boiler with dome top, 4ft. (or 5ft.) in height and 4ft. diameter, with mud-holes and covers, feed and fire-doors, cross-tubes, and furnace-bars. The same to have sockets for flow

and return pipes 4in. diameter, gunmetal emptying cock, patent safety-valve, smoke pipes, soot-doors, firing tools complete. The boiler to be incased in a lining of asbestos or fire-felt lin. or 1½in. thick.

70. *Connections, &c.*—A 3in. (or 4in.) cast-iron flow-pipe to be taken from top of boiler and connected to a ¾in. wrought-iron welded connecting tank in roof of 3ft. by 3ft. by 1ft., with bolted manhole, brass air-cock, and a 1in. wrought-iron exhaust turned over cistern. From tank in roof bring down two or more 2in. wrought-iron mains, connected to 4in. main, connected to bottom of boiler, and properly connect to coils on each floor with 1½in. flow-and-return pipes from 2in. mains.

71. *Coils.*—The coils to have gunmetal screw-down valves, with brass throttle-valve to 2in. return mains, and to be so arranged as to cut off any coil from the circulation. The coils to have 2in. or 3in. cast-iron pipes, let into cast-iron blocks at one end and tilted. (Specify number and position of coils or radiators, and the size of each.)

Provide all necessary supports, unions, air-cocks, bends, tees, and other connections, &c., the cast-iron pipes to be securely jointed with gaskin and Portland cement, and the wrought-iron pipes to have screwed joints, put together with red-lead cement, and leave the whole in a workmanlike manner, and to the approval of the architect.

72. *Radiators.*—Provide and properly fix all wrought-iron steam-pipes of the diameter shown on plan and table for flow and return, and make all necessary connections as figured, with radiators numbered on plan of each floor. Or—

The flow and return pipes to be fitted to boiler, with all approved socket connection. The mains to have a gradual rise from boiler to allow of easy circulation and emission of air, and provide and fix coils or radiators of approved pattern (or the American Radiator Co.'s ornamental radiator), or other approved radiator (state pattern), and provide to each radiator a gunmetal regulating valve, and connect up from flow-pipe by a 1½in. (or 2in.) diameter steam-pipe, and also form outlets of radiator to return pipe. The radiators to be connected so that any of them can be cut off if desired. Provide all air-gratings in outside wall at the back of radiators, and make all necessary connections from flow and return pipes to lavatories, &c. The whole to be carried out in workmanlike manner to the architect's satisfaction, with all necessary bends, sockets, regulating valves, screwed-down diaphragm valve with gunmetal mountings to cast-iron flow and return pipes, and expansion pipes.

The heating engineer is to enter into a guarantee to maintain in the rooms (or building) a temperature of 65° when the outside temperature is so many degrees below freezing-point, without working the apparatus to its full capacity.

(The hot-water apparatus is often made a provision. The access of pipes should be considered in the plan, and they should be placed early to avoid after-cutting about the walls.) Or—

Provide and fix where marked on plan (or against outer walls) No. 6 Chas. P. Kinnell and Co.'s (Southwark-street) ventilating radiators as pattern number, and having the necessary square feet of heating surface—(state



same), with air-inlets from air-gratings in outside wall to radiators. Each radiator to have a gunmetal hot-water regulating valve and escape-valve. Properly connect up to radiators from flow-pipes with  $\frac{1}{2}$ in. (or  $\frac{1}{4}$ in.) steam-pipe, and from outlets to return. The connections are to be made so that any radiator can be put into action or shut off independently of the others.

A few miscellaneous clauses are:—

73. *Stair-Treads*.—Provide and fix to stair-treads from ground-floor to office above Hawkesley's patent stair-treads, made of cubes of hard wood let into cast-iron frame, with grain upwards, or provide Elsley's rolled iron fluted stair-treads (or other approved description).
74. *Window Grilles*.—Provide and fix cast-iron (or wrought-iron) grilles to windows in ground-floor, as per design, 3ft. wide and 5ft. 6in. high. (If of wrought-iron or slate, the framework to be  $\frac{1}{2}$ in. by  $\frac{1}{2}$ in. or  $\frac{3}{4}$ in. square).
75. *Gates*.—The wrought-iron entrance-gates to be according to pattern selected (or design) with lock and sham, 10ft. wide by 5ft. high, and to be hung to stone piers with strong gate hinges.
76. *Wrought-Iron Gates*.—The entrance to carriage-drive to have a pair of gates, as shown, 9ft. wide, 4ft. high above ground, with vertical  $\frac{3}{4}$ in. bars 5in. apart centres, with hangings for wood or stone; side gate, 3ft. 6in. wide, to correspond. Both gates to be fitted with patent lock and sham. The gates to be hung to three cast-iron octagon-shaped pillars, 6in. diameter, with bases for stone, including bolts (or with self-fixing bases). Or—  
Provide and fix gates according to design, 9ft. wide and 5ft. high, with square uprights  $\frac{3}{4}$ in. at 4in. centres, braced with diagonal bars, fitted with slip-bolt for padlock and drop-bolt, hung upon cast-iron pillars 5in. diameter, with self-fixing bases (or provide p.c. sum of £11).
77. *Grille to Entrance*.—Provide and fix to office entrance (or shop entrance) an ornamental wrought-iron grille or gate, 5ft. wide and 4ft. 6in. high, hung on strong hinges to reveals or piers or to shop-framing, to design (or No. C. 4781 in Young and Marten's catalogue, p.c. £5 5s.).
78. *Shop Railing*.—Fix to shop-front wrought-iron ornamental railing with double gates and hanging and lock, 4ft. 6in. wide, to design (sketch 6), the framework to be 2ft. high, and to be  $\frac{1}{2}$ in. by  $\frac{3}{4}$ in., with  $\frac{3}{4}$ in. square bars, with scrolled tops fixed to sill.
79. *E.W. Separator*.—At the foot of down-pipe fix one of C. G. Roberts's "Rain-Water Separators" for storage of rain-water (p.c. sum £5 or £6).
80. *Ornamental Gutters*.—Provide and fix to roof Macfarlane's ornamental moulded gutter  $\frac{1}{2}$ in. by  $\frac{3}{4}$ in. (number 12 in catalogue) including fixing with red-lead cement, screwed to fascia, &c.
81. *Roof Cresting, &c.*—Provide and fix to ridges of roof Macfarlane's (or other) ornamental cast-iron crestings and finials (state patterns or numbers in catalogue, including screws and fitting to hips).

#### SLATER.

There are many kinds of slates. The well-known Bangor quarries are largely patronised. The Penrhyn, the Dinorwic, and other quarries are noted, and supply best Bangor slates. There are three varieties: the old quarry for blue and red slates, and the new quarry of light blue, and these supply various qualities and thicknesses. Specify the kind, whether Penrhyn blue or Westmoreland green. Laxton gives a few facts: "The best Portmadoc slates are blue, and come from Oakeley quarries, North Wales. Large supplies are sent to the London market from other Portmadoc and Carnarvon quarries, but they are inferior in quality." Cornwall produces excellent roofing slates from the old Delabole quarries of a greyish blue, very uniform in colour. For sea-green slates, the Westmoreland are to be preferred for colour and durability, the best of which are obtained from the Tiberthwaite quarries near Coniston. The best slates are 12in. to 30in. long and of proportionate width, and one ton will cover about  $2\frac{1}{2}$  squares. There are also "Seconds," "Thirds," &c., and are not made to sizes. They are laid in diminishing courses. Specify the kind or size of slate, such as "Countess" slates (20in. by 10in.), Duchesses (24in. by 12in.), Ladies (16in. by 10in. or 16in. by 8in.).

The sketches given illustrate slating to

roofs. Section 1 shows the laying of Duchess slates; sections 2, 5, and 6, Countess slating, with the slates nailed in the middle instead of at the head. Fig. 3 is a plan of this mode of laying. Fig. 4 illustrates slate rolls to ridges; the "gauge" and lap of both kinds of slating are shown.

The following are a few alternative clauses:

1. *Generally*.—The slates to be even in thickness, smooth and tough, free from patches, cracks, veins, and other defects, and are to give a clear ring when struck. The slating to have a proper lap prescribed, not less than  $2\frac{1}{2}$ in. The eaves are to be laid double, and all the slates are to be closely and neatly cut, and fitted to vertical faces, hips, and ridges. The slating to be properly bonded in every part, and to be left water-tight at completion. (If copper nails be not used, composition or malleable iron nails, galvanised or dipped in boiled oil, should be specified.)
2. *Slating*.—Cover the main roofs with best Bangor red (or best Westmoreland green) Countess slates laid to a 3in. lap. The joints to range in true lines horizontally and vertically, and the work to be properly bonded and laid flat, each slate to be about  $\frac{1}{2}$ in. thick, and fixed with two  $\frac{1}{2}$ in. copper (or zinc or malleable iron) nails (10lb. per thousand) upon  $2\frac{1}{2}$ in. by  $\frac{3}{4}$ in. fir battens from ridge to eaves, 12in. apart, and spiked through felt to boarding.
3. *Felting*.—The boarding of roofs to be covered with the best asphalted roofing felt,  $\frac{1}{2}$ in. thick (or McNeill's roofing felt), lapped and nailed every 3in. with  $\frac{1}{2}$ in. copper or other nails. (The slate battens to be fixed over). Or—
4. *Banded Slating*.—The roofs to be covered with the best Bangor or Portmadoc Countess slating, from the North Wales Slate Company, 20in. by 10in., laid to a 3in. (or  $2\frac{1}{2}$ in.) lap, with two  $\frac{1}{2}$ in. copper nails to each slate—weight, 6lb. per thousand—with close-cut and mitred hips, in red-lead cement and copper screws. Or—  
The roofs to be covered with the best green "Eureka" slating from Tiberthwaite quarries, varied with bands of red Bangor, laid to a 3in. lap on diminishing courses from eaves to ridge, with two  $\frac{1}{2}$ in. copper nails to each slate.
5. *Green Slating*.—The main roofs to be covered with the best quality of Westmoreland green slating, and to correspond to sample submitted (or to be approved by the architect), and to be laid in gradually diminishing courses from the eaves upwards to a 3in. lap, with extra stout copper nails, 2in. and  $1\frac{1}{2}$ in. long, 90 and 110 to the pound respectively. Put a double course to the eaves, and each slate to be secured by two copper nails. The slating to be accurately cut to all hips, valleys, &c.
6. *Blue Slating*.—The roofs coloured blue on elevation to be covered with Portmadoc blue slates from the Oakeley (or other) quarry, laid to a 3in. lap, with two copper nails to each slate. The ridges and hips to be covered with 2in. (or  $2\frac{1}{2}$ in.) rounded birdsmouthed rolls, and 6in. by  $\frac{1}{2}$ in. wings, fixed with copper screws and bedded in oil cement.
7. *Gable*.—Lay a double course of slate to gables, and bed in cement.
8. *Ridges and Hips*.—The ridge and hips to be covered with slate,  $2\frac{1}{2}$ in. roll, screwed with 2in. copper screws to woodwork, with  $\frac{1}{2}$ in. sawn slate wings, 6in. wide, in 4ft. lengths, bedded and pointed in cement (or red-lead cement) with fitted ends, mitres, and intersections of ridges and hips. Or—  
The ridge and hips to have 2in. Bangor slate, rounded, birdsmouthed ridge rolls, with 6in. by  $\frac{1}{2}$ in. sawn slate wings in long lengths, bedded in oil putty, and screwed to woodwork by  $2\frac{1}{2}$ in. brass or copper screws, and the rolls to be fixed with 3in. brass or copper screws with countersunk heads, stopped in with oil putty.
9. *Roofs with Tile Ridges, &c.*—The roofs to be covered with the best Bangor Countess slating 20in. by 10in., laid to a 3in. lap, each slate nailed with two  $\frac{1}{2}$ in. copper nails; the slates to be cut closely to hips, ridges, and the eaves laid with a double course. All slate at verges to be laid in cement. The roofs to have 2in. Williams's patent slate ridge (or rubbed slate birdsmouthed roll), and  $\frac{5}{8}$ in. by  $\frac{1}{2}$ in. sawn slate wings securely bedded and jointed in oil cement and screwed with copper screws; or to be finished with approved red ridge tiles bedded and jointed in cement and nailed with 3in. nails; or the ridge tiles to be made by the Aylesford Pottery Co.; or J. C. Edwards (Ruabon); or the Hartshill Brick and Tile Co., Stoke-on-Trent, and give pattern. The ridges to be finished at ends by hip knobs of approved design bedded and jointed in cement and screwed or nailed to ridge.

#### THE ARCHITECTURAL ASSOCIATION.

THE ordinary fortnightly meeting of the Association was held on Friday evening, the president, Mr. G. H. Fellowes Prynne, F.R.I.B.A., in the chair. The following twenty-six new members were elected:—A. E. Bell, W. L. Binney, H. E. Brown, H. P. Buckingham, H. M. Cantley, H. J. Cundy, C. E. Stewart, S. M. Deacon, H. Dru-Drury, H. L. Etherington-Smith, R. Findon, C. R. B. Goodman, F. F. Lemaistre, J. H. Mellish, E. Y. Mitchell, J. A. Payne, H. T. A. Percy, J. B. Royle, H. V. Shebbare, C. O. Spencer Smith, W. H. Stainton, T. S. Vickery, J. N. R. Vining, A. P. L. Wood, and W. Worrow.

#### ARTS AND CRAFTS AND THEIR RELATION TO ARCHITECTURE.

A somewhat wordy paper on this subject illustrated by numerous lantern-slides shown by the aerial graphoscope, was read by Mr. H. Wilson. In his introductory remarks, the author observed that the abraded epigram that Architecture was the mother of the Arts was dictum begotten by some wit with a bowing acquaintance with Architecture and a refreshing innocence of Art. The author contended that Architecture was not the mother of the Arts, for they existed thousands of years before she was born. The Arts and Crafts were the ancestors of Architecture, and she was born from their conjunction. Going back to prehistoric times, Mr. Wilson showed that the art of personal adornment and the craft of tool-making came first in the evidences of human activity. The art of using tools was acquired in the making of them. Further, the savage, by unconscious symbolism, built up for himself a kind of religion. At that early period each man was an artist, because he did not concern himself with art, and only thought of the suitability of the thing he was making for its purpose; the decoration of it was a natural instinct. The offspring of this primitive artist in turn imitated the parent, and thus early arose families of craftsmen with nascent traditions and methods of work. When the scattered families gathered into tribes and built their palisades they joined themselves into families of craftsmen and formed the rudiments of a guild. Each member of the family worked out in his own craft the budding ideas of early symbolism. The guild was as much the national product of evolution as the family or the human being, and it found its completest development late in history—late in relation to the time taken in the evolution of society. Having shown the development of crafts from family industries to trade guilds, the lecturer sought to elucidate the moulding influence of these guilds upon social, industrial, municipal, and religious life over the whole world, as the disseminators of culture and shapers of society. Their influence waned at the period of the Renaissance, when the designer who delegated the execution of his work to others came upon the scene, and this inversion of the designer developed into the establishment of design as a separate faculty, as we now knew it. Reverting to the prehistoric crafts, Mr. Wilson urged that these disunited integers of design contained in themselves the essence and the promise of the highest art, and when men banded together architecture was advanced another stage, the work of each man becoming modified in aim and character by that of his fellows. Architecture was thus a complex art; it never had been and never could be a one-man art, but was the absolute expression of past states of the racial soul. The key to human development was in evolution, and the key to architecture also was found in the gradual evolution for arts and crafts unconsciously. Modern building might be interesting, and even at times beautiful, but it was not architecture. When beautiful, modern building was the work of artists who by hazard had made bricks and mortar the medium of expression. He emphasised the point that the Renaissance was notable for architect's architecture—the work of men who designed as distinguished from those who did. It would be illogical to blame the architect for being the result of a natural process of evolution; it would be equally illogical to expect from a man the work of a multitude, or to get from a molecule the momentum of a mass. It was well to show why a thing was wrong, but it was important for his hearers to know what they themselves were to do, and this, though difficult, was not impossible. It was necessary for each to follow his own particular bent, and to devote himself to



that work to which he felt most drawn. There need be no strife for precedence, for all were independent. Just as there were in life diversities of gifts, but the same spirit, so there were diversities of crafts with the same art working in all, embracing all, inspiring all. He was not advising dilettantism, but that each man should determine to be a craftsman first—and an architect afterwards. By intrusting the execution of his designs to others, he lost the power of modifying work in progress and its suggestiveness, while the work done was neither the architect's own nor the workman's. Architects found themselves in an age in which labour was organised, not to produce the finest kind of work, but to regulate the hours of labour and the rate of wages. The trades-unions took the place of the guild. Separated thus from the very means by which fine building had been done, architects were themselves organised into a profession, and, instead of being actually concerned in the work of building, produced briefs and diagrams from which erections were raised. He believed that a hopeful beginning had been made towards evolving living art out of this muddle of dead systems by the revival of interest in individual craftsmanship, and in the establishment of the School of Art and Handicraft in Regent-street. But it was essential that our architects should abate somewhat of the professional dignity which inclosed them, and give the craftsman freer play; then they might see a new Architectural Association on the ruins of the old, but it would only be done when they had for ever got rid of the architect.

A discussion followed, in which Col. Lenox Prendergast, Mr. Thomas Blashill, and others took part.

#### OIL DRAWINGS.

THE small set of pictures by Mr. Rupert Bunny, now on view at 148, New Bond-street, deserve a more distinguishing name, though it is not easy to suggest an exact title. The method consists in painting a picture in oil upon a copper plate, and taking off a transfer upon plate-paper. The result has an individuality about it quite unlike colour-printing. There can be no duplication, as the picture is the finished result of the one transfer. The effect differs entirely from either oil or water-colour painting, and retouching after printing is a very hazardous proceeding. Mr. Bunny does not claim to be the inventor of the process, on which, however, he has expended a considerable amount of time, with the result that he has carried the method further than any other artist working in the same field. That his productions are decorative and artistic none can deny, and, moreover, they are inexpensive. The draperies of the figures and the colours in which the compositions are rendered, show no mean capacities on the part of the artist. Some are monochromes, and these perhaps are the most satisfactory. The general effect somehow seems limited to the idea that these "drawings" are studies for big cartoons. Whether the method could be utilised for transferring figure decoration to cabinet or other wood-work or not is doubtful; at any rate, no examples are shown; but with a properly prepared surface there should be no difficulty, and it strikes us that some very pleasing results might be obtained which in a way would more accord with wood-work than ordinary painted decoration sometimes does. Anyhow, Mr. Bunny's little collection merits the attention of all interested in such matters, particularly if they consider themselves within the "know."

#### THE SURVEYORS' INSTITUTION.

AT the opening meeting of the above society, held on Monday last at the temporary premises in Savoy-street, W.C., the President, Mr. Robert Vigers, delivered an interesting address to the members, dealing principally with Metropolitan matters. He began by stating that the progress and success of the institution continued, as it had done during the thirty years of its existence, to be more and more manifest. The membership, now nearly 3,000, embraced many types of surveyors, and the successive presidents, representing as they did these many types, were in turn men of different professional experience and practice. He himself was a surveyor only, in the strictest sense of the word, and must therefore speak mainly of such things as came within his personal purview. The material growth of

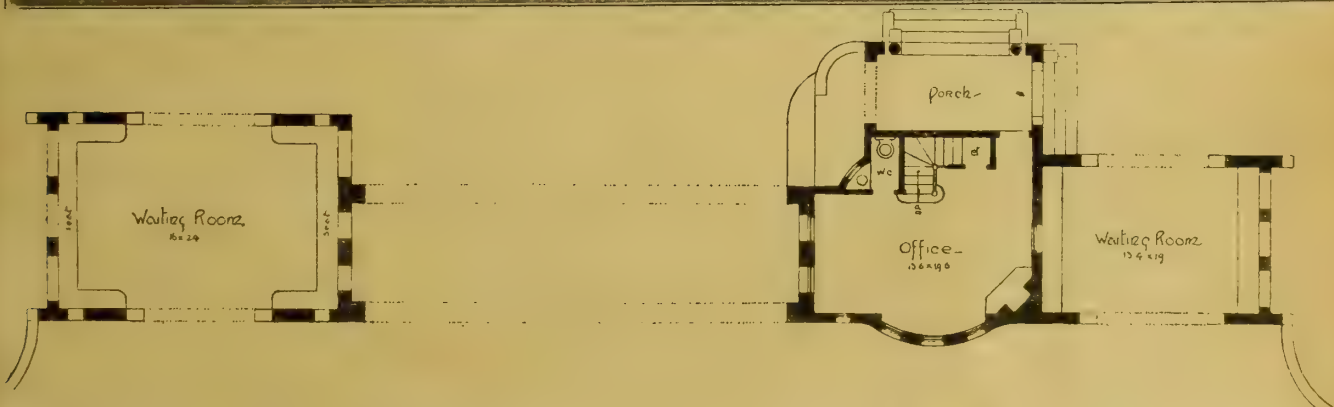
London within the fifty years covered by his professional experience was almost beyond belief—a comparison of a map of London in the forties and one of the present day showing how rapidly the adjacent open country and the spaces between the town and the neighbouring villages had been taken possession of by the two millions who had been added to the population. He took, for example, the parish of Kensington. In 1856 it had a population of 54,000; it had 6,300 inhabited houses, 27 miles of roads under the vestry, and about £290,000 rateable value. In 1896 the population was 170,000, the inhabited houses numbered 22,580, the roads measured 85 miles, and the rateable value was £2,200,000, and this remarkable growth could no doubt be matched by other districts. Looking at the matter from another point of view, the population of the area now known as the Administrative County of London had risen from 2,363,274 in 1851 to 4,232,118 in 1891, spread over 75,422 acres, or 56 persons per acre. It was a little difficult to reconcile the figures of the different censuses, as the area with which they dealt had differed from time to time, and he was indebted to the courtesy of the Registrar-General for the reduction of the figures to uniformity, without which his statement would have little value. After giving similar figures with regard to the number of inhabited houses at the two periods above named, the president showed that the growth of the population had been 2 per cent. less than the increase of houses; from which he could not but draw the conclusion that overcrowding was less year by year, while it was probable that the less overcrowded also occupied more healthy and pleasant dwellings than their more closely-packed predecessors. With respect to the Housing of the Working Classes Acts, it was mentioned that the rehousing on the route of the proposed Strand to Holborn improvement would involve the County Council in a loss of £260 per person provided for; or for a family of seven persons, an unremunerative outlay of £2,820 for land only, if reinstated close to their former dwellings. The Peabody Trustees, for whom he acted, had not quite such an exalted idea of philanthropy as to build their dwellings on the most expensive land in order to save their tenants a quarter of an hour's walk to their work, and there was, indeed, less necessity than ever, in these days of cheap workmen's trains, for such an exorbitant expenditure. Incidentally, the President mentioned that some of the conditions with respect to cheap trains which were now being imposed on the new deep-level railways were oppressive and deterrent to enterprise. To Mr. Peabody's gift of £500,000 the trustees had been able to add from rents and interest nearly another three-quarters of a million, thus carrying out the donor's wish that his beneficence should extend to future generations of the poor. They had now expended a million and a quarter, had provided 11,367 rooms, besides baths and washhouses, &c.; there were 5,121 separate dwellings at an average rent of about 4s. 9d., while the tenant's average wages were about 23s. 2d. per week. The death rate in these dwellings with 725 persons to an acre was 2·8 per thousand below that of London with its 56 per acre. The congestion of the traffic in London was a perennial subject, and many suggestions had been made for its mitigation, but hitherto without much good effect resulting. The Tower Bridge had indeed relieved London Bridge and its approaches to a very sensible extent, but the great east and west arteries were as densely crowded as ever, while at their intersections with the heavy traffic going north and south, progress was frequently entirely checked. But one factor in the question had not, he thought, received sufficient attention—i.e., the insufficiency of the footway accommodation. Houses were set back, roadways were widened—as, indeed, they should be; but the same narrow footpaths prevailed, and a man in any sort of hurry who wished to get along the main thoroughfares found his pace reduced to that of the loiterers and sightseers. The remarkable growth in the value of City property had, he thought, arisen not entirely from the increased facilities afforded by the railways for reaching the central points, but also to a large extent from the very large area of ground which the great railway works had taken from the land market, thus enhancing the value of what remained available. As an instance, he mentioned the case of the Chatham and Dover Railway Extension, the estimates for the land in which case were

about 2½ millions, making, with incidental expenses, about £2,630,000. The surplus land was in this case sold, within some thirteen years, for £1,100,000. The sale of the surplus lands on the site of the old Fleet Prison actually left a balance in the company's favour over and above the price paid for the whole site. Mr. Vigers instanced a plot of land in Lombard-street, which, bought by the vendor's grandfather at £1 7s. 9d. per foot super., was sold recently at £71 11s. per foot. After giving some interesting statistics of the amount of land which had been lost to the market in this way, and which amounted to nearly 37 acres, Mr. Vigers proceeded to deal in a general way with the vexed question of sewage disposal, more especially referring to the electrozone process at Maidenhead, which was still on its trial, and to Mr. Cameron's septic tank system at Exeter, the latter appearing to consist of the engineer's enlisting the aid of the hitherto dreaded bacteria, to enable him to effectually dispose of the injurious matter in the sewage, and to turn out, by a very simple process of letting nature take its own course, an effluent which was harmless, unobjectionable, and not liable to further putrefaction or fermentation. Of this, more will no doubt be heard, as Mr. Cameron is enlarging his plant, and has already achieved the most satisfactory results. With some observations on professional etiquette, and the absolute necessity for surveyors to maintain such a high standard of professional rectitude and integrity as to place them above suspicion in all their dealings with their clients and their fellow practitioners, Mr. Vigers brought an interesting address to a close, and a cordial vote of thanks having been proposed by Mr. Howard Martin and seconded by Mr. G. M. Fresman, Q.C., the meeting adjourned.

#### NEW ENGLISH ART CLUB.

THE Dudley Gallery is much more interesting this season than it has been for years. It is by no means so startling, and the Impressionist school of painting has either lost some of its wilder adherents, or they are sobering down to more worthy methods of work. There are still some strange things displayed, and the "cult" may be found here as heretofore; but more honest manners are being recognised, and more ordinary aims are distinguishing themselves. We are always glad to recognise any individuality, and we go far in welcoming any change to the mediocrity of a Royal Academy gathering. Following the list, for convenience sake, we note a drawing by Mr. Roger E. Fry, which, on account of its architectural character, arrested our attention. It is outlined in brown like the old Italian studies were, and, like them, washed in with tints of colour. The façade of a somewhat Rococo Renaissance building to the back of the wall-inclosed pool is of a peculiar pink brick, and here is a mural fountain of florid design; to the front are some maidens bathing. Mr. A. W. Rich has a charming water-side sketch of the Windmill at Rye, with the old timber bridge in the foreground. The white mill is prettily managed against a somewhat cold sky. Mr. Will Rothenstein pleases us with a dark quiet interior of a Stable in Burgundy; but we do not like the emerald-green trees outside the doorway. The cartoon-like drawing in red and muddy brown, by Mr. M. Bauer, of the Mosque at Delhi is a laborious work, almost in outline (13), and by no means effective. The liquid sympathy displayed for his subject by Mr. Alfred W. Rich in "Evening, Norwich," is broadly expressed in a poetic way, though perhaps a trifle stagey. Mr. E. J. Sullivan's work, "Maud has a Garden of Roses and Lilies fair on a Lawn," does not inspire any desire to see the young lady either in the garden or elsewhere. It is a barbaric work, and trivial too. The lilies are giants, and the roses look impossible. The clever chalk character-study of an old man, called a "Mug of Cyder," is much more worthy of note—a drawing by Mr. W. W. Russell. Mr. Bernard Sickert has an ambitious but true "View of Lincoln Minster from Brayford Water," with the old red brick shanties to the front of the scene. They are managed in a subservient way to the main feature in the picture, which is clever on account of their dominating scale, the cathedral being in the middle distance. The picture, however, is not very attractive. Mr. J. W. Bottomley's brown study of a cow is odd (45), and its ability as a painting is thereby overshadowed. "Flitting





A GATE HOUSE AND OFFICE AT SEA GATE, LONG ISLAND.—MESSRS. PARFITT BROTHERS, Architects.

"Shadows," by Professor Fred. Brown is a powerful view of Ludlow Castle, which is shown in high light. A bright blue spot of water occurs between the heavy trees in the fore part of the scene, and the distance in this Shropshire landscape is exceedingly well managed. Mr. P. Wilson Steer sends a patchwork and spotty rendering of the same subject. There are several other things worth seeing, but we must end our notes, and we do so with warm praise for Miss Alice Farmer's "Swaledale, Yorkshire" (No. 106). It is unlike a woman's handling, so distinctly broad and powerful is this delightful painting, which gains much by a distant observation of the work. The old stronghold of Swaledale stands up in the middle distance, and a stone-littered stream runs at the foot of a big tree, which makes the picture. It is a sunny landscape of no common order, well done.

#### A GATE-HOUSE AND OFFICE AT SEA GATE, LONG ISLAND.

THIS is an unusual-looking building, and is, consequently, more than ordinarily interesting. Its American characteristics are unmistakable. Messrs. Parfitt Bros., of Brooklyn, are the architects, and the premises belong to the William P. Rae Company. The site is on the seashore, and the gate leads to a suburban place of fashionable residences within easy access of New York. The property juts out seawards, with the Atlantic Ocean on one side, and Gravesend Bay on the other. There is a broad and beautiful beach to this peninsula. The observatory to the right of the gateway commands extensive views. The structure is shingled, and left to the weather

to furnish a natural silvery-grey colour. The roof shingles are stained moss-green. The "trimmings" are painted bottle-green. The conveniences on both floors are finished with yellow pine, and these offices are furnished with toilets and other sanitary fittings. Our illustration is reproduced from the *Scientific American*.

#### THE ART OF HERALDRY.

AN address on this topic was given on Monday in the lecture-hall of the Scottish National Portrait Gallery, Edinburgh, by Mr. Balfour Paul, Lyon King of Arms, as one of the Rhind Lectures on Archaeology. It was shown how heraldry, besides being the science of blazoning the cognisances of different families, might be considered as an art which displayed itself profusely in the surroundings of our ancestors. The period of the fourteenth and fifteenth centuries with its strong Gothic tendencies was favourable to the development of artistic heraldry. The men who worked at it were deeply imbued with its spirit, and were not tied down by the pedantic rules which were introduced in later times. They rather looked to the general effect of an achievement, than tried to get every detail into conformity with some rigid type. In depicting the charges on a shield, they did not slavishly copy the actual shape of the objects represented, but used a conventional form. Their lions, for instance, were not copied from the life, but were forms which typified the characteristics of the animal. Their main purpose was to be distinct, spirited, and easily read, therefore all forms were clearly silhouetted on the shield, and drawn with an entire absence of perspective. To the impera-

tive end of intelligibility all minor resemblance to nature was sacrificed, and the consequence was that their designs had a spirit and vitality which succeeding ages laboured after in vain. In order to comply with this requirement of distinctiveness, all charges had, as a general rule, to be shown in profile, and additional strength was imparted to the design by the field of the shield always being well filled up by the objects depicted on it, as little space as possible being left unoccupied. Owing to the shape of the "heater" shield, which was the prevalent Gothic pattern, the charges where there were more than one necessarily varied in size, which imparted variety and animation to the design. Quarterings were rare at first—indeed, altogether absent. The shield was generally couché, the helmet cylindrical in shape, and both it and the crest very large in comparison with the shield. The mantling was small, and to the end of the period remained restrained in character, and without that prominence which it afterwards assumed. Supporters, originally introduced as a mere ornamental filling up of a seal, gradually assumed the form of animals, but they did not support the shield so much as the large helmet and accompanying crest. Mottoes were not of common occurrence. During the Renaissance period, armoury was affected along with the other arts. Shields forsook their former simple and severe lines, and became bent, rolled, and peaked in all directions. The consequence of this was that while the Gothic artist shaped his charges to suit the form of the shield, the draughtsman of the Renaissance could make his shield suit his charges. The big cylindrical tilting-helm made way for the lighter vizored helmet. The mantling became more audacious in its flutterings and twists, and became



an important and decorative part of the achievement, while the charges themselves began to lack their original vigour, and to be treated with indications of light and shade, and in a more naturalistic manner. All this gave a grace and airiness to representations of armorial bearings; but these were not attained without a corresponding loss of power, picturesqueness, and distinction. Heraldry, as an art, went on the downward course, and though the rococo treatment of the eighteenth century designers saved it for a time from absolute ugliness, that depth was reached before the century closed, and continued up to our own day, though now there is a breath of revival in the air. The lecturer then directed attention to some of the special objects to which heraldry, as an art, was applied. One of the earliest of these was seals, and it is to them that we owe the preservation of many of our most ancient coats. A man's seal was a very important object in the days before writing became universal, and the art of seal-cutting rose to very high excellence—higher, indeed, than it can pretend to now. After alluding to the different kinds of flags used for the display of armorial bearings, and giving examples of various historical flags which were still in existence, attention was directed to the exhibition of arms on places of sepulture. Of all such specimens, the memorial-brass was undoubtedly the most artistic from a heraldic point of view. Although the brasses in England are numerous, and often of a high order of excellence, very few remain to us in Scotland. We probably never had so many in proportion as in England, and of the small number we had, few have escaped the violent handling to which all our art work in connection with churches has been subjected. Indeed, we have not half a dozen altogether, and none of these approach in antiquity such a fine memorial, for instance, as the brass to Sir John d'Abernon, in Stoke d'Abernon Church, Surrey, which belongs to the later part of the thirteenth century. Our earliest existing brass is that in St. Nicolas Church, Aberdeen, to the memory of Alexander de Irwyn, Lord of Drum, and his wife, Elizabeth de Heth, a daughter of the Marshal. This must date from about 1460; but, oddly enough, the dates of the deaths of both the parties are left blank. St. Giles, Edinburgh, ought to have two brasses—one to William Preston, of Gorton, whose arms may still be seen on the pillars of the aisle, which bears his name, and another to the Regent Moray, but only the last now remains to us. A curious feature about the latter is that it was made out of part of another brass of a larger size, reversed and engraved on the back, and there is reason to believe that the other part of the original brass was utilised for a memorial to Alexander Cockburn, of Ormiston, and still exists in the ruins of the old church at that place. There is another fine armorial brass also in St. Nicolas, Aberdeen, to the memory of Dr. Duncan Liddell, who died in 1613. It also contains a portrait of Liddell, the draught of which is supposed to have been executed by George Jamieson, the father of Scottish portrait painting. There is a small brass in Glasgow Cathedral, but it is not armorial, and there is a singular example of an engraved plate of copper, containing no less than eight coats of arms on it, let into a flat tombstone in the churchyard of Kilmany, Fife. It is to the memory of John Melville, of Cairnie, but is late in date, having been erected in 1734. The lecture concluded by a brief reference to some other armorial tombs with effigies in stone.

#### PICTURESQUE "BRITAIN AND BRITANNY."

THE Continental Gallery in Bond-street has added to its collections of contemporary art a small series of water-colours by Mr. Reginald Jones, which with freshness and skill represent some well-known spots in Yorkshire, Dorset, and Devon, as well as in the north-west of France. The ruined Abbey of Whitty grimly standing out against the sky, with the meadow dyke to the front of the sketch and the red-roofed cottages of the hamlet hard by, furnishes our first note of approval. Or again, in No. 28, "A Breton Church," with its Flamboyant traceried window and odd buttress—a study in grey walling relieved by two figures in blue—arrests attention, although, architecturally speaking, the sketch is scarcely appreciative. Where the buildings are less detailed, Mr. Jones is more at his ease—say the street scene (No. 24) from

Corte in Corsica, with the tall cream-and-white houses in high sunshine relieved by the shadows in the forefront from a big tree. No. 21, "In Ballast," is a masterly study of a brig, cold in tone, but charmingly rendered; and the same may be said of an Essex farmstead, No. 40, with the rotten old timber barn stubbornly resisting the hard hand of adverse days and the effect of age. Plymouth Quay (54) is distinguished by the clever suggestion of a crowded background of houses in the distance. These are only a few of the pictures among many deserving attention as works of an unambitious kind. All are bright and pretty, none indifferent, and most display considerable ability.

#### NEW OFFICES FOR MESSRS. EASTWOOD AND CO., LIMITED.

FEW firms of equal prominence in the brick, lime, and cement trades can congratulate themselves on a steadier increase of business, or the more gratifying establishment of an enviable reputation for rational enterprise ballasted with praiseworthy caution, than that established so many years back in the Belvedere-road, Lambeth, close to the Charing Cross railway bridge, by Messrs. J. and W. Eastwood. Those whose pleasant business relations with the firm have familiarised them with the old premises will well remember how, with increasing developments, additions became necessary, during the course of years, almost here, there, and everywhere, which at last rendered the demolition of the whole absolutely necessary. During the past few months new offices, admirably designed by Mr. E. T. Hall and built by Messrs. Perry and Co., have been gradually nearing completion, and on Tuesday last an informal but cordial gathering of the friends of the firm assembled at its hospitable invitation to celebrate the housewarming of the new premises.

We congratulate Mr. Hall on his successful planning of the new offices. He has secured a maximum of light in almost every room—no easy matter, considering the environment, and Messrs. Eastwood and Co. may for years to come welcome the still further expansion of their business without any dread of hindrance by reason of cramped surroundings. Most readers know that since the firm became a private limited company its operations have broadened out in every direction, and that this has been mainly due to the enterprise and energy of Mr. George E. Wragge, the present managing director.

The firm was founded in 1815, by Mr. Eastwood, who carried on business as a lime, cement, and brick manufacturer in Lambeth. After his death, his widow continued the business, followed by her sons John and William, until 1872, when it was converted into a private limited company. With the inauguration of the Company, Mr. George E. Wragge, its present managing director, entered commercial life. What has been done under his management the following figures will show:—In 1872 the Company took over two wharves, they now have 17; they took over two barges, they now have 40, with 50 outsiders also at work for them. Then they had no brickfields, now they have eight, representing an annual manufacture of 100 million bricks. Last year they sold 30,000 tons of cement and 17,000 tons of lime. Their annual tonnage delivered over their wharves and by their barges is 500,000 tons, half of which is manufactured by themselves, and every day they have 125 horses and vans working for them in London, over 80 of them their own.

Mr. Wragge has done good service, in addition, to the trades generally, of which Messrs. Eastwood and Co., Limited, are so worthy a representative firm. Many a successful organiser of industry to-day seems to set himself the task of crushing rivals and appropriating their business. That has not been Mr. Wragge's method. He has converted rivals into co-operators, and all have found in increased mutual prosperity the reward of honest energy. We need hardly enlarge here on his services in connection with the Brickmasters' Association. Those who know what that body has done, and is doing, will need no arguments of ours to enhance their opinion of Mr. Wragge's capacity and kindness.

Nor will others who have benefited by his relaxations. Less dependent on the extortionate rapacity of the railway companies than their brethren in the Midlands, the Kentish brick-makers still send their goods mainly by water;

and those who have relations with the navigators of the picturesque barges which still breast the waves of Father Thames laden with bricks and lime and cement, know how business is facilitated by discipline and legitimate emulation. The *esprit de corps* of a barge-skipper is as real and solid a thing as that of a crack regiment; and how much has been done by Mr. Wragge to cultivate this, in connection with the fine fleet of barges owned by Messrs. Eastwood and Co., Limited, the pictorial records of barge sailing-matches, and the albums of portraits of their barge captains, which adorn the board-room fully testify. Long may these veterans brave the dangers of the lower reaches of the river, till their increased numbers and multiplied cargoes double and treble the profits of the Kentish brickmakers, and render many future enlargements of Messrs. Eastwood and Co.'s premises—spacious and convenient as they now are—absolutely necessary.

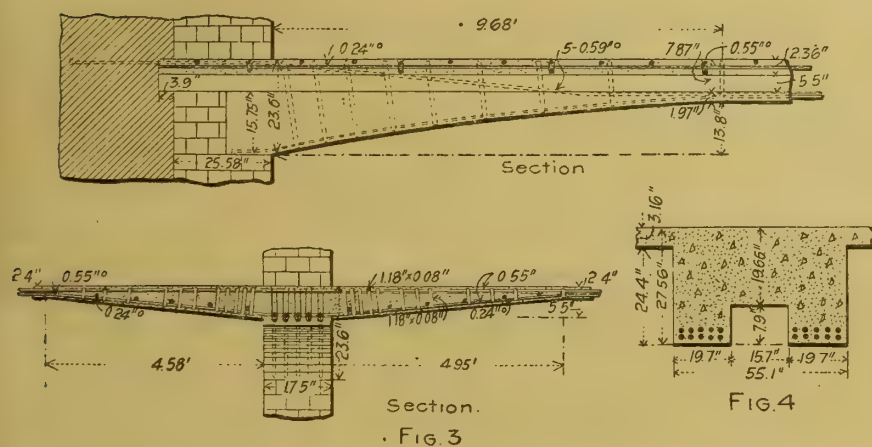
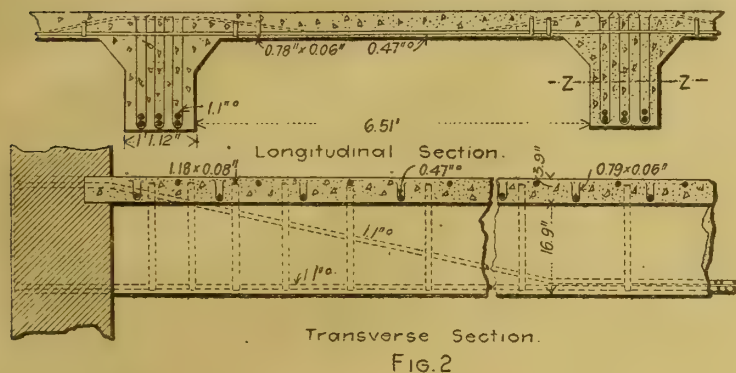
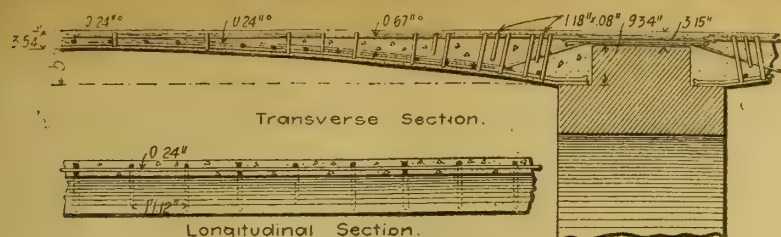
#### SKETCHES IN THE MIDLANDS AND IN ITALY.

MR. ALFRED EAST is the author of a delightful series of water-colour studies now on view in the large gallery of the Fine Art Society's premises in New Bond-street, to which we may confidently direct our artistic readers' particular attention. The poetry of the whole of these drawings thus displayed affords their distinguishing characteristic, more especially in the glamour of his evening scenes and where twilight plays an effective part. Mr. East has also the distinguishing power of localising his aerial effects, and this he accomplishes with little evident effort and with a defined distinction, not only in the high lights of a midday sun but in the half-tones of a sunrise or an evening symphony. Some of the exhibits are slight, and many clearly were made as studies for more ambitious works. The collection as a whole, however, bears a singularly uniform degree of merit, and the impression consequently left upon the mind of the visitor is the undesirability of instancing individual examples in which the chief aim of the artist has been to perpetuate a fugitive effect. For the architect there is not much technical rendering of buildings in this gallery; but such landscapes as No. 36, "Three Church Towers from Sheringham," evince recognition by the painter of the important part which architecture really plays in such a scene, or again No. 90, "Haverstock Hill," with Teulon's conical-spired church just to the right in the middle distance, a very different subject of course, and very differently treated, but equally faithful as a record. The breezy Cotswolds or the silent water meadows round about Arundel have, with the same poetic precision, found here an illustrator, as in the hot scenes of Southern Europe, or midst the stranger beauties of Japan. Wherever Mr. East finds himself, and however rapid his work, it is capable, good in colour, and unassuming. The trick of the lightning artist is far removed from his productions.

#### A NEW FRAMING SQUARE.

A FRAMING square has recently been patented by James H. White, of Ansonia, Ohio, by means of which a carpenter can lay out mortises and tenons on the top side, or bottom, of a piece of wood without the necessity of turning the timber. The framing square is provided with two graduated side arms of different lengths, connected by a mortise and tenon-bar. This mortise and tenon-bar is formed with an aperture 1 in. in width, leaving the remaining two portions also 1 in. in width, so that the bar can be used in laying off 1 in., 2 in., or 3 in. mortises and tenons. To one slotted end of the long side arm a gauge-plate, lying parallel with the mortise and tenon-bar, is adjustably secured and held in any position within the length of the slot by means of a clamping screw. The other end of the long side arm and the free end of the short side arm are slotted to receive the clamping screws of an adjustable head. If it is desired to use the square for 7 in. timber and 2 in. mortises and tenons, the inner edge of the head is set 2 in. from that edge of the mortise and tenon-bar which is lowermost, and the gauge-plate is set 2 in. from the edge of the mortise and tenon-bar. The tenons, as well as the mortises, can then be laid out by placing the head against one side of the timber and drawing the mortise and tenon lines along the





edge of the tenon-bar held lowermost, and along the edge of the aperture of the mortise and tenon-bar. When set as described, the device can be readily used in laying off 1 in., 2 in., or 3 in. mortises 2 in. from the edges of the timber, and of any desired length. The head is made adjustable, to enable the carpenter to lay off the mortise any desired distance from the edge or corner of the timber.

# REINFORCED CONCRETE FLOORS IN THE PARIS EXPOSITION BUILDINGS.

**T**HE Petit Palais des Beaux-Arts in the Champs Elysées, Paris, covers a surface of 5,000 square metres (53,821 sq. ft.) After serving the purposes of the Exposition in 1900 it will become the property of the city of Paris, and be permanently used as a museum. The construction is therefore intended to be durable, and embraces several types of reinforced concrete floors in the lower story. The Hennebique system has been adopted, and for spans up to 20 ft. the flat arches shown in Fig. 1 are used. For large spans up to 24 ft., solid rectangular girders supporting uniform continuous flat slabs, as shown in Fig. 2, are used. The basement floor, Fig. 3, over the cellar, is composed of arches similar to those of Fig. 1, which are supported by arch girders about 19 ft. span, and 12 3/4 ft. apart centre to centre. The floor of the 40 ft. gallery in the grand vestibule is carried by six double girders, Fig. 4, 33-6 ft. span and 18-27 ft. apart in the clear. This floor is designed for a load of 800 kilograms per square metre (164 lb. per square foot), and is proportioned for maximum unit strains of 161 lb. per square inch compression in concrete, and of 6,451 lb. per square inch for tension in iron. The floors shown in Figs. 1 and 2 are proportioned for loads of 164 lb. and 225 lb. per square foot respectively. Tests of the construction shown in Fig. 2 showed

a maximum deflection of 0.35in. at the centre when loaded with 500lb. per square foot—i.e., three times the working load. All the floors were made by ramming the concrete in wooden moulds, which, in Fig. 2, was done in two processes, the first one forming the bottom of the girders up to line Z Z, and the second completing them and making the floor platform. The concrete was composed of 54lb. of Portland cement to 2,410c.in. of sand and 5,184c.in. of gravel. It was allowed to set eight days before removing the moulds, and 30 days before testing. The reinforced concrete floor constructed in this building amounted to nearly 53,300sq.ft.

CONVENTION OF THE AMERICAN  
INSTITUTE OF ARCHITECTS.

ON Tuesday, November 1, the American Institute of Architects began its twenty-second annual convention in the capital city of Washington, in which it has now established permanent headquarters. President George B. Post, of New York, in his annual address, congratulated the institute that the past year had been marked by three events which will form an era in the history of American architecture. The Secretary of the Treasury had not only established a most important precedent and practically made a public recognition of the fact that educated talent was essential to economy and success in the work of the profession; but, more important still, that there should be no politics in art, by the appointment of a supervising architect after exhaustive competitive examination, conducted by a specially-appointed civil service commission, consisting of a board of architects of recognised position in their profession. For almost the first time in the last three decades they had seen architects in private practice selected by fair competition, judged by expert jurors, for the designing and erection of govern-

mental buildings, a practical recognition of the fact for years asserted by the unanimous voice of the profession, that worthy architecture could not possibly be secured, except by accident, from a Government office, no matter how great the ability of its chief, where the mass of business in the maintenance and repair of existing buildings was so enormous that the work of design was of necessity largely delegated to assistants.

The Treasurer's report showed a balance in hand of 382-07dol. Chapter and committee reports and a consideration of amendments to the by-laws took up the remainder of the first day's session. The delegates were received by President McKinley in the afternoon, visited the Octagon House, the new national headquarters, later, and in the evening were escorted through the Congressional Library by Superintendent Bernard R. Green, M. Am. Soc. C. E.

The first paper of the Wednesday's session was by Professor W. C. Sabine, of Harvard University, on "Acoustics." A second paper on the same subject was contributed by Adolph Cluss, of Washington.

Professor G. P. Merrill, of the National Museum, followed with a paper, "Remarks on Some Little-known American Ornamental Stones." Among no nation of the world, he pointed out, was stone so generally used for general structural purposes as in America.

Professor B. E. Fernow, Dean of the New York State College of Forestry, had prepared a paper on "Some Peculiarities of Wood." Wood was considered an indispensable requirement of our civilisation, never to be entirely or practically supplanted and the author suggested the appointment of a committee to study and report on specifications for wood materials, so as to reduce, as far as possible, the dangers from rot and fire.

At the evening session, Dr. Cyrus Adler, of the Smithsonian Institution, spoke on the architectural work of the Jewish people, before and since the beginning of the Christian era, and Mr. H. G. Bradlee, of Boston, considered the employment by architects of heating, sanitary, and electrical engineers.

The election of officers resulted as follows:— President, Henry Van Brunt; First Vice-President, W. L. B. Jenney; Second Vice-President, J. W. McLaughlin; Secretary and Treasurer, Glenn Brown; Auditors, S. A. Treat (for two years), E. H. Kendall (for one year); Directors, for one year, Frank Miles Day, Joseph C. Hornblower, T. D. Evans; for two years, Robert W. Gibson, Levi T. Scofield, W. M. Poindexter; for three years, Arthur G. Everett, of Boston, W. C. Smith, of Nashville, George B. Post.

Pittsburg was chosen as the place of meeting in 1899.

Thursday morning the concluding session was held, and was devoted to consideration of the changes in the by-laws, which will go into effect on January 1 next, and to the report of the committee on building laws.

## FIRE PREVENTION.\*

THIS volume is published under the auspices of the council of a committee, which contains the names of many leading architects and experts. Edwin O. Sachs, chairman; Professor Aitchison, R.A., P.R.I.B.A., Thomas Blashill, F.R.I.B.A., superintending architect, L.C.C.; Sir A. Blomfield, A.R.A.; Arthur Cates, F.R.I.B.A., F.S.I., are among the many representing the council. We have already spoken of the main objects of this committee, in the adoption of preventive measures to protect life and property from fire; to bring together those interested in fire prevention, to discuss questions on construction, and to publish specially prepared papers, tests, and records of experiments undertaken by them. The list of officials holding appointments under government and local authorities, who are members of the committee, is the best guarantee of the position and usefulness of this body. The volume just published contains several useful papers. The chairman, Mr. Edwin O. Sachs, an expert authority on the subject of fire prevention, writes the first paper on "What is Fire Protection?" Fire protection is defined by Mr. Sachs as a combination of fire prevention, fire combating, and fire

\* Publications of the British Fire Prevention Committee. Edited by EDWIN O. SACHS, Architect, F.S.S., Chairman of the Executive Committee. Vol. I. London: British Fire Prevention Committee Offices, 1, Waterloo-place, Pall Mall.



research. Under "fire prevention" he classes all preventive measures, including the education of the public. Under "fire combating" he classes both self-help and outside help. Many useful suggestions are thrown out on all these general heads which we recommend to the attention of all local authorities. The remarks on the tactics of brigades are very good; it is easy sometimes to swamp a fire and to damage all the property by water; the trained and skilled brigade carefully extinguish or suffocate a fire in a room or a basement. The paper on "Some American Opinions of Fire Prevention" being abstracts of papers by several authors, is interesting, containing many useful hints to architects. Many instructive facts are given in the papers contributed by American experts. Mr. Charles H. Bebb's description of the burning of the Chicago Athletic Club building, a perfectly fireproof building, is of interest. It was near completion when a fire broke out on the fourth floor. After the fire the floors remained intact; but every particle of combustible material, of which there was plenty, was burnt out—window-frames and wood fixings, and all. The heat was intense. The surface of the fireproof materials and brick became fused, and the glass from skylights flowed in molten streams down the walls. The chief of the Fire Department never saw a "hotter fire" than on this very modern "fireproof building"; but structurally it remained perfect, not a tile arch of porous terracotta was injured, not one had fallen. The partitions also of the same material remained intact, except that every door-frame, casing, and wainscoting were stripped off, and the wood floors were consumed. Mr. Bebb says the hollow iron columns and vertical piping for soil and wastes, &c., which passed through the floors and were never properly stopped up with concrete, though imperfectly "fireproofed" on the outside, formed continuous flues 150ft. high for the passage of heat and flame. He also condemns the unnecessary combustible material used. These are the perils of all so-called fireproof structures.

Mr. Edwin O. Sachs's contribution on the sad fate of the Paris Charity Bazaar fire read at the A.A., with comments, we have already given. The paper on "Theatre Exits," by Alfred Darbyshire, with plan of Sir Henry Irving's "Safety Theatre," and Mr. Frederic R. Farrow's useful paper on "Fire Resisting Floors" are of much value. Mr. Farrow describes all the leading fire-resisting floors used in London, the Stuart Granolithic Co.'s, the Doulton-Peto floor, the Expanded Metal Company's, the Fawcett, Potter and Co.'s, and others. Mr. Thomas Blashill's paper on "Lessons from Fire and Panic," already reported in our pages, is also a valuable and practical contribution to the volume. We may have a better opportunity of referring again to a few of these and other papers contained in this volume. Their collection in one volume is an advantage that will be appreciated by practical men.

#### NORTHERN ARCHITECTURAL ASSOCIATION.

THE inaugural address was delivered by the President, Mr. Frank West Rich, at a general meeting of the members, held at the Art Gallery, Newcastle-on-Tyne, Nov. 16.

Since I last had the honour of addressing you (which seems but yesterday), there has appeared in one of our professional journals an illustrated article on the architecture of this city. In my address last year I took the opportunity (it being the Diamond Jubilee year) to describe some of the buildings and the progress of architecture in Newcastle during her Majesty's reign, and I then ventured to assert that the architecture of this city was of as high a quality as will be found in any city in England (excluding, of course, London, which will compare with no place, or rather no place can compare with it). It was with some satisfaction, after reading the criticisms in the journal before referred to, to find them so much in accord with my own. I should like here to pay, on behalf of our present and past members, a graceful tribute to the said journal for its fair and unbiased criticisms on the architecture of Newcastle. There was one part in this criticism which was not very palatable—that referring to the domestic architecture. I think we must admit it, with some exceptions. There is however, one consolation—that it is possibly as good as that in many other cities. It

is astonishing what a very small percentage of domestic buildings are the work of architects. Those of our friends who reside in detached residences and who do employ architects are generally men of simple or quiet tastes, who allow little latitude or scope for design. They generally are possessed of a cherished ideal—a house after their own hearts, often one like a square box, with hipped roofs. This tendency on the part of some of our friends for this modest display is perhaps better so than the other way. It may be called a national characteristic; but however plain or simple our friends desire a house designed, or whatever cranks they may have in their heads either as to the plan or exterior effect, it is our duty, as architects, to place before them the correct course to be followed; and whether the house be simple or elaborate, the design should be right, and the plan a model of usefulness. The journal says the architects of Newcastle must look to their laurels in this respect. We have done fairly well in other walks of architecture; but in this we are not up to the mark. We have the consolation, as I said before, of being perhaps as good as our neighbours; but that is not sufficient. The criticism may be a fair one, and the stigma must be wiped out. The British public ever grumble at the cost of works, whether public or private; but if any really fine design be placed before them they are quick to recognise its merits (except members of a Government, or, indeed, of any elective body), and rightly applaud its author, and will gladly face the extra cost rather than a poor design. Our students have done some work during the past session; but one cannot help feeling that there is with our students, as with those in nearly every other similar association, a certain lack of enthusiasm. This is a matter to make us all think seriously whether the plan we follow is a good plan. The whole of our efforts in teaching our younger students at present is voluntary, and, however excellent in theory a voluntary system may be, yet there is no shutting our eyes to the fact that the results are not satisfactory, and the reason is not far to seek. The task of teaching should, and no doubt does, devolve upon the man of most experience, and of greatest merit; but these men are generally those engaged in active practice, whose every moment is bespoken, and rendering it impossible they can do any justice to voluntary teaching. It, after all, very much resolves itself into a money question—that is, the teachers of our students, or demonstrators, or whatever we may term them, should be remunerated to make it worth their while, as in other professions, and the cost involved in this remuneration should be paid by the recipients of the knowledge; and what is more important is the fact that the teachers should be architects in active practice—the information must not be taught by professional crammers. Architecture is a living art; there are no dry bones about it. The practice of architecture carries with it the implication that any person practising it must necessarily be quite to the front in all the endless wants and details of our busy lives, taking advantage of, and working into use, the innumerable facts that science is for ever disclosing, and last, but not least, to possess an enthusiastic and thorough knowledge of what we may safely call our "Old Masters" and their works—the men who have laid down the foundation of our art, from that Egypt of which we have lately heard so much, down through all the centuries to our own time, building up in stone and in literature a colossal and a glorious art;—one which it is incumbent on us to hand down unsullied and bettered, if we can, to future generations. It is on considerations of this nature that the littleness of our teaching becomes apparent, and the need of a better system being inaugurated. The system of pupillage (as in the apprenticeship system in the building trades) has undergone great changes in our lifetime; our younger students have, however, all the greater need for information. It is a well known fact that one man in every ten would not hesitate to attempt to teach architecture, so much is it the custom of every man to consider architecture an art with which he is quite conversant, and, therefore, attacks it gaily with a light heart. He lives in a house, or has business premises, and, therefore, knows all about it; but, take my word for it, there is no one who knows so much of architecture, as your architect. He spends his life in the study and performance of it; he is in touch with the innumerable wants of the times, and conversant with the record of past centuries to which I have

before alluded. It is to such men to whom I would hand over our younger students. The manner in which this is to be done is the crux of the whole subject. The voluntary system has been tried, and with no particular success; there then only remains the other, accompanied by the financial consideration. Our council have given this matter some attention, and know that in this city there exists an institution, the Durham College of Science, where very many subjects of a technical nature, and in touch with architecture, can be studied, and a scheme for amalgamation with the college on these subjects is at present under consideration by our council. But after the study and mastery of technical subjects there remains that immense field of true architecture, embracing the absolutely useful in every-day life, and the absolutely immeasurable field of imagination, or what is more generally termed the fine art of design—a quality beyond the range of examinations. I think we may leave the matter for the present with our council, who will safeguard our younger friends, and trust the scheme of amalgamation with the college, and also with the Institute, who, I believe, have a plan in embryo to work in conjunction with allied societies, not possibly so much in technical subjects as with the literature and history of architecture, will have the effect of putting our students upon a sound footing. But all this points distinctly to some greater scheme looming in the future—a future I imagine not far distant. I should now like to refer to one or two subjects relating to our general practice. I believe we all find, and every day accentuates the position, that the inspection of our works becomes more onerous, owing to circumstances we need not stop to examine here, and the employment of clerks of works has become a necessity to meet the varying changes of practice. But the admittance of a clerk of the works is not always a blessing, and frequently brings uncalculated responsibilities upon us, who have already many to bear. The uprising of so many local and money-spending authorities, who so frequently appoint their own clerk of the works, calls for some decided course of action from our side. Men appointed in this way are frequently so appointed on political or other questionable grounds, working, very often, antagonistic to the architect, rendering his position well-nigh unbearable. We all know, from long experience, that our best-designed schemes may be absolutely wrecked in the performance by the carelessness or ignorance of an inspector. There is no need why any more responsibility should be put upon members of our profession by the faults of others. Therefore, the clear course is apparent—that is, the architect must appoint the clerk of works as recommended by the Institute, selecting a man who, from his own knowledge, is fully qualified to carry out the work. I think it prudent that the clerk of works should, in the first instance, be paid by the architect, who, in due course, is repaid by his client. I have never known a work suffer when worked on this system, but have known deplorable results follow the other course. It will, I have no doubt, be well within the knowledge of members of the increasing vigilance of the city engineer in respect of the deposit of plans, and the carrying out of buildings;—there can be no fault lying with the city engineer in his efforts to obtain accuracy. It is a quality much wanted; but it, like many other things, goes to make work more costly. Where we do really find a fault, is in the town improvement committee taking such an extended time in approving or disapproving plans. I wish here to make a strong protest, on behalf, not only of our members, but of the public generally, against the long interval of time that is lost in the committee meeting for the consideration of plans, at intervals of fourteen days, causing, in many cases, considerably financial loss to owners of property, and would respectfully ask the committee to fall in more with the wants of the times, and place their meetings at lesser intervals. I remember some years ago, when I happened to act as your secretary, the same question arose, and information was obtained from all the chief cities of England and Scotland, as to the usual practice in these matters. When it transpired that in many of the larger cities there were much quicker facilities in dealing with deposited plans than what obtains in Newcastle, this was communicated to our town improvement committee, but no good resulted. Let us hope they will no longer stand



in the way of public business, but take a more enlightened view of the situation. There is not time in the present rush of business to wait a fortnight for a decision as to whether a plan is approved or it is not approved. The public want their work done quickly, and in some instances, where alterations occur in the progress of building, to wait a fortnight frequently means laying by the work altogether for that period, to the manifest loss to the owner. There is a general feeling that we are becoming very much over-governed in municipal matters. Powers are now being sought which still further interfere with the liberty of the public in building, the strangest part of it being that the public have never asked particularly to have their liberty curtailed in this way; but there is no doubt nine-tenths of these new powers are fads emanating from the mind of some of our city councillors, and generally for notoriety or elective purposes. This may be plain language; but, speaking for architecture, we shall find presently serious obstacles placed in the way of free design, and the architecture of our streets reduced by these by-laws to a "ditch-water" level. It goes without saying that the picturesque quality of our streets depends entirely on diversity in design—upon one building differing from the other in height, width, disposition of eaves or gables, projections, or recesses, or the like. Some there may be found who advocate a design in street architecture of the "Gower-street" type—but let us hope they are few—or, to fly at a higher game, some of the streets of Paris, of the Baron Haussmann period, which, although more grandiose than the former, are equally unsatisfactory in their final effect. The quality of street architecture marks the history of the times, and records the sentiments of the people. We all know the circumstances under which the Haussmann buildings were erected, and we all know scores of cities where other circumstances existed, where a free people have given free scope to their qualities in design, imprinting upon their buildings a strong individuality, rendering their cities interesting in every turn we take. I am the last man in the world who would advocate the abolition of by-laws for the regulation of some building matters; but let these matters be confined to health measures and the like, but let us have liberty in design. One is tempted into making these remarks by a suggestion emanating lately from our town improvement committee, and there is the draft for a further Bill now lying at the town-hall, which should have the careful attention of every citizen. While on building matters, we may say a word or two on a special kind of building very much talked of nowadays, and much needed: one popularly called a "fireproof" building; but, as a fireproof building has never yet been built, it is more correct to say a "fire-resisting" building, precisely in the same way as iron or steel safes have changed their names of late. I do not purpose here reading an essay on fire-resisting buildings, but merely to call attention to their increasing importance. This is a class of building needing all the skill of skilful men to devise, needing all our powers of observation and investigation to enable us to keep in touch with the times. It is what may be called the "modern building." Business, as we all know, moves quicker year by year, and the hazards increase. To have a large and valuable building, filled with equally valuable stock, burned down about our heads, is too serious an interference with business to be lightly endured. There is often too much theory in the design of fire-resisting buildings. Fire is a terrible master, but in it Dame Nature will have her way, it is therefore no use romancing in matters of construction. It is now pretty well agreed that all important or business premises, especially those abutting on public thoroughfares, should be reasonably fire-resisting, yet we frequently find them supported on the ground-floor entirely on cast-iron columns or steel stanchions. The effect of this in the event of a fire is for the whole building to collapse like a pack of cards. It may be said that architects are to blame for this; but it is not so. From what I know of architects, I do not think there is one who, in designing a building, would on his own intuitive knowledge of design ever produce a building standing apparently on plate-glass. This iron and plate-glass is one of the signs of the times—one of the phases in the history of architecture of the 19th century. The busy city man, in his instructions to his architect, insists on having "all window," and he has to have it. Therefore, that material which

will bear the greatest load on the smallest section must be used for supports, and for the rest glass, for which there is no substitute. But, unfortunately, both these substances are not safe under fire. Here, however, is where the skill of the architect must come in, and here we must rely on our actual experience in fires, noting the effect on building materials and on well-conducted and authentic experiments. I think, further, that at this time, it is peculiarly opportune to refer to fire-resisting building, for our methods of construction are altering every day, and if they are so altering, they may as well alter in the direction of safety. Science has yet a big field before it; but there are already many materials in the market of which we can take advantage in constructing fire-resisting buildings, but more efficacious ones are needed. Everyone who has noted the great change that has come over building material during the last 25 years, and of the wants of the general public, cannot, I believe, help coming to the conclusion that, sooner or later, some of our well known and much used materials, such for instance, as wood and common lime plastering, will become more scarce, and may to a great extent drop out altogether. Already other materials are taking their place. Wood has two great faults (though I am bound to say it has many virtues): it is very inflammable, and it is highly susceptible to wet and heat. Schemes have been tried with a view to render wood less inflammable; but before we can consider our buildings fire-resisting, much more must be done in that direction—that is to say, if wood be used. I alluded earlier in this address to the "rush of business," and it is here where wood fails us: our clients will not wait; they must have their buildings finished quickly, and expect them to be quite dry in no time, forgetting that the materials of which they are built are mixed with water. If we were like the shipbuilders, we could rivet iron plates together, and there you are finished, and as dry as ever it will be; but we have not quite come to that. The wood fittings are fixed while the building is reeking with moisture, and having had time to imbibe a quantity of this moisture, which expands the fibres of the wood, the heating apparatus is then lighted up, and the woodwork shrinks often to a wreck. It is quite clear that, under these circumstances, neither of these materials (wood and lime plaster) meet the demands of ordinary practice—wood, on account of its inflammable nature and instability, and lime plaster on account of its weakness and slow-setting. There are, as we know, many excellent quick-setting plasters in the market; but then we frequently lay this on the wooden laths, which in their turn are upheld by wooden struttings. In case of a conflagration all this ends in disastrous results—indeed, we may go further, and say a great many of the usual modes of construction are wrong, for do we not imbed floor, roof, and other timbers in the walls, where they rot?—and do we not form cavities between floors and ceilings, hollow partitions, skirtings, &c., which form excellent channels for fire? Much of this can be avoided by using a more solid form of construction; but this means more cost. It is the difference between good work and jerry work, and the public, after all, have it very much in their own hands to decide. I think all buildings should be built reasonably fire-resisting, especially public buildings, business premises, and country mansions. There seems to have never been a public building so reasonably fire-resisting as the Colosseum of old Rome, and although such a building is unlikely to be built in this age, yet its lessons should not be lost upon us. A building of to-day would be more composite in its materials; but, take my word for it, simplicity in materials, as in details, is often the secret of good design. It is distressing in the extreme to hear of public buildings being destroyed by fire, probably carrying with it some loss of human life; of immense places of business reduced to a heap of ashes, dislocating trade, and throwing scores of people out of work at a moment's notice; of some old ancestral mansion engulfed in the same fury, destroying in its irresistible force not only the building, but at the same time priceless works of art that are lost for ever. It is time, therefore, that more attention was given to fire-resisting building, even in a small way; and if wood is still to be used, it must be rendered entirely non-inflammable, and which must not much increase its market value or render it unworkable on the bench; or if wood cannot be so treated, then some

other material is wanted to fill up the missing link—some material that will be easily worked into all the varied uses to which we now put wood, such as our doors, windows, staircases, and innumerable other things. It must not only be non-inflammable, but must be of such a nature as will admit of its being worked into all the uses I have indicated, and also to be adaptable to all the alterations that occur in ordinary life, such as the alterations of buildings, or even the alteration of a door, or a window, or making a new way through a partition, &c. Wood lends itself easily to all these alterations. It is owing to this very word "alterations" that so many schemes now in the market for fire-resisting purposes fail; but that fatal word "alterations" must be reckoned with, for although the quality of being fire-resisting is a most important question, yet it must go hand in hand with ordinary usefulness, for buildings change owners, and often uses, and alterations become inevitable. The new material, if, indeed, we are to have one, must have a further quality beyond being fire-resisting; it must be proof against all influences, as to wetness or dryness, it must not shrink when the fires are lighted, or swell in a damp building; for, as I have said before, men will not wait nowadays for natural materials to season. How different all this is from the time in which they took to erect the mansions of the time of Elizabeth or James, Burghley, Montacute, Crewe, Audley End, Burton Agnes, and many others, in which twenty years were frequently spent in the erection and completion of these houses; but, then, look at the glorious results! If wood ever ceases to be one of our prime materials in building construction, it will be with a great twinge of regret that we shall part company with it, for has it not been associated with us since time was? Have we not fashioned our dear old British oak into all the uses of our lives?—do we not look with pardonable pride on its sympathetic grain as it incases our cosy panelled rooms, and think of its great traditions immutably bound up with some of the most glorious events in our national history? I do believe, fire-resisting considerations notwithstanding, that the oak will never leave us. There is another circumstance in our practice I must refer to. I allude to the testing of materials. The scope of this subject is endless, as all experimenters know. It is too vast a subject to be undertaken by a private individual, and no Government will undertake it. We have not the advantages that our friends the civil engineers possess in frequently having the wealth of a huge company behind their backs to conduct experiments without limit. No, our works are not of such a colossal size as our friends', and will not justify such an expenditure. How, then, can this thorough, far-reaching, and absolutely authentic series of experiments be carried into execution? There are, and have been, men who have devoted much expense and time to these matters, and to whom we are much indebted; but it is frequently fragmentary, and not easy to reach. There has been no thorough series of experiments for architects on materials in purely architectural construction. The Institute have very lately carried out some experiments as to the strength of brickwork, &c., which are most valuable; but I do not think the expense of the system I am now foreshadowing should fall on only a part of the members of our profession. I think a much greater grasp should be taken of the situation. All our building materials, as used in the ordinary building manner should be subjected to exhaustive tests of every kind, not only with regard to strength and endurance, but also to that "fire-resistance" to which I have before alluded. I do not mean that every piece of brick, stone, concrete, wood, or iron should be tested, but sufficient experiments be carried out to establish reliable data. All this would be a matter of hard facts; there would be no question of design, or other debatable ground, to interfere with the steady carrying out of this scheme. After we are in possession of the mass of facts such a scheme would bring out, we could, from knowledge then acquired, design accordingly. And who can tell what school of design or style of architecture this would produce? But, as I said before, all this will cost money, and it will be continuing expenditure. I am not going to say who is going to move first in this matter, or to say how it is to be brought about. I shall leave that to the collective wisdom of the members of our profession. All I would suggest



is, that in such a scheme the control should be in the hands of the Institute, and all members of the profession, whether members of the Institute or not—all members worth the name—should contribute in annual subscriptions in such a sum as to make it worth while for the best men giving us the benefit of their services.

#### SIR WOLFE BARRY ON LONDON TRAFFIC.

THE 145th session of the Society of Arts was inaugurated on Wednesday night by an address from Sir J. Wolfe Barry, F.R.S., K.C.B., the new chairman of the council, on the "Internal Traffic of London." In his opening remarks, the chairman discussed the factors which have led to the enormous expansion of the traffic in London streets during the last thirty or forty years. The pressure on London streets was, he said, getting yearly heavier and heavier, and becoming more and more unmanageable. Considering the new streets and widenings of thoroughfares effected in the last fifty years with the view of facilitating the constantly-growing streams of traffic, he remarked on the smallness of the mileage and capital expended as compared with the outlays of railway and tramway companies. In the matter of street improvements in London, there was an absence of grasp of a large subject, and in the history of the past 40 years we looked in vain for any new arterial thoroughfares traversing inner London from end to end and proportioned in width to the demands upon them at different parts of their route. On the contrary, in the new streets, as in the old, the nearer they were to the heaviest of the traffic the narrower they were in absolute dimensions. Cheapside, Fleet-street, Piccadilly, the Strand, Marylebone, and Euston roads remained very much as they were 50 years ago, when the traffic was a mere fraction of what it is now. But most, at least, of modern street improvements seemed piecemeal and patchwork enterprises narrowed to the smallest dimensions that would pass muster, and without any but the most meagre provision for the future, or, except in the case of Regent-street, the slightest attempt at systematic artistic treatment. To meet the traffic of London it was not so much additional railways, underground or overground, traversing the town and connected with the suburbs, that were wanted as wide arterial improvements of the streets themselves. Strictly urban railways only tended to add to the congestion from the point of view of both urban movement and suburban influx. Street improvements in London should be considered as a whole and in a large-minded way, unless we were to be doomed to perpetual disappointment. A scheme of new main thoroughfares of adequate width for present and future traffic should be laid down, and realised as time and finance permitted. There should be continuity of effort towards radical amelioration by the construction of great main lines of through communication as distinguished from merely local improvements, and all local improvements should be devised so as to form parts of a harmonious whole. Apart from wide streets, a matter which had been too much lost sight of was the provision of means for allowing the north-and-south traffic to cross the east-and-west traffic with the least possible confusion. If some means could be devised for the crossing of north-and-south traffic over or under that going east-and-west at places like Hyde-park-corner, Piccadilly-circus, Ludgate-hill, and Wellington-street, the relief to the main thoroughfare at these points would be enormous. The results would be well worth the expenditure, heavy though it might be, and there was nothing impracticable in the suggestion. The Euston-road, Oxford-street, Holborn, and Cheapside, and the Strand (including Fleet-street, Ludgate-hill, and Cannon-street) were all ludicrously inadequate. The Oxford-street route was fairly adequate as far east as Edgware-road, but from that point a radical improvement, either by means of important widenings or by a new street, was wanted, and should be carried through the City so as to connect at its eastern end with the Mile End-road. In the case of the Strand, Fleet-street, and Piccadilly the only course was a systematic widening of all three thoroughfares, with a broad, diagonal street from Piccadilly-circus, *via* Coventry-street, to join the widened Strand near Wellington-street. Another want that was beginning to be pressing was a route for bicycle traffic. They wanted one new and

spacious thoroughfare east and west, about 120ft. wide. It might leave the Bayswater-road near Westbourne-terrace, follow the line of Wigmore-street to Russell-square behind the British Museum, and thence run to near Broad-street Station. In addition, there should be two or three thoroughfares north and south, slightly less in width, which should be carried over the east and west route by bridges at the points of intersection, and all these new routes should have a raised or sunken road for bicycles. A street 120ft. wide and four or five miles long must mean many millions of money, though the recoupment from the new frontages would be very important. The heavy expenditure should not affright us, for it would be repaid by the increased facilities both for trade and pleasure.

Sir O. Tudor Burne moved, and Sir F. Bramwell seconded, a vote of thanks to Sir Wolfe Barry for his paper.

#### PLYMOUTH MARKETS.

OF late years Plymouth has devoted itself to a systematic improvement of its market accommodation. With a splendid site in the heart of the town, and easily accessible, the aim has been to make the premises all that could be desired from the point of view of both salesman and purchaser, and the result, as far as it has been attained, has been excellent.

Thirteen years ago the first section was started, and since then a splendid corn exchange, lofty weighing-house, inferior to none in the West of England, and stalls that have been erected, while a fine broad street, connecting Cornwall-street with Old Town-street, has been made. On Tuesday, by the opening of the new fish and poultry section, another step in the completion of the scheme was registered, and the Market Committee and the contractors (Messrs. W. Trevena and Son) are alike to be congratulated on the success of the work on which they have been engaged.

The section as far as at present finished is 170ft. in length, while the breadth is 41ft. 6in. Down the left-hand side, coming in from Drake-street, are a series of stalls for poultry and fish on the latest plans. They are built of white Staffordshire glazed bricks with brown glazed bands, and are admirably fitted up with every facility for purposes of cleanliness. Slabs of beautiful marble are fitted, together with revolving shutters and lifting sashes, glazed with plate glass. In the interior there is a fine trough, with water, and a fireplace; and the stalls, which are double, with a single door, measure 24ft. by 12ft., or each section 12ft. by 6ft.

The main walls of the building are of brick, and the whole is covered by an excellent roof. One side of the roof is of slate, while the other is of patent waterproof glazing, in the fixing of which into the sashes no putty whatever has been used, lead being substituted. An ingenious method of ventilation has been adopted, and the lofty roof is supported by steel spans of great strength. The floor is of asphalt laid on concrete, and is so arranged that the process of washing may be exceedingly easily performed. On the left hand outside the stalls a large gutter covered by grating runs, and into this all water and dirt may be swept, the whole emptying into the main drain. Down the centre of the building are movable stalls, uncovered, for vegetables and general farm produce, and these are fixed with iron shores. At present the light is supplied by gas; but as soon as the general lighting of the town by electricity is consummated the better system will be instituted.

The Market Hotel, the license of which the corporation allowed to lapse, has been turned over to the inspector of weights and measures, and here splendid offices have been fitted up for the accommodation of this important branch of the municipal life of the town.

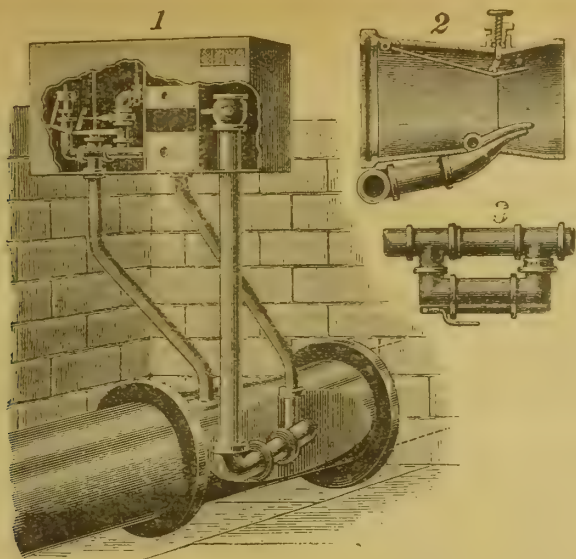
As soon as possible the contractors will start on the other sections of the market, and here, where the fish shops now stand, will be erected killing and cleaning-houses for poultry, and other accommodation necessary to the large number of business people who will make use of the premises. The old Corn Exchange, beside the New Market Hotel, will be pulled down, and the section just completed will be extended to a total length of 212ft. Thus the whole of the site from the back of the above-mentioned hotel to the end of Drake-street will be under cover, and the market will be undoubtedly the finest in the West of England.

Messrs. Trevena are well within their time in the erection of the fish and poultry section, and it is hoped that the whole market will be ready to accommodate the West of England Fat Cattle Show of 1899, for there will be unrivalled facilities for holding exhibitions of all kinds under the vast roof.

#### BOOKS RECEIVED.

*Redress by Arbitration: a Digest of the Law Relating to Arbitration and Awards.* By H. FOULKE LYNCH, Solicitor. Third edition, revised by D. F. DE L'HOSTE RANKINE, M.A., LL.D. (London: Effingham Wilson, Royal Exchange).—This is a third and revised edition of the late Mr. Lynch's work, in which the editor has brought the subject up to date by giving the most recent decisions. The division of the treatise is retained. Chapter I. deals with "The Submission" of the parties. By the Arbitration Act of 1889 it means a written agreement to submit differences to arbitration, whether the arbitrator is named or not. It must be signed by both parties. The other chapters deal with the arbitrators and umpire, their appointment, authority, remuneration, and proceedings; the award, its requisites, referring it back, setting it aside, enforcing it, &c. Each of these divisions of the subject is briefly explained, and illustrations are appended, thus rendering the book easy to the comprehension of any intelligent person. Architects and others connected with building contracts, contractors, and commercial men generally will find this digest of the law of much value. The work is clearly printed, and the marginal headings of each section and the alphabetical list of cases cited render this little book a complete summary of the law of the Act of 1889.—*The Essex Review* (Chelmsford: Edmund Durrant and Co.) completes in the quarterly number just published its seventh volume. The current of this interesting quarterly record of all matters of permanent interest to the county contain articles on "The Church Bells of Essex," by the Rev. Cecil Dering and Mr. Edward P. Wells; one on "Wanstead Manor and Palace," by S. C. Tasker; and a third on "The Lord Lieutenants of Essex," by Edwin A. Fitch. The old numbers of the series will become increasingly valuable to antiquarians and genealogists as time goes on.—*Pumps: their Principles and Construction.* By J. WRIGHT CLARKE. Illustrated. (London: B. T. Batsford.)—This little book is a reprint of a series of lectures delivered to students by the author at the Regent-street Polytechnic, and published in the *Plumber and Decorator*. The author treats his subject in an elementary manner, suitable for workmen or students, avoiding mathematics or formulae as much as possible, and the work is illustrated with numerous diagrams.—*Land and Engineering Surveying for Students and Practical Use.* By T. BAKER, C.E. Seventeenth edition, revised and extended by F. E. DIXON, C.E., Assoc. M.I.C.E., &c. With numerous illustrations. (London: Crosby Lockwood and Son.)—This very useful and popular treatise on land surveying, levelling, and railway surveying by the late Mr. Baker has been revised and brought up to date by Mr. Dixon. Many of our practising surveyors owe a deep debt of gratitude to this elementary treatise for its clearness and simple exposition of the principles of land surveying. Mr. Dixon, while retaining the main features, has revised the text and added chapters on Mensuration, Trigonometry, Logarithms, Levelling. Many new illustrations have been added, and this new edition of an old friend will be found of value to all students who are about to embark as surveyors or engineers, or studying for the exams. of the Institution of Surveyors, which place it on its list of recommended books.—*Electrical Engineering for Electric-Light Artisans and Students.* By W. SLINGO and A. BROOKER (London: Longmans, Green, and Co.).—is a revised and enlarged edition of a deservedly popular textbook on electric lighting and engineering. It covers the syllabus of the City and Guilds of London Institute. Its authors have extended the work to include all that is necessary for those engaged in electric lighting industries, as well as those having less knowledge, but who have the supervision of electrical machinery. To all students, those engaged in such work, engineers and naval officers, managers, and municipal authorities, the work will be found of value. The text is copiously illustrated by clear diagrams and engravings and well-drawn delineations of





## CHIPS.

The new technical schools and free library at Northwich, opened last week, have been built from designs by Mr. E. T. Worth, A.M. Inst. C.E., until recently surveyor to the urban district council, who acted as honorary architect. The contractors were Messrs. Clarke and Son, of Middlewich. The style adopted is English Renaissance, and the facings are of red Ruabon bricks, with terracotta dressings, supplied by Mr. J. C. Edwards, of Ruabon.

The work of laying tramway lines through the central thoroughfares of Norwich has been in progress for some six months past. There will be termini on Earlham-road (near the cemetery), Dereham-road, Silver-road, Thorpe-road, Trowse Railway Bridge, Mousehold Heath, Aylsham-road, Newmarket-road, and City-road, and all the lines will converge near the General Post Office. Electric power will be used for traction.

The deadlock as to the election of mayor at Plymouth, arising out of the close balance between political parties, was removed on Friday, when Mr. J. A. Pethick, builder and contractor, was unanimously elected to the chair.

The sales at the Mart last week, as registered at the Estate Exchange, amounted to £68,775, and to this must be added the result of the sale, at the Cannon-street Hotel, of Mr. E. T. Hooley's Wiltshire and Essex Estates (£137,140), making a gross total of £206,515. Last year the returns for the corresponding week were £86,521, so that 1898 shows a distinct advantage, and some of the leeway lost in recent weeks has been practically regained.

Mr. Alderman George Kett, the newly-elected Mayor of Cambridge, is the senior partner in the firm of Messrs. Rattee and Kett, builders of that town. His father, who died in 1872, joined Mr. Rattee in business in 1848, and the firm have carried out many important contracts in the university town and throughout the country. Mr. Kett, who is in his 62nd year, served as Mayor of Cambridge in 1891, and has been a member of the town council for 16 years past.

New board schools in Crescent-road, Dukinfield, were opened last week. They are Elizabethan in style, two stories in height, the large hall for boys and that for girls being 65ft. by 28ft., while that for infants in the one-story detached building is 54ft. by 28ft. Messrs. Eaton, Sons, and Cantrell are the architects, and Messrs. Jabez Gibson and Son the contractors. Accommodation is provided for 900 scholars.

## WATER FILTERING APPARATUS.

THE method of filtering water patented by Mr. S. McElroy, designing engineer of the Brooklyn Waterworks, is intended to supersede the expensive appliances, by providing an apparatus in which the force of gravity becomes the agent of applying air or antiseptic solutions to the water running in a main. In the line of the main the patentee places the induction-valve shown in Fig. 2, the casing of which is contracted between its ends, so as to produce an increased velocity of water in the throat thus formed. This valve is further provided with inlets for the entrance of air, and of antiseptic gases or solutions, and with a deflecting-plate adjusted by a screw-rod to promote the increased velocity of the water. A casing, as shown in Fig. 1, is placed near the induction-valve, and is provided with an air-chamber properly connected with an inlet to the induction-valve, and with a check or stop-valve to guard against reactions. The casing is furthermore provided with a solution-chamber, and with a mixing-chamber, also connected with the induction-valve and guarded by proper check and stop valves. The solution and mixing chambers supply the antiseptic gases as they are required. A pipe is applied to the main, as shown in Fig. 3, for the purpose of collecting the organic matter with which the water may be impregnated. In operation the water flowing through the main will produce a draught, which draws through their respective pipes the air from the air-chamber in the casing, and the antiseptic solutions stored in the solution-chamber. The impurities of the water coming into contact with these corrective agents will be destroyed or neutralised.

The King's Norton Board of Guardians decided at their last meeting, after a long discussion, that Messrs. C. Whitwell and Son be appointed architects for the contemplated workhouse extensions, erection of casual wards, and the construction of an underground cistern at the remuneration of 5 per cent. on the contract sums, &c.

The memorial-stone of a new Baptist chapel for Longsight, Manchester, was laid on Saturday. The new building, which will accommodate over 500 persons, has a frontage to Slade-lane, and will be Gothic in character. The architect is Mr. Thomas D. Lindley, of Ashton-under-Lyne. At the rear of the chapel there will be a lecture-room. Both the chapel and lecture-room will be supplied with the electric light, and the total cost of the land and buildings, including furnishing, will be £3,700.

At the last meeting of the Ipswich Corporation it was announced that Mr. T. H. Tacan, the present high sheriff of Suffolk, had offered to give to the town a drinking-fountain and cattle-trough, to be erected near the Cattle Market at the junction of Princes-street and Portman-road. The design, prepared for the donor by Mr. F. Wheeler, F.R.I.B.A., of 6, Staple Inn, E.C., showed an erection of Portland stone, with granite base and basin. The gift was accepted with hearty thanks.

The new west porch of Manchester Cathedral was formally dedicated and opened on Saturday. The porch, which has been fixed in commemoration of the 60th year of the Queen's reign, is to be used on all State occasions. For one of the niches a statue of her Majesty has been designed and in part executed by Princess Louise, and statues representing the patron saints of St. George, St. Andrew, St. Patrick, and St. Peter are to occupy the other vacant niches. The arms of the county of Lancaster and the city of Manchester surmount the porch.

## Building Intelligence.

BRISTOL.—New premises are being erected by Messrs. Ford and Canning in Baldwin-street, to be known as Canada House. The first portion of the block has already been built, and the remainder, which will occupy the circular corner and extend into Queen Charlotte-street, will be ready for occupation by the end of the coming spring. The style of the building, which will afford offices for professional men, is more or less a continuation of the present block—that is, a phase of Flemish Renaissance. The materials used for the front are Cattybrook face bricks with dressings of orange rubber brick and freestone. The roof will be of slate. The floors consist of basement (to be used as a bonded cellar), ground, first, second, third, and attic. The architects are Messrs. Gingell and Bond, of Alliance Chambers, Corn-street, Bristol, and the work is being carried out without the aid of a contractor, Messrs. Ford and Canning's own men being employed, under the superintendence of a building manager. The cost of the whole block will be about £10,000.

CARDIFF.—A new Custom House at the Docks was opened last week. The building adjoins the offices of Messrs. Cory Brothers and Co. at the lower end of Bute-street. The front is of Portland stone, and the side walls are of glazed bricks, relieved with Portland stone dressings. The total depth of the building is 94ft., and behind it is a yard 40ft. in length. The frontage to Bute-street is 40ft., and the elevation is the same. The premises are floored throughout with wood blocks, and illuminated with gas. Pneumatic bells are also fitted all over the building, which is heated by means of hot-water coils. The staircases are of stone with ornamental rails. The various offices are distributed as follows:—On the ground floor, chief preventive officer and surveyor's office, book-room, Queen's warehouse, and boat-watchers' room. On the second floor are the long room for general business, fitted with counters, with sabbic tops and panelled fronts; collectors' room, test-room, and store-room. The top floor is reserved for the caretakers, and in the basement are the heating chambers. The whole building, which was erected by Messrs. William Thomas and Son, contractors, Tresillian-terrace, Cardiff, from plans drawn by Mr. Henry Tanner, F.R.I.B.A., H.M. Office of Works, Whitehall, London, cost £5,000.—The Cardiff School Board are proceeding to erect a block of schools to be known as the Marlborough Road Schools, to cost over £19,000, with provision of carpenters' shop, laundry, cookery kitchen, and caretaker's house. The schools will accommodate 1,360 children exclusive of central halls. They are designed in the Renaissance style with red brick facing freestone dressings. The architects are Messrs. Hatherson, Fawcner, and Groves, Pearl-street, Cardiff, and High-street, Newport, the contractor being Mr. David Davies, of Cardiff. These are the first schools being built in Cardiff on the central-hall system, the existing ones being principally on the corridor system, of which there are some very good examples by the different Cardiff architects.

COLINTON, N.B.—St. Cuthbert's Episcopal Church, which was built in 1889, from designs by Dr. Rowan Anderson, of Edinburgh, has recently been enlarged, furnished, and decorated. Originally the church consisted of a nave, chancel, and tower. The additions include a transept on the south side, an organ-chamber adjoining it, and a bell-chamber on the top of the tower. The transept opens upon the nave through two 15th-century arches of red stone, and increases the accommodation by fifty sittings, the total number of seats being now about 180. The decoration of the church has been carried out, from designs by Dr. Rowan Anderson, by Mr. Powell, Lincoln. The walls of the nave above the dado, which is panelled in a chocolate tint, are painted in greens, diapered with a darker shade. Around the top of the walls is a broad scroll, with Scripture texts executed in black letters on a cream ground. The timber of the open roof is painted red and diapered in green, while the plaster between the ribs is cream colour, and diapered in red, blue, and green, in floral devices. The chancel is decorated in a somewhat richer fashion. The walls are a grey green, with red and yellow diaper work, while at different points angelic figures, carrying scrolls, are introduced. On each



side of the chancel window are figures representing the Annunciation. On the ceiling between the ribs is a flowing ornament with panels and shields containing sacred symbols. The chancel stained-glass three-light window of silvery tint is a votive offering. The subject is the Resurrection. In a small side window is a figure of St. Cuthbert, the patron saint of the church. The only stained-glass window in the nave contains figures symbolical of Hope and Love. The altar and reredos are of carved oak, richly gilded. The reredos has three panels, which it is intended to fill in with sacred pictures. A Celtic cross, set with large cairngorm crystals, upon the altar, and the candlesticks alongside of it, are a special gift. The chancel-screen is of oak, carved and gilded; the vestry and organ-chamber are separated from the church by a similar screen; and the oak pulpit, hexagonal in form, is also painted and gilded, the panels being filled in with tracery and shields containing sacred monograms. The belfry addition to the tower is of wood and lead. In it has been placed a peal of three bells.

**HOLBECK, LEEDS.**—A suburban theatre to be known as the Queen's is approaching completion, and will be opened on Christmas Eve. The situation—at the corner of Jack-lane and Meadow-road—has an area of nearly 1,000 square yards, with streets on practically all sides. The façade has a semi-circular frontage to the angle, the red brick and stone dressings being crowned with a dome. The architects are Mr. W. Hope and Mr. J. C. Maxwell, of Newcastle-on-Tyne. A good part of the seating accommodation is provided for more than 3,500 persons. The pit and gallery are planned to accommodate rather more than two-thirds of the entire audience. Ornate fittings are promised, along with heating appliances, fire-proof floors and staircases, electric light (the wires for supplying which have been already laid), also refreshment rooms. The dimensions of the stage are 66ft. by 45ft., the proscenium by 32ft. across, and on one side 16 dressing-rooms are placed. Direct exits from the theatre are arranged from each of the three floors of the house. Mr. S. F. Davidson, of Newcastle-on-Tyne, is the contractor.

**LEEDS.**—A new bank in Park-row, for Messrs. Wm. Williams, Brown, and Co., was opened on Monday. The premises have been erected from the designs of Messrs. Alfred Waterhouse, R.A., and Sons, and cover an area of 100ft. by 80ft. From the street level to a height of 26ft. the exterior is of polished grey Dalbeattie granite, relieved with courses and pillars of red granite. Above the granite the structure is faced with glazed buff terracotta. Angle pavilions rise to a height of 90ft. above the street. The bank, a lofty apartment, is lined throughout with faience. In the basement, covering an area of 75ft. by 50ft., are the strong-rooms. These have arches of fire-brick, upon which rests solid concrete 4ft. in thickness. The floor is likewise of concrete. The bullion-room is lined throughout with hardened steel plates. On the upper floors of the building are suites of offices, some 50 rooms in all. The ornamental ironwork has been made by Messrs. Hart, Son, Peard, and Co., and the passenger lifts by Messrs. R. Waygood and Co., London.

**LONGTON, STAFFS.**—The church of St. Mary and St. Chad, Sandford-hill, Longton, was consecrated, on Wednesday week, by the Bishop of Lichfield. The church is Early English in style, and is built of red brick with stone dressings. It consists of nave of five bays, chancel of two bays, Lady-chapel on the north side of chancel, and an organ chamber on the south side, at present containing a small new organ. The architect is Mr. J. Martin Brooks, A.R.I.B.A., of 35, Wellington-street, Strand, W.C., and the builders are Messrs. Rudd and Son, of Grantham. The first cost was estimated at £3,500, with accommodation for 500. The plans provide for enlargement at a total expenditure of £5,500.

**LOWESTOFT.**—New science and art schools in Clapham-road were opened last week. The buildings have been designed by Mr. George W. Leighton, architect, of Ipswich, in the Renaissance style, with a modern rendering of the collegiate type. The external walls are of Suffolk red bricks, with Monk's Park Bath stone dressings. The accommodation on the ground floor for science teaching provides two lecture-rooms, 26ft. by 25ft., and 24ft. by 20ft., divided by a revolving shutter. The practical physics room is 22ft. by 30ft. The large chemical laboratory is 30ft. by 25ft.; it has windows and roof-lights on three sides, and the walls are lined

with glazed bricks. The woodwork shop is 35ft. by 26ft., and is fitted with Sloyd benches. The cookery school is 31ft. by 22ft., and in connection with it there is a scullery. The principal's room is large, and could be used as a committee-room. The art rooms are situated on the first floor. The elementary art room is 25ft. by 36ft. This is fitted with single desks quite separate for each pupil. The central room, 24ft. by 45ft., is divided by screens for elementary models, elementary casts, advanced casts, and models. The room set apart for drawing from the antique, from the life-model, and for painting is 20ft. by 31ft. The classroom for modelling in clay is 22ft. by 31ft., and the room for building construction and machine construction is 39ft. by 33ft. The fittings throughout have been specially designed by the architect, and have been made in the builder's workshops, of Oregon pine. The general contractor has been Mr. Arthur Bedwell, of Lowestoft.

**NEW CLARIDGE'S HOTEL.**—Claridge's Hotel, in Brook-street, Grosvenor-square, which has been rebuilt on an enlarged site and scale, was opened on Saturday. It consists on plan of a hollow square, the double archway entrance from Brook-street leading into a central courtyard, laid out as a winter garden. The red facing bricks and the rubbers for gauged work were supplied by Messrs. Thomas Lawrence and Sons, of Bracknell, Fletton bricks being used for backings. The dressings are of red Mansfield stone. The reception rooms have parquet floors, and the chief corridors are paved with mosaic. The hotel is nine stories in height, and contains upwards of 400 rooms. A suite of Royal rooms is provided, decorated and furnished in the Georgian style, and with private staircase and entrance from Davies-street. Mr. C. U. Stephens, of Hans-place, is the architect, and the contractors were Messrs. Trollope.

**NORTH SHIELDS.**—The Queen Victoria school, in Lovaine-place West, erected by the Borough of Tynemouth School Board, was formally opened on Friday. The buildings consist of eight classrooms, each 24ft. by 24ft., capable of seating 60 children in the mixed department, and, in the infants' department, 72. The present buildings form only two-fifths of the whole scheme. Playgrounds and sanitary arrangements have been provided for the complete school for 1,350 scholars. The designs for the school were prepared by Messrs. Marshall and Dick, architects, of Newcastle-on-Tyne, whose plans were selected in competition for the work, and the contract for the building has been carried out by Mr. Joseph Elliot, of North Shields, while the heating apparatus has been supplied by Messrs. Emley and Sons, of Newcastle. Messrs. Doulton, of London, supplied the terracotta. The clerk of works was Mr. W. Moore, the superintendent architect Mr. C. T. Marshall, M.S.A., of Newcastle and North Shields.

**PADDOCK.**—The Society of Friends' School, adjoining the meeting-house at Paddock, near Huddersfield, was opened on Saturday. The old school, which was the original meeting-house, built in 1760, has been pulled down, and the new premises have been erected on the site and land extending beyond. The assembly-room is 36ft. by 30ft., and a movable platform is provided. The entrance-hall, 10ft. wide, extends the full width of the school, and contains a staircase leading up to classrooms on the first floor. The total cost amounts to £1,200. The work has been carried out from plans prepared by and under the superintendence of Mr. J. Berry, architect, 9, Queen-street, Huddersfield.

**TISBURY.**—On the Feast of St. Winefred, the Roman Catholic Bishop of Clifton dedicated the new Church of the Sacred Heart of Jesus at Tisbury. The church occupies a prominent position on the east side of the road from the railway station, close to the entrance of High-street. It has been erected by Mr. J. H. Kitch, builder, of Bridgwater, from the designs of the Very Rev. Canon Scoles, of Yeovil. It consists of a nave 55ft. long by 22ft. broad, a sanctuary 18ft. square, and a Lady-chapel, with two bays of an aisle. There is also a sacristy, with heating chamber attached. The church is built of Tisbury stone, given by Lord Arundell of Wardour, the interior masonry being of Bath stone. The style is Early English. The cost of building, exclusive of fittings, was close upon £2,000.

**WINCHESTER.**—The repairs to the roof of the Cathedral, begun more than two years ago, have

proved more expensive than was anticipated, and an appeal for further subscriptions is being circulated throughout the diocese by Dean Stephens. The means adopted for strengthening the roof of the nave were designed by Mr. T. Colson, of Winchester, the Cathedral architect, and were approved by Sir J. Wolfe Barry. All the repairs of the roof and the more difficult operations on the stone vaulting of the nave, which was in a critical and dangerous condition, have been executed; but there are several works still to be taken in hand, the most urgent of which is the restoration of the south aisle of the nave. When these have been finished, the whole of the main fabric of the cathedral will have been put into a state of sound and solid repair. The present financial position is thus summarised by the signatories to the appeal:—"We have no fabric fund to draw upon, and the estates from which our revenues are derived have been reduced to about half their former value through agricultural depression; but we have undertaken to contribute out of our caputal incomes £1,350. About £7,000 has also been raised by public subscription, but a further sum of £5,900 is still required, partly to extinguish the debt, amounting to about £4,500, due to the contractor and architect for work already completed, and partly to meet the cost of work not yet commenced but urgently needed."

## CHIPS.

The Diss Urban District Council have elected Mr. S. Lait, of that town, surveyor and inspector of nuisances. Four candidates in all attended.

A unique piece of ecclesiastical furniture distinguishes the recently-opened Church of All Saints, South Merstham. It consists of a font, the basin of which is formed of a *Tridacna gigas* shell brought by Mr. William Willox, one of the churchwardens, from the Philippine Islands. It is believed there is no other instance of one of these shells being thus utilised in England, though there are fine examples in the Church of St. Sulpice, in Paris, and the Church of St. Eulalia, at Montpelier.

The Bishop of Southwark opened a new school-chapel at Lewisham on Wednesday week. It has been built at a cost of £1,200 from plans by Mr. W. A. Purdie.

The Lutterworth District Council have instructed Messrs. Simpson and Harvey, engineers and surveyors, Leicester, to report on the best available method for disposing of the sewerage of the town.

The will of Mr. Alfred Heales, of Leasons, Chiselhurst, and formerly of Doctors' Commons, Proctor, F.S.A., Hon. A.R.I.B.A., has been proved, the value of the estate being £46,884 3s. 5d.

The second half-yearly local examination of the Royal Institute of British Architects, London, held under the auspices of the York Architectural Society, took place on Tuesday, Wednesday, and Thursday in last week, in the lecture-room of the exhibition at York.

The Board of Trade have under consideration a scheme for the erection of a new stone pier at Salt Island, Holyhead, at a probable outlay of £180,000 or £200,000, which will greatly improve the accommodation at the harbour for mail and passenger steamers.

Yarmouth Town Council have agreed to seek Parliamentary powers to borrow £53,000 for street improvements and for electrical extensions for tramways.

The Committee of the Birmingham Art Gallery have received an offer of valuable pictures from Mr. John T. Middlemore on the condition of the council erecting a gallery for the proper display of the works of art which it possesses and hopes to possess. He will give a number of works by Sir E. Burne-Jones and Mr. G. F. Watts. If the offer is accepted, Lady Burne-Jones will present Mr. Watts's portrait of her husband.

The new municipal buildings at Margate, erected at a cost of £3,000 on the site of the old market in Market-street, adjoining the town-hall, were opened on Tuesday week.

On Saturday, the 5th inst., the foundation-stone of the new water tower at the Bedworth Waterworks was laid by Mr. William Johnson, C.C., the chairman of the parish council. At the ceremony a silver trowel, suitably engraved, was presented by the engineer, Mr. H. Bertram Nichols, Assoc. M.Inst.C.E., of Birmingham. The works are being carried out by Mr. Amos Jenkins, of Southwell, Notts, whose contract amounted to £9,700.

Mr. Edward Boardman, F.R.I.B.A., has been re-elected an alderman of the Norwich Corporation, and at Southampton Mr. James Lemon, F.R.I.B.A., has been re-elected to the aldermanic bench.



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## ILLUSTRATIONS.

NEWEL STANDARD FIGURES, "SOUTH LYNN," PUTNEY HILL.  
— "ST. MONANS," WALTON-ON-THAMES.—NEW HOUSE AT EDWALTON.—SECOND PREMIATED DESIGN FOR PROPOSED SOUTHERN HOSPITAL AT CARSHALTON.—A GATE HOUSE AND OFFICE AT SEA GATE, LONG ISLAND.

## Our Illustrations.

NEWEL STANDARD FIGURES, "SOUTH LYNN," PUTNEY HILL.

THESE cartoons, by Mr. Fred Roe, of Hampstead, were designed for a house at Putney, now completed, for Mr. W. J. Lancaster. There is not much to say about them, as they are so well shown by our reproductions from Mr. Roe's admirable drawings.

"ST. MONANS," WALTON-ON-THAMES.

THIS drawing is of a wayside cottage, built of red brick and rough-cast. Messrs. Niven and Wigglesworth were the architects. The drawing was hung in the recent exhibition at the Royal Academy.

RESIDENCE AT EDWALTON.

WE publish this week an illustration of the above, for Mr. Wm. Wright. Edwalton is situated about four miles from Nottingham. The house contains three reception-rooms and fourteen bedrooms, and is designed in the Georgian style, the entrance-hall being panelled in oak in large squares; the main staircase is also in oak. The work has been carried out by Mr. Wm. Smith, contractor, Newark. The architects are Messrs. Brewill and Bailey, of Nottingham.

NEW SOUTHERN FEVER HOSPITAL, CARSHALTON: SECOND PREMIATED DESIGN.

THE Metropolitan Asylums Board awarded to the authors of the accompanying design, Messrs. Pennington and Son, architects, the second premium in the recent limited competition for this large hospital, and the drawings of this admirable scheme cannot fail to be of value and interest to the readers of the BUILDING NEWS. Mr. Henry Currey, F.R.I.B.A., was the professional referee. The general plan gives the key to the whole proposal, which comprises a series of double cottages and officers' quarters (illustrated by our single-page sheet), grouped very ingeniously, with reference to the administrative block, of which a double-page illustration is herewith given. The dormitories and day-rooms have a south aspect, with verandahs sheltered from the north. The house-mother's room is central, so as to supervise well both dormitory and day-room. The highest hospital authorities are unanimous in considering a one-story ward by far the best form adapted for obtaining purity of air, and as being most economical in construction,

as well as administration. None of the buildings in Messrs. Pennington's plan are less than 100ft. apart. The ward forms the important unit of a hospital, and so its contrivance assumes a vital importance when considering the scheme as a whole. Each dormitory is 48ft. by 20ft. wide, and is 12ft. high, giving 960c.ft. air space, and 8ft. lineal wall space for each patient. Farian cement, painted and varnished, is intended for all walls and ceilings, with round skirtings, angles, coves to ceilings. Floors of steel joists, and concreted, with air-space below, and covered with narrow boards secret-nailed; the areas under these floors covered with tar-paving to prevent damp rising. The windows to have double-hung sashes, and with transoms and fanlights to fall into glass-sided hoppers. The ventilation adopted in this design is promoted by placing the windows opposite each other, and on each pier a ventilator at the ceiling-level, and a specially-made hit-and-miss inlet ventilating grid under each bed, the vitiated air being extracted by flues formed in the central shaft, which, when heated by the smoke-flues, insures a constant up-draught, and in summer a Bunsen burner fixed at the ceiling-level is used for the same purpose. The sanitary turrets are disconnected by an open corridor, and can be reached from the airing-courts as well as from the dormitories. The fireplaces are central, and proposed to be faced with faience or glazed brickwork—a material used for the walls of sculleries, bath-rooms, w.c.'s, &c. Each ward has its own adjuncts, as shown; but at the east side of the main corridor connecting the buildings is placed a central scullery for general purposes of the wards. The isolation houses contain 36 beds—viz., two wards of eight beds, and two wards of six, one of four beds, and two of two beds. The dimensions of wards give in every case at least 150ft. super. floor space and 12ft. wall space. Their height is 12ft. throughout. With regard to the administrative block, its simplicity is its great recommendation, combined with economy of administration and ready access to all parts. The leading officials' rooms face the west, and they are in the front of the block, thus obtaining good views towards Banstead. The kitchen is located well, and the male and female staff are completely separated. The position of the laundry adjoins the female wing on the north. Fire-escape staircases are furnished from the first-floor rooms. The food is distributed by conveyances working from the kitchen by means of electric motors. All waste and soil-pipes are on external walls, and no drains pass under the buildings. Telephonic communication, of course, would be provided from each block to the administration building. The cubic feet contents of the buildings is 5,974,160, which, at 8d. per foot, exclusive of drainage, works out at £199,138.

## CHIPS.

The Dingwall School Board have resolved to build a technical school in conjunction with the academy, at a cost of £1,500.

Among the schemes for which Parliamentary powers are to be sought next session is a revival of the proposal to construct a railway between Stone Point and Totton near Southampton.

A stained-glass window, consisting of five lights and tracery, has just been placed in St. John's Wesleyan Church, Sunderland, as a memorial. The work has been designed and executed by Messrs. Powell Brothers, of Park-square, Leeds.

The Tyldesley, Atherton, and Leigh Rural District Councils and Lawton Parish Council have approved the Lancashire Light Railway Company's scheme so far as its affects their districts, the proposal being to connect Liverpool, St. Helens, Leigh, Wigan, Bolton, and intermediate towns by means of a gigantic tramways system.

A pro-cathedral for the Roman Catholics at Carnarvon is to be erected at a cost of not less than £10,000. Attempts will be made to secure a central site in the middle of the town. Promises of subscriptions amounting to £5,000 have already been received, and Mr. Farren, who partly owns extensive sett quarries in South Carnarvonshire, offered to supply all the stone necessary, for the cost of labour alone.

The joint railway station at Aberdeen is to be enlarged, and the main line approaches by rail from Ferryhill widened from two to four tracks. Plans have been prepared by Mr. Barr and Mr. P. M. Barnett, engineers-in-chief respectively to the Great North of Scotland and the Caledonian Railway Companies. Parliamentary powers will be sought to carry out the scheme next session.

## COMPETITIONS.

LEYTON.—A limited competition for public baths at Leyton has this week been determined. Mr. Lowland Plumble, the assessor appointed by the district council, has given his award as follows:—1st, "Economy No. 2," Messrs. Harrap and Duffield, 34, Queen-street, E.C.; 2nd, "Economy No. 1," Mr. J. Williams Dunford, 100c, Queen Victoria-street, E.C.; 3rd, "Q.E.D.," Messrs. Gordon, Lowther, and Gunton, Finsbury House, Blomfield-street, E.C. The competition was limited to the above mentioned. In concluding his report, Mr. Plumble says that "all the competing architects thoroughly deserve the thanks of the council for the painstaking, skilful, and intelligent way in which they have responded to the invitation to compete." The cost of the building will be £15,000.

SHREWSBURY.—At the annual meeting of the town council a special committee appointed by the council in regard to providing adequate accommodation for technical instruction reported that they had advertised for competitive plans to be sent in by architects in practice and residing within the county of Salop, the premiums offered being £20 and £10, to be awarded to the architects for the designs placed first and second respectively in order of merit, the decision of the committee to be final, and the designs, plans, specifications, and estimates to become the property of the corporation. If either of the architects who designs were selected should be chosen as architect, his premium was to merge in his commission, which commission was to be the usual fees paid in the district. In response to the advertisement, five sets of plans had been received by the committee, who had awarded the first prize of £20 for the plans submitted under the motto "Daylight," and the second, of £10, for the plans under motto "Sphinx." The envelopes would be opened and the names of the successful architects disclosed on the acceptance of the report by the council. The committee recommended that they be empowered to proceed further in this matter with the view of obtaining tenders for the work, and that a memorial be sealed and sent to the Local Government Board for sanction to borrow the necessary money. The consideration of the report was postponed, so that, for the present, the names of the successful competitors have not transpired.

WIVENHOE.—In the recent open competition for schemes of sewerage, sewage disposal, and water supply for the district of Wivenhoe, Essex, the schemes submitted by Messrs. Sands and Walker, civil engineers, Nottingham, have been selected as the best, and unanimously adopted by the council.

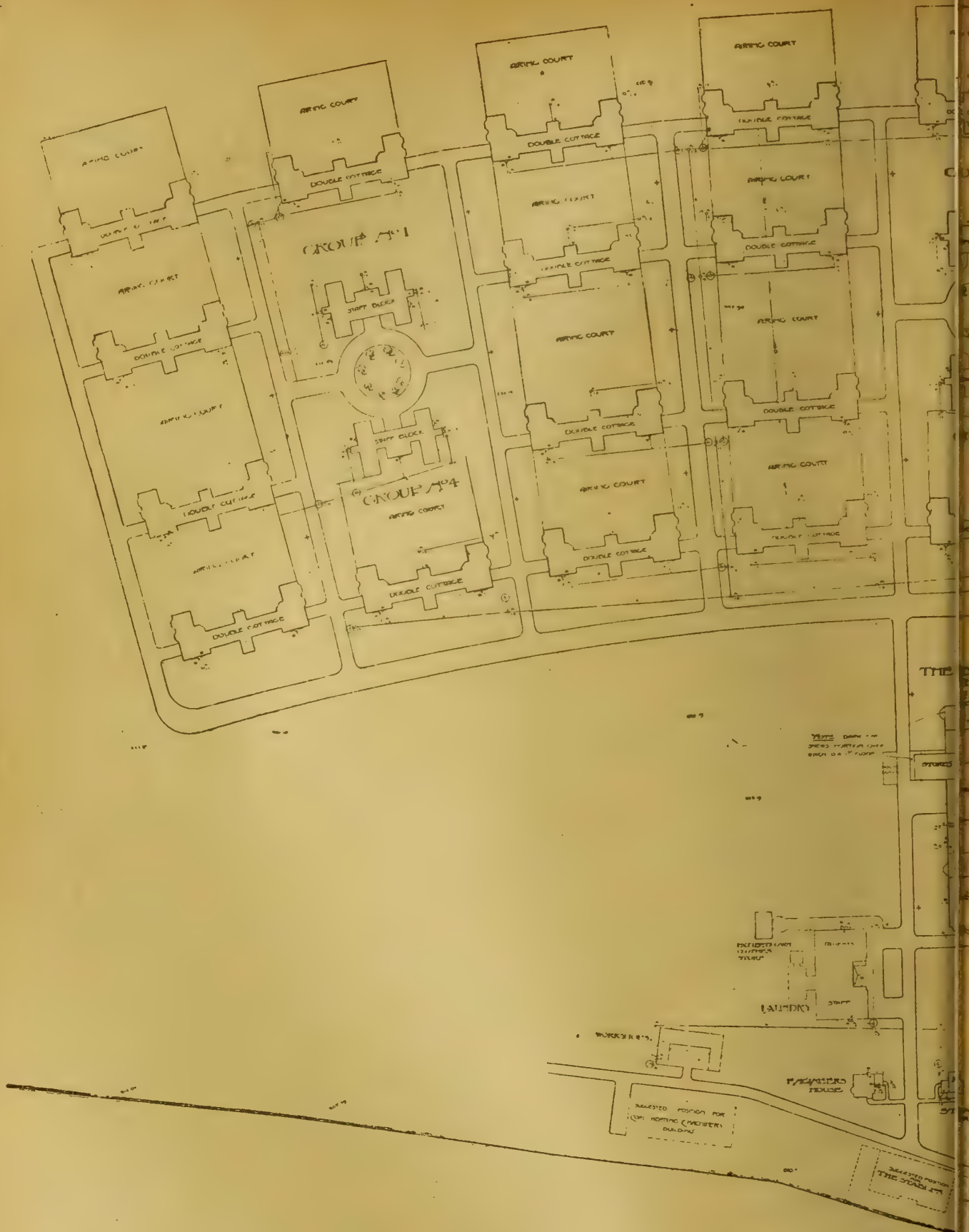
The national schools in St. Stephen's parish, Paddington, which have been reconstructed at a cost of £10,900, were reopened yesterday (Thursday) by the Bishop of London. The buildings are in three departments, and provide a hall available for parochial purposes.

The borings for the Simplon Tunnel begun two months ago are beginning to make progress, and are being carried on by gangs of Italian workmen changed every four hours. A depth of 170 metres has been driven at Brique on the Swiss side, and one of 35 metres only at Iselle on the Italian side.

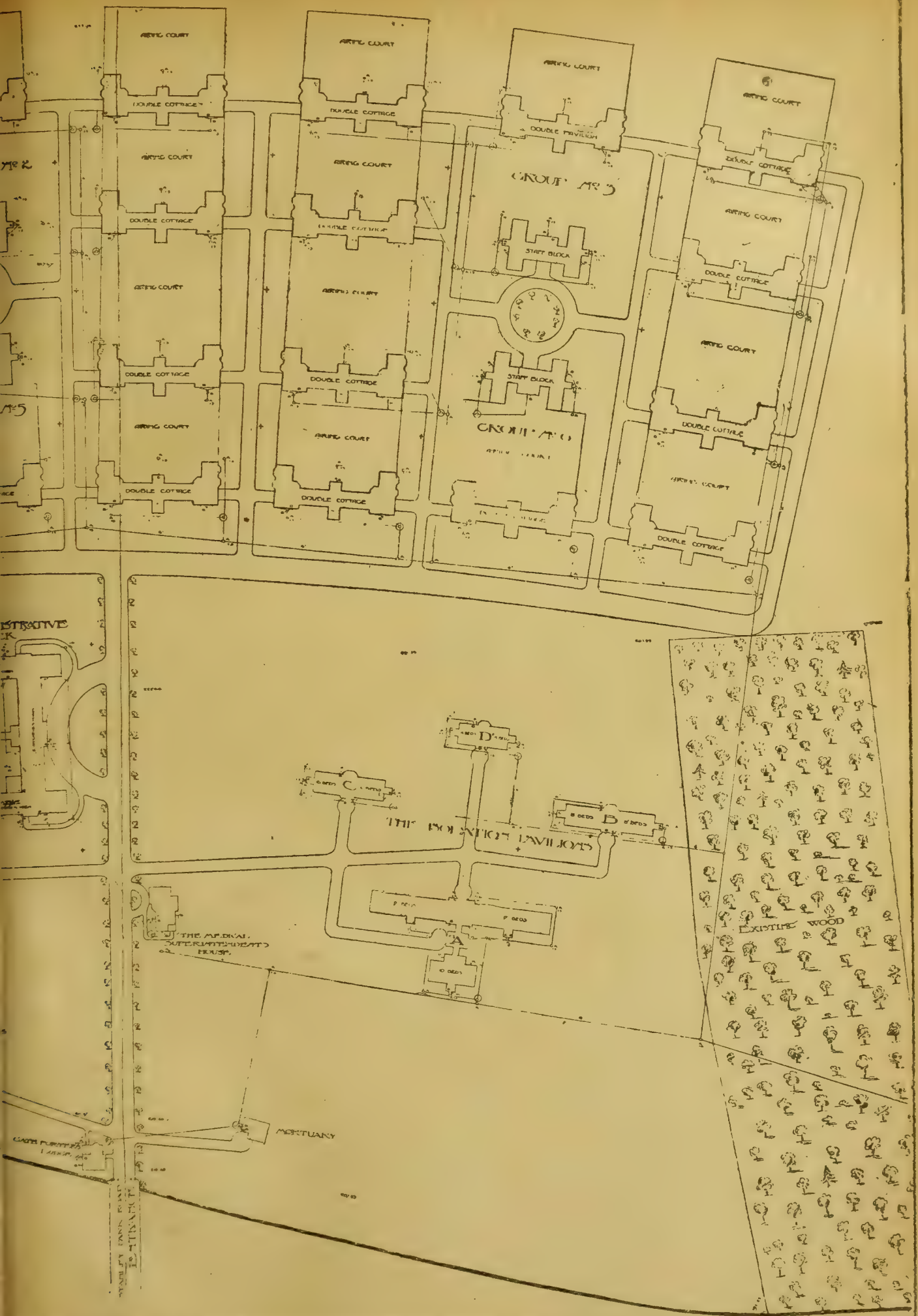
After the lapse of 250 years the parish of Huncote, near Leicester, has again its own church. The dedication is to St. James the Great, as was the original building; but, unfortunately, the old consecrated site could not be obtained. The new church accommodates 230 worshippers, and about £1,600 has been expended. Another £1,000 is required for the finishing of the nave and erection of the tower. The style is Early English, from the plans of Mr. Francis Bacon, of Newbury.

During the last few months the church of All Saints, Stanton, Norfolk, has been undergoing renovation. Messrs. Waters and Sons, of Watton, have carried out the work. The nave-roof has been stripped, cladded, felted, and retiled. The flint walls have been repaired and the buttresses newly capped. The wall surrounding the churchyard has been rebuilt and restored, and a new entrance-gate erected. The whole of the interior has been cleaned and the walls repaired. The oak roof of chancel, which is in an excellent state of preservation, has been cleaned. A rood-screen has been erected, surmounted with a cross on a base, and a new reredos has been erected. Provision has been made both in the nave and chancel for lighting by the erection of wrought-iron ornamental standards. An oak chair has been placed within the communion rails, and the chancel has been laid with carpet.









HOSPITAL, CARSHALTON.—MESSRS. PENNINGTON AND SON, Architects.



## PROFESSIONAL AND TRADE SOCIETIES.

### LEEDS AND YORKSHIRE ARCHITECTURAL SOCIETY.

—The annual gathering of this society was held at the Queen's Hotel, Leeds, on Monday evening, when the President (Mr. George Corson) gave his address. The council had arranged to have the use in future of a large room in the old Medical School, and the hour of meeting had been changed to half-past six instead of half-past seven. The council had had under consideration a form of agreement between builders and those for whom they built. This form had been submitted to the Builders' Association, and he hoped it would become a general basis of contract not only in this district, but throughout the country. The Royal Institute of British Architects had recently issued a revised schedule of professional charges. It was necessary that it should be understood that 5 per cent. upon the total cost of the completed building was the architect's authorised charge. Sometimes a client chose to obtain various fittings, such as chimney-pieces, grates, heating apparatus, &c., from other sources without referring to the architect, who, however, was entitled to his commission upon such fittings. Again, a client might omit certain portions of a building after estimates had been obtained and conditionally accepted. The architect was entitled to a commission upon those of at least 3 per cent. It was not where there was one client concerned, but where there was a committee or a board to deal with, that difficulties arose. Conscience was singular, not plural. Where the cost of work was small, as in alterations, it was not recognised that 5 per cent. was unremunerative to the architect, and clients thought anything higher was an overcharge. Leeds, continued the president, was a new city, but a very old town, and it had inherited a legacy, like most old towns, from former ages of narrow streets and crooked ways, totally inadequate to accommodate the present immense traffic. Within the last fifty years the population had increased from 200,000 to over 400,000, and was still increasing at the rate of something like 7,000 a year. From the immense increase in the value of property in the centre of the town it was practically impossible to widen such streets as Park-row and Commercial-street. There was, however, another way in which the traffic might be relieved. New streets could be pierced through dense masses of property of comparatively small value. Victoria-square still needed artistic treatment. There they had one of the finest buildings in England—the town-hall—affronted by a group of wretched buildings, only fit to be carted away. Law-courts and an art gallery more befitting the dignity of Leeds than the present ones would have to be undertaken. The action of the city council with regard to such architectural work as they had to direct had been brought to his notice by several members of his profession. In former days, all such work was confined to members of their profession. But of late years it had drifted into the hands of the city engineer. At the present time certain buildings were being contracted for, the plans for which had emanated from the city engineer's office—for a police-station and a branch of the free library, at a cost of about £6,000. He (Mr. Corson) would have thought the engineering work properly devolving upon the city engineer's office would have been more than enough for the energies of that department, without encroaching upon the special field of architecture.—Mr. J. Tweedale moved a vote of thanks to Mr. Corson for his address, which was seconded by Mr. Butler Wilson, and carried with acclamation.

**MASTER BUILDERS AT BRIDGWATER.**—The half-yearly meeting of the West of England and South Wales Federation of Building Trade Employers was held on the 7th inst. in the council chamber, town-hall, Bridgwater. Among those present were the Mayor of Bridgwater (Alderman F. C. Foster), Messrs. W. Symonds (president), A. Krauss (Bristol, ex-president), H. W. Pollard (president of the local association), T. Stockham (Bridgwater), John Linton (Newport), Edgar W. Worster (Bath), Charles E. Hagon (solicitor to the local association), H. J. Spear (secretary to the Federation), W. Jones (Newport), R. Gibson, Jonas Holloway, David Davies, and C. Wells (Cardiff), E. J. B. Mercer (Bath), D. Williams (Pontypridd), J. Harris (Bridgwater), G. J. Long (Bath), George Downs (Bristol), S. Ambrose (Bath), William Dyer (Weston-super-Mare), Charles Hoddinott (Weston-super-Mare), W. P. Lewis (Hereford),

W. H. Kitch (Bridgwater), A. S. Morgan (Newport), W. M. Blackburn (Newport), W. Church (Bristol), George Wilkins (Bristol), A. J. Spiller (Taunton), John Morse (Taunton), Joseph Palmer (Bridgwater), George Humphreys (Bristol), W. A. Green (Clevedon), R. Ashton, C. A. Silk, A. Geen, J. Withycombe (Bridgwater), Frank Cowlin (Bristol), T. H. Willis, F. Tapscott, C. Bryer (Bridgwater), H. Passmore, Edward Mudge (Exeter), John Wakeham, A. M. Coles, A. W. Lethbridge (Plymouth), and John Squire (Bridgwater). Mr. H. W. Pollard (president of the local association) and Mr. Foster, the Mayor of Bridgwater, welcomed the members. The president of the Federation (Mr. W. Symonds, of Cardiff) returned thanks. Mr. H. J. Spear (secretary) read the half-yearly report, which stated that minor disputes had occurred in districts, but these had been settled by the respective local associations. The most important dispute was in Bristol, which affected the whole of the trades, and was for a rise in wages all the way round, with sundry alterations in the working rules. This request the masters resented, and eventually a strike ensued; but Mr. A. A. Hudson was appointed to act as arbitrator, and on his award being given the trades, consenting to the reference, immediately resumed work. The bricklayers, however, resisted the arbitration, but consented shortly after to the mediation of his Honour Judge Austin, and finally they accepted his award. Since the last federation meeting the Workmen's Compensation Act had come into operation. Many of the rates asked by the insurance offices were of a very extortionate character; but it was believed that the majority of builders had been treated in a very fair manner. It was impossible until the Act had been in operation for at least twelve months to determine actually what risks and liabilities were covered by the policy, and what adequate premiums should be paid by the employers. It was pretty certain that the Act was not giving satisfaction. During the past six months the National Association of Master Builders had been actively engaged in the formation of a scheme for the federation of the United Kingdom into districts, and no doubt this would be accomplished before the annual meeting of this federation next May. In conclusion, the committee emphasised the importance of organisation in the building trade, Mr. J. Linton (treasurer) read the financial statement, which showed a small balance in hand. The President moved the adoption of the report. Mr. A. Krauss seconded this, and it was agreed to. On the motion of Mr. W. Church (Bristol), seconded by Mr. E. Mudge (Exeter), the following resolution was, after a long discussion, unanimously adopted:—"That until a better form of contract emanates from the National Association this federation pledges itself to adopt the same whenever possible, or one based upon the conditions of that now in force by the National Association of Master Builders of Great Britain." Mr. A. Krauss reported with regard to the federation scheme. It was decided to hold the next meeting at Cardiff.

**NEWPORT ENGINEERS, ARCHITECTS, AND SURVEYORS.**—The first annual dinner of civil engineers, architects, and surveyors of Newport, Mon., which it is hoped will lead to the formation of an institute, was held at the Westgate Hotel on Wednesday. Mr. W. Hitchcock presided, the vice-chair being occupied by Mr. W. S. Smyth. Mr. Smyth gave "The Town and Trade of Newport and District." Mr. T. Canning, Mr. John Linton (the president of the Newport Master Builders' Association), and Mr. L. H. Hornby responded. Mr. R. A. Forsyth gave "The Visitors." The town clerk (Mr. A. A. Newman), the Clerk of the Peace for the County (Mr. H. Stafford Gustard), and the President of the Newport Medical Society (Dr. Egerton Williams) responded. The toast of the evening—viz., "The Professions of the Civil Engineers, Architects, and Surveyors," was given by Mr. W. Lyndon Moore, and responded to by Mr. R. H. Haynes (the borough engineer), Mr. John Brain, and Mr. John J. Swallow.

The directors of the Hard Stone Firms, Limited, announce that the first six months of the company's trading, during which a number of unremunerative contracts entered into by their predecessors were completed, resulted in a loss of £258, and the second six months in a gain of £1,246 (being at the rate of 3 per cent. per annum on the capital), thus wiping off the loss and enabling the directors to recommend a dividend of 1 per cent. for the year.

## Engineering Notes.

**NEW BRIDGE.**—The Middlesex County Council held a special meeting on Monday to consider further the question of rebuilding Kew Bridge. In view of the fact that Surrey agreed on Tuesday last to accept Mr. Easton Gibb's tender at about £150,000 and seek a fresh Bill, the Middlesex Council now resolved to do the same. Mr. Burt expressed his opinion that the plans did not show a bridge of sufficient width to meet the increasing traffic. The chairman (Mr. Littler) concurred, but said that under the terms of the tender, it would be open to require the contractor within six months to increase the width. Mr. Burt then gave notice to move at the next meeting that it should be an instruction to the joint committee to increase the width to 50ft.

**RAILWAY WIDENING AT KENTISH TOWN.**—A large portion of the Kentish Town and Camden-road widening of the Midland Railway's junction with the Metropolitan line—namely, that between Kentish Town and St. Pancras stations—was opened on Monday. In connection with this widening, four additional platforms have been provided to meet the requirements of the suburban traffic—two at Kentish Town Station and two at Camden-road Station. Messrs. John Aird and Sons have been the contractors, and the work has been carried out under Mr. J. A. Macdonald, the engineer in chief to the company; the resident engineer was Mr. G. Macdonald. In addition to these extra suburban lines, the Midland Railway Company opened at Somers Town on Monday a large coal depot, which has been completed at a cost of half a million sterling. The depot is in two floors, having a superficial area of over ten acres, and the whole will be worked by hydraulic power. There are three hydraulic lifts, and a fourth will shortly be added. The depot is lighted by electricity, and there are two electric traverses, one on each level, from one end of the depot to the other.

### CHIPS.

An inquiry was held at Blackpool on Friday by Mr. W. A. Duckett, Local Government inspector, into the corporation's application for the approval to a loan of £8,100 for purchasing property for the extension of the town-hall. The application was unopposed.

The workhouse at Kirby Moorside is about to be altered at a cost of £1,200 in accordance with plans by Mr. Bradley, a local architect.

At the Wallasey petty sessions last week David Hughes, builder, Hillside, Wallasey, was summoned by the urban district council for nine breaches of local by-laws as to new buildings in Mill-lane. Defendant, who is president of the Builders' Association, pleaded guilty to three informations, and was fined in a total amount of £15 1s. 6d.

A Local Government Board inquiry was held at Yarmouth on Friday by Mr. H. P. Boulnois with reference to the application of the corporation for loans of £6,000 for a shelter hall at Gorleston, £850 for repaving part of the market area, and £3,000 for the extension of sea-water works.

The London United Tramways Company will make an application under the Light Railways Act for permission to extend their system of electric tramways through Twickenham, Hampton, Hampton Court, Hampton Wick, and Teddington. Last year the company obtained an Act authorising them to construct electric tramways from the London boundary at Hammersmith, through Chiswick, Brentford, and Isleworth to Hounslow.

At Monday's meeting of the Morecambe Urban District Council over 40 sets of plans were submitted, these including plans for the erection of a new hotel on the site of the Regent Park Pavilion, which is about to be demolished. Plans for several new streets were submitted and approved.

Lady Heathcoat-Amory laid on Thursday in last week, memorial-stones of a new wing which is to be added to Tiverton Infirmary. The wing is intended for paying patients, and will comprise a waiting-lobby, nurses'-room, operating-room, bath-room, boiler and heating apparatus for the entire building, with stores and other offices. Messrs. Deering and Son have taken the contract at £1,048.

In consequence of an application by the Corporation of Norwich to the Local Government Board for leave to borrow £1,316 for the purpose of establishing a new fire-station in Pottergate-street, an inquiry was held at the Guildhall in that city on Wednesday in last week by Mr. H. P. Boulnois, M.I.C.E. The city engineer, Mr. A. E. Collins, explained the proposals.



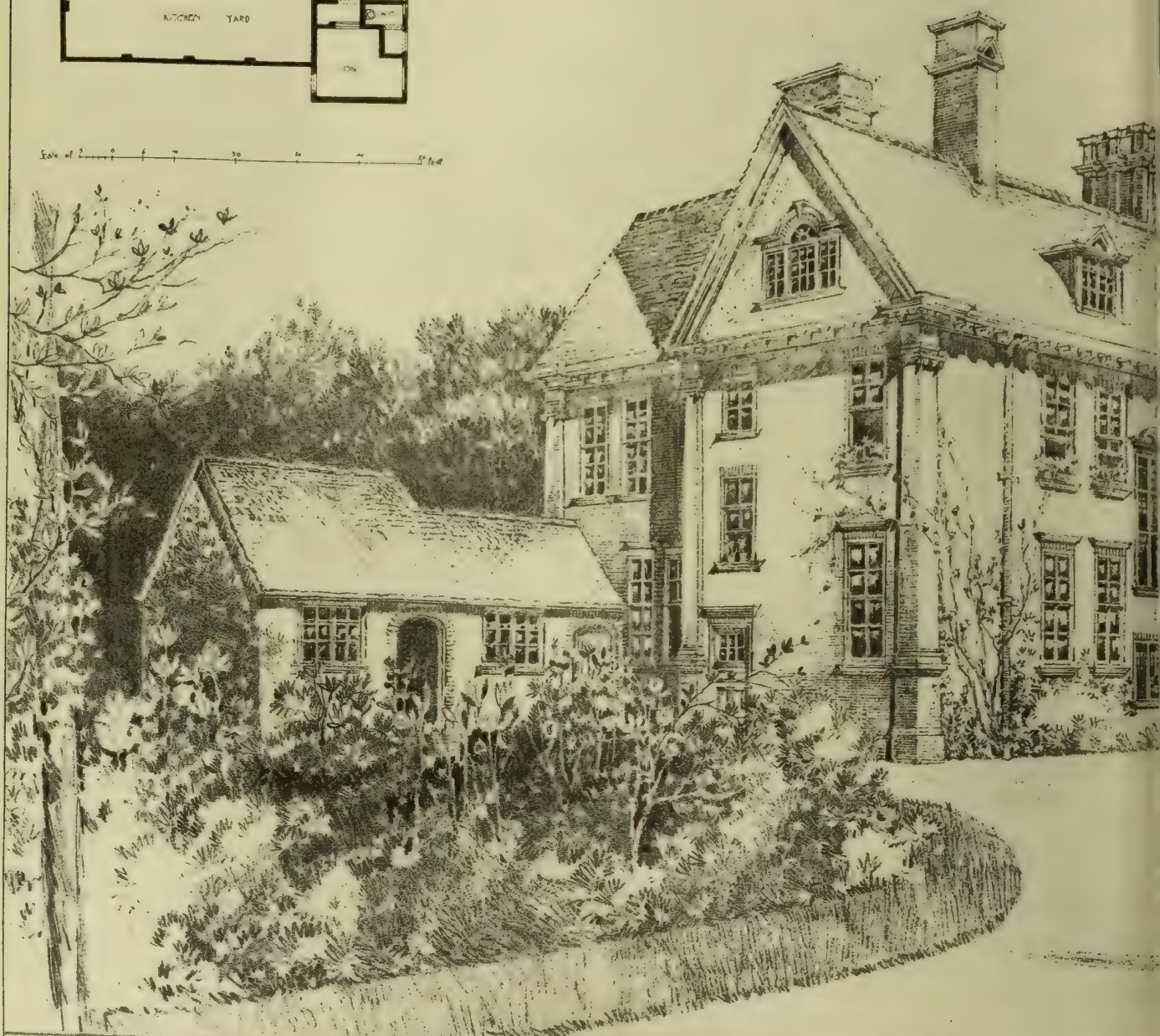






GROUND  
PLAN

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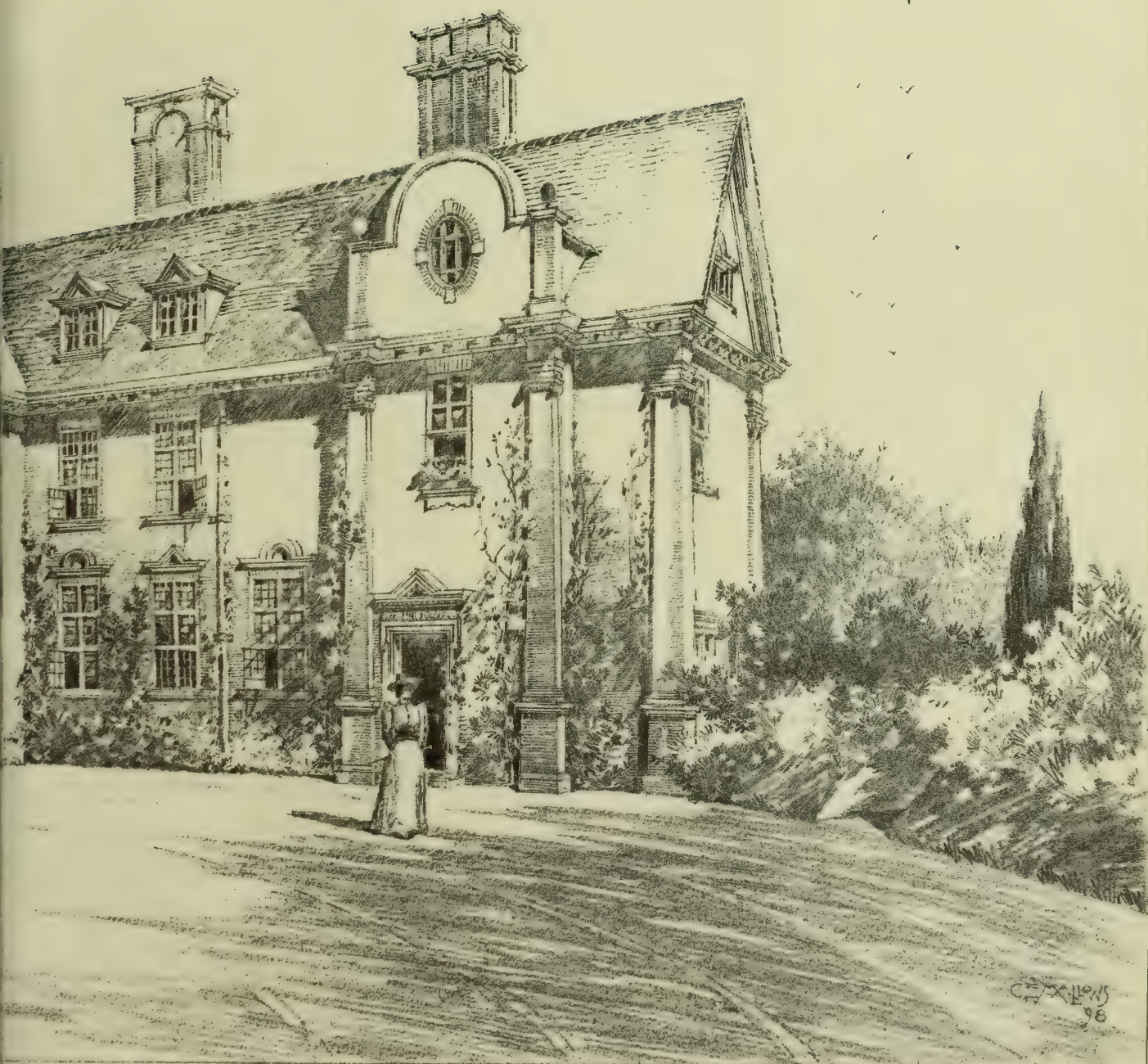


VIEW OF ENTRANCE FRONT

NEW HOUSE AT EDWAL



s. Nov. 18, 1898.



FOR W. WRIGHT ESQ.

BREWSTER & BAILY ARCHTS NOTT.M.

"PHOTO-TINT" BY James Axeman 8, Queen's Square London W.



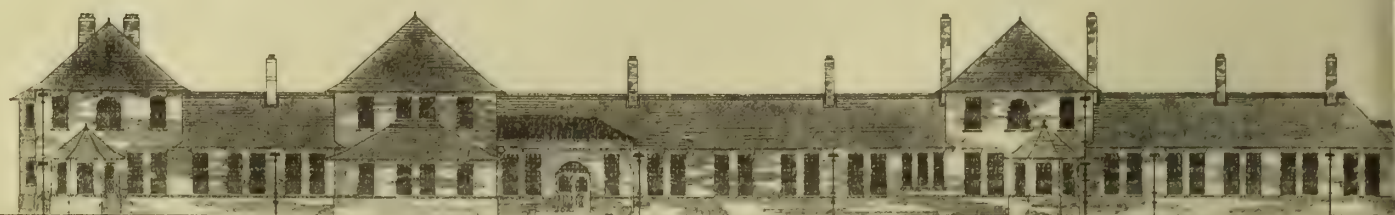








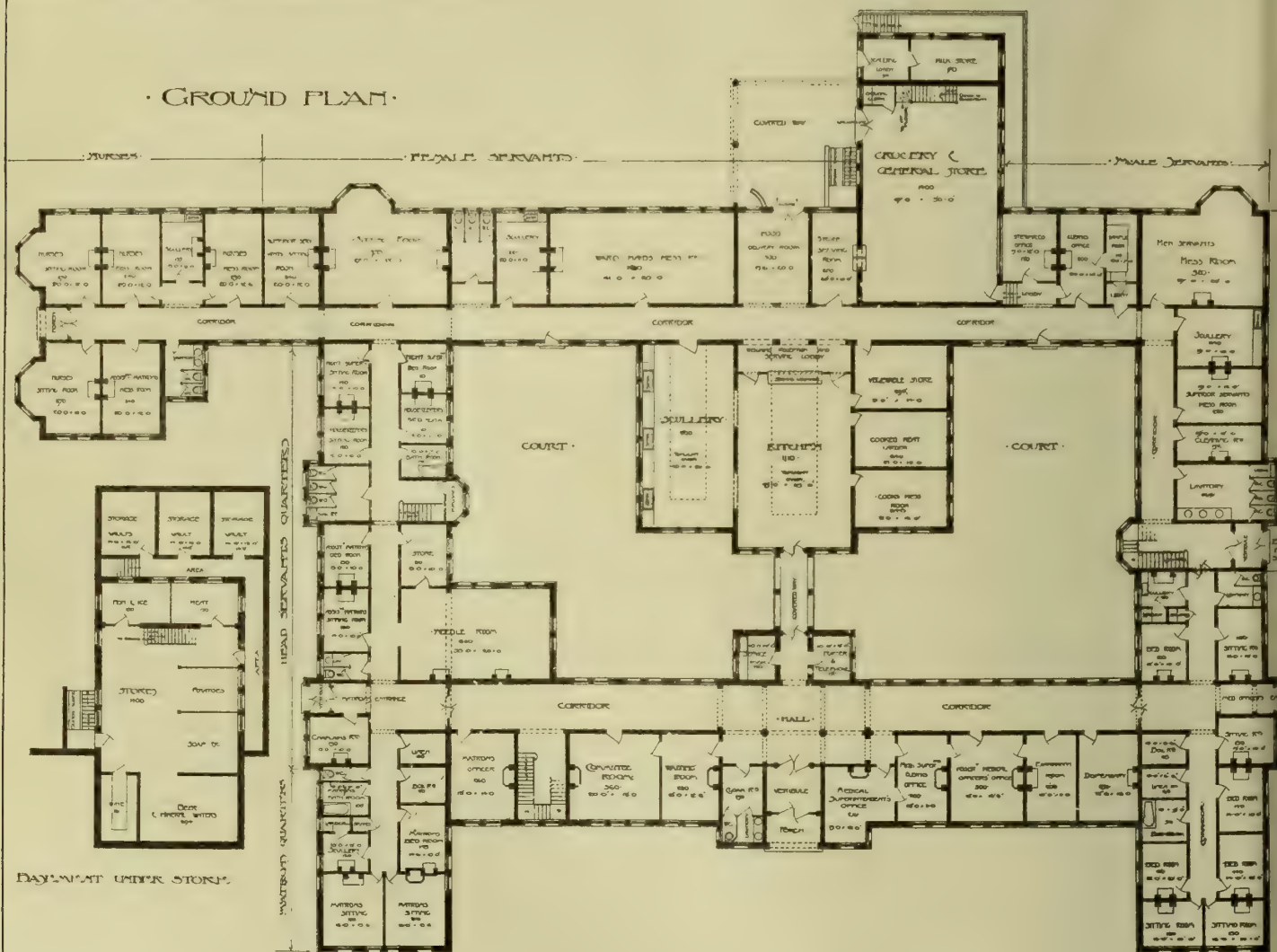
# METROPOLITAN ASYLUMS BOARD PROPOSED SOUTHERN HOSPITAL CARSHALTON.



BACK ELEVATION

## THE ADMINISTRATIVE BLOCK

GROUND PLAN

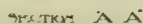


DAYLIGHT UNDER STONE



FRONT ELEVATION

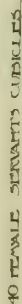




WOLFE

KITCHEN 225

25



THE FIRST BOOK CONTAINS

40 SERVANTS CUBICLES  
4 W.C.  
2 BATH ROOMS  
JUNK ROOM  
LAWN FOR LEISURE  
RU. FISH ROVING OUTLINE  
PETS  
8 FISHES BOWLING  
LAWN  
THE CUBICLES FOR MEN  
W.C. AND URINAL  
3 BATH ROOMS  
LAWN & BOW BOWLING  
AND ADJACENT OVERSEAS  
PUN ROOM.

- 20 BED ROOMS FOR FEMALES









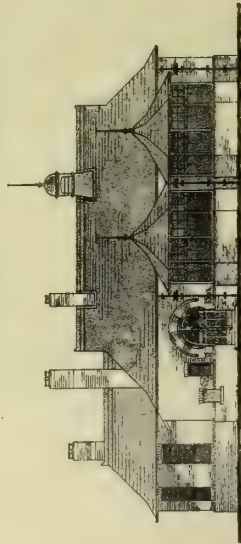




• SECOND PRIZE DESIGN • PENNINGTON & SON ARCHTS. •

• METROPOLITAN ASYLUM BOARD •  
• PROPOSED SOUTHERN HOSPITAL • CARSHALTON •

• THE DOUBLE COTTAGES •



ENTRANCE

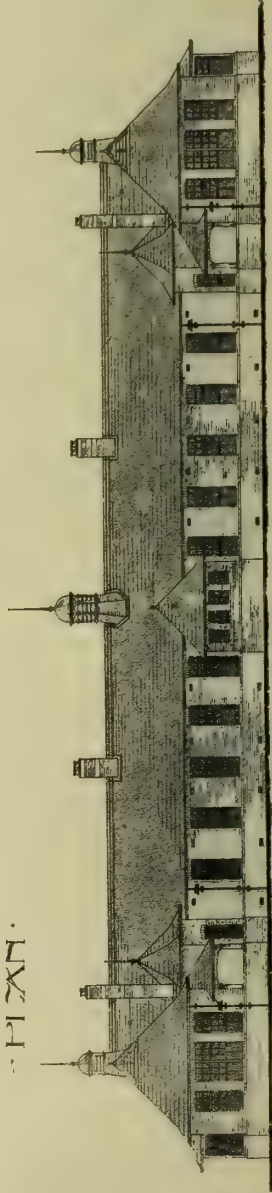


TRANSVERSE SECTION

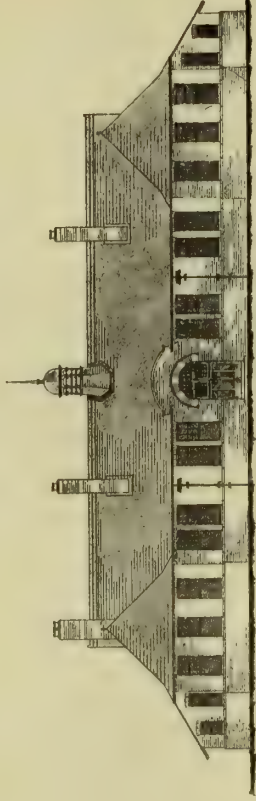
LAND ELEVATION



PLAN



TRANSVERSE SECTION



FRONT ELEVATION

ENTRANCE



PLAN



BACK ELEVATION







Design for Figure  
on Staircase Newel,  
for WJ Lancaster Esq  
South Lynn  
Putney Hill





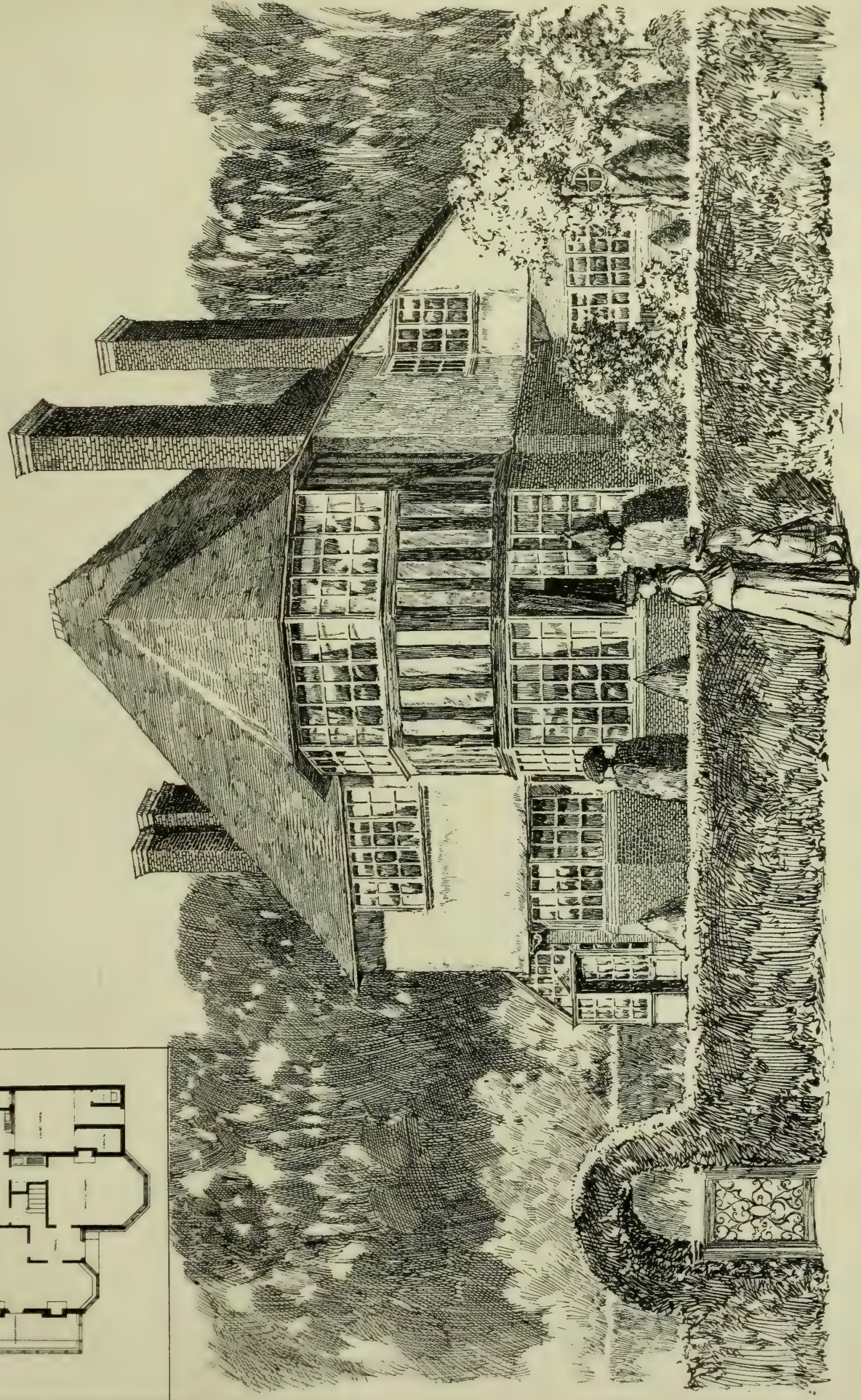
Design  
for Figure on  
Staircase Newel  
"South Lynn"  
Putney Hill.  
S.W.











S. MONAGS WALTON · ON · THAMES · NIVEN & WIGGLESWORTH ARCHTS.







## TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the BUILDING NEWS, 332, Strand, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

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Advertisements for the current week must reach the office not later than 3 p.m. on Thursday. Front-page Advertisements and alterations in serial advertisements must reach the office by Tuesday morning to secure insertion.

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## NOTICE.

Bound copies of Vol. LXXIV. are now ready, and should be ordered early (price Twelve Shillings each), as only a limited number are done up. A few bound volumes of Vols. XXXIX., XL., XLVI., XLIX., LI., LIII., LVIII., LIX., LXI., LXII., LXIII., LXIV., LXV., LXVI., LXVII., LXVIII., LXIX., LXX., LXXI., LXXII., and LXXIII., may still be had, price Twelve Shillings; all the other bound volumes are out of print. Most of the back numbers of former volumes are, however, to be had singly. Subscribers requiring any back numbers to complete volume just ended should order at once, as many of them soon run out of print.

RECEIVED.—K. S. and Co.—A. D.—S. L. N.—M. E. R.—W. H. and Son (Norwich).—P. T.

## "BUILDING NEWS" DESIGNING CLUB.

DRAWINGS RECEIVED.—"Arc," "Bull Nose," "The Unknown," "Plevna," "The Rotter," "Tokio," "Isis" (Hford), "Casual," "Rikki," "Trojan," "Trefriw," "King Crow," "Cainam," "Little Ray of Sunshine," "McGilligan," "Cyclops," "Astragal," "Claude," "The Old Firm," "Chin Chin," "Thistle," "Merlin," "Scruton," "Pup," "Balbus," "Sportsman," "Jay," "X. L. C. R.," "Jonnie," "Vigoria," "Leonidas," "Emma," "Alexem," "Cambria," "Oberon," "Grip," "Ariel," "Socrates," "Eros," "First Attempt," "Will o' the Wisp," "Bedouin," "Lodgings," "Whitefriar," "Attician," "Dachs," "Jos" (this last was very late).

## Correspondence.

## THE NEEDS OF ARCHITECTURE.

To the Editor of the BUILDING NEWS.

SIR,—I am both amused as well as interested in our President's address to the members of the R.I.B.A. During the nearly forty years that I have been in the profession, how often have I not heard and read before nearly all the address contained? But does he, or any of the "eminent architects," show us, or somebody else, by their own superior ideas, anything in the way of originality, or towards a new style?

I certainly think that the younger men—many, also, who have had to "ghost" for the great ones—show far more artistic and sensibly-designed buildings than some erected, I will not say designed, recently by some of the professors.

The reference to the "sewer arch" doorway is rather a happy one; but only a short time since I saw a building which at first I took to be a branch of a well-known insurance company, but which turned out to be a town hall, with a principal doorway so low in proportion to the height of the story that gas was burning inside the lobby in the daytime. This building was

not erected by a young man, but by one of the leviathans of the craft. What teacher, then, can we follow?

The reason, in my opinion, that our architecture is nearly always at such a low ebb is that so few architects are artists, or have any artistic talent or capability. Parents article youths to architects, thinking they can be turned out like warehousemen are, who sell ready-made goods, or lawyers, who simply follow precedents, not invent new laws. During my experience, which has been severely practical as well as artistic, I have had no end of designs sent to me by commercial architects to doctor up, revise, and make pictures of. Their authors (!) had, as a rule, no idea how their buildings would look in execution, having designed them by the cast-iron office rule of tee-square and set-square, and when their owners have seen them in perspective, they have been often surprised, sometimes shocked. How often have I had to level up and level down their designs till they bore very little resemblance to the originals, and then with what a cheerful confidence the "architect" signed his name boldly at the corner and sent the drawing to the R.A.!

When more suitable pupils are put in the profession, and when young men are not too genteel to mix more with the workmen, and be employed actually on buildings in progress or in the workshops, then, perhaps, we may see some improvement in our architecture.

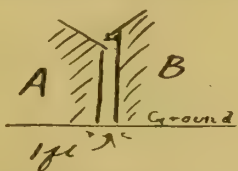
Finally, when we get a Registration Bill passed, the status of the architect (who, as a rule, is entirely ignored and unknown to the general public), will be raised to its proper position—a legally recognised profession—which will produce far greater outside respect than the vapourings of professors craving after, but not suggesting, a new style.—I am, &c., A.R.I.B.A.

## Intercommunication.

## QUESTIONS.

[12102].—**Fixtures**.—Will any reader kindly inform me if cupboards are landlord's or tenant's fixtures, and in what the distinction consists; or is there any inexpensive work on the subject?—H. Y. P.

[12103].—**Eaves Spout**.—B. has property adjoining A's property, as indicated by the sketch. A's property



has been built 50 years, and never had any spout at eaves. B's property was erected 30 years later than A's property. B. wants A. to put up an eaves spout, and threatens to compel him to do so. Can he do this?—F. W.

[12104].—**Steel Joist**.—Would any of your correspondents kindly tell me the formula for calculating how much stronger a rolled steel joist becomes by having a  $\frac{1}{2}$  in. plate riveted on top, or on bottom, or on both top and bottom?—Joist.

## REPLIES.

[12096].—**Gable**.—I do not quite understand "Enquirer's" question. If he wants to build an outer wall 7 in. in front of the 11 in. cavity wall, he can do so by using iron cramps every four or five courses; but I do not know what "Enquirer" means by black and white work of 1 1/2 in. strips and cement, built 7 in. in front and away from the outside. The word "strips" is possibly a misprint. As to the question of dampness, the 11 in. cavity wall ought to keep out the wet; but a wall in front, with, say, 2 1/2 in. cavity and 9 in. thickness, will make the wall of gable impervious.—G.

[12097].—**Casements**.—I believe the N.A.P. Company, Victoria-street, Westminster, has a casement that can be made to open inwards as well as outwards. Apply to Company.—G. H. G.

[12097].—**Casements**.—I have seen casements made in bronze so constructed as to open both ways. I think the patent was the property of the N. A. P. Window Co.—L. E.

[12098].—**Sanitary Apparatus**.—Any manufacturer of sanitary apparatus will supply you on application with catalogue, or they will be pleased to show you round their showrooms, where apparatus can be seen fixed, so that you can see them at work.—LOUIS EAWOLD.

[12099].—**Tile Roofs**.—Broseley tiles can be hung on feather-edge boarding nailed to the rafters, with the thick end up. The patent interlocking square tiles seem to form a very sound roof, and one that ought to stand strong winds.—L. E.

[12100].—**Window Frames**.—It is now allowable to fix window frames flush with face of work. For particulars see London Building Act, 1894.—L. E.

[12101].—**Liquid Indian Ink**.—I have not experienced the difficulty stated by "Old Correspondent"; but perhaps he might thin his ink with water.—L. E.

## LEGAL INTELLIGENCE.

**ARBITRATION CASE FROM BANBURY.**—Mr. Robert Vigers, president of the Surveyors' Institution, sat at the Medical Examination-hall, Embankment, on Monday, as arbitrator in the case of "Pearce v. the Great Central Railway Company," a claim for compensation in respect of 12 acres of land acquired by the railway company in crossing the Thorpe Mandeville estate, near Banbury, Northamptonshire, for the purpose of a connection with the Great Western Railway. It appeared that the Thorpe Mandeville estate comprised about 590 acres and a house, specially arranged for the use of hunting tenants. It had commanded a rental of from £350 to £500 a year, furnished. It was submitted that the value of the agricultural portion of the property was seriously diminished, notwithstanding the construction of accommodation works, such as bridges, at an expense to the railway company of over £3,450. Mr. Percival Fox Tuckett (Tuckett and Son), Mr. Howard Martin (Thurgood and Martin), and Mr. Charles Bidwell (Ely) gave evidence in support of the claimant's case, their estimation of the total compensation payable averaging £2,700, inclusive of an allowance of 25 per cent. for compulsory sale. On behalf of the railway company, Mr. Edward Boyle, Q.C., submitted that 10 per cent. should be the maximum allowance, and that a sum of about £1,500 would amply compensate the claimant. The principal experts for the railway company were Mr. Daniel Watney (past president of the Surveyors' Institution), Mr. J. H. Oakley (Daniel Smith, Son, and Oakley), Mr. Alexander Stanning, Mr. H. R. Goddard (Bedford), and Mr. Lightfoot (Dunlop, Lightfoot, and Wallis). The award was reserved.

**CLAIM AGAINST THE LONDON SCHOOL BOARD.**—Mr. Under-Sheriff Burchell and a special jury, at Red Lion-square, Holborn, heard, last week, the case of "Young v. the School Board for London." This was a claim for compensation in respect of the freehold interest in corner premises No. 49, Stoke Newington-road, N. It appeared that the claimant purchased the property by auction in 1893 for £920, and subsequently let the ground floor on lease at £48 a year to the firm of solicitors of which he was a member (Messrs. Young and Windsor). The upper rooms were occupied by a caretaker. Mr. William Eve (Eve and Sons) estimated the rental value of the upper portion at £25 a year, making a total rent of £73, which he capitalised on the 6 per cent. tables at nearly 17 years' purchase—£1,217—and he expressed the opinion that the vacant land adjoining could be utilised so as to be worth £430, making, with the customary addition of 10 per cent. for compulsory sale, a total of £1,812. Mr. James Green (Weatherall and Green) estimated the rental value at £87, of which he would give 20 years' purchase. Mr. J. M. Klenck also gave evidence. On behalf of the School Board, Mr. Daniel Watney (D. Watney and Sons) stated that the fair rent of the house was £48 a year, of which 20 years' purchase should be given—£960—representing, with the usual allowance for compulsory sale, £1,056. Mr. Samuel Walker (Walker and Son) gave evidence to the same effect. The other surveyors engaged in the case on behalf of the School Board were Mr. E. E. Harding (Toplis and Harding), Mr. W. S. Cooke, Mr. H. R. McCarthy, and Mr. Henry Donaldson. After a long consultation, the jury awarded the claimant the sum of £1,320.

**DARLINGTON v. THOMPSON.**—This was an action tried before Mr. H. W. Verey, an Official Referee of the High Court, on Nov. 2 and 4, and arose out of certain work done by the plaintiff, Mr. George Darlington, builder and contractor, of Amersham and Chesham, for the defendant, Mr. George Thompson, of Ninnings Farm, Chalfont St. Peter. Mr. W. A. Attenborough (instructed by Mr. R. H. Rushforth, of Amersham) appeared for the plaintiff, and Mr. G. M. Cohen (instructed by Messrs. Camp and Ellis, of Watford) represented the defendant. The plaintiff's claim was for £250, the amount of a contract for alterations and additions to Ninnings Farm, Chalfont St. Peter, and £71 (amended at the hearing to £69) for extras. The amount of the contract was not disputed, and extras to the amount of £36 were admitted; but the defendant made a counter-claim amounting to £171 for expenses incurred and loss sustained in consequence of alleged failure on the part of the plaintiff to complete the work in a reasonable time. Mr. Arthur Vernon, F.S.I., of 29, Cockspur-street and High Wycombe, and Mr. Henry Bushell, of 33, New Bridge-street, E.C., had surveyed the extras and valued them at £69, and gave evidence for the plaintiff. Mr. New, F.S.I., was called for the defendant. The learned Official Referee gave a verdict for the plaintiff for £305 (the full amount claimed less £14 allowed to the defendant in respect of the counter-claim of £171), less £200 which had been paid into Court, the plaintiff also getting costs on the whole action.

**THE WIDENING OF PARLIAMENT-STREET.**—At the Surveyors' Institution, last week, an arbitration was held with the object of determining the sum to be paid by the Government in respect of premises



situate at Nos. 11 and 13, King-street, Westminster, which are required in connection with the scheme of widening Parliament-street. The premises are in the occupation of Messrs. Lewin, Gregory, and Anderson, Parliamentary agents and solicitors, on lease, and the claim is for their leasehold interest and for disturbance of business. The rent was £200 per annum, including rates, taxes, &c. The lease had seven years to run, and Mr. Kelly had agreed to renew it at the present rent. Owing to so many other firms having been displaced by the scheme of street widening, the claimants had been compelled to go to No. 6, Broad-sansbury, for which, though not nearly so convenient, they had to pay a rent of £450; the rates and taxes were £246, making £496 more. This sum, less £70 in respect of one floor which was sublet, left a net rent of £426. Dealing with that as for a term of seven years—the time the lease had to run—on the 6 per cent. table gave £2,343, which represented the reinstatement of rent, to which was added £300, out-of-pocket expenses in preparing the new premises, and £2,000 (which was a pure estimate) for injury to the business caused by removal, making a final total of £4,643. Witnesses were called, including Mr. Maurice Anderson, of the claimant firm; Mr. R. Vigers, president of the Surveyors' Institution; Mr. Alexander Stenning, surveyor and valuer; and Mr. Kelly, whose evidence was generally corroborative of counsel's statement. The Solicitor-General contended that the claim was excessive; and several valuers—Mr. E. Horne, Mr. A. L. Ryde, and Mr. W. H. Elwell—were called, and put in detailed valuations varying from £1,175 to £1,486. The arbitrator reserved his award.

**ACTION AS TO FOUL-SMELLING SEWERS AT BIRKENHEAD.**—At the Birkenhead County-court last week, before his Honour Judge Wynne Foulkes and a jury, an action was brought by Mr. Walter G. Wall, Prenton-road West, against the Birkenhead Corporation for five guineas damages on account of illness caused to his child Beatrice Ida, aged three years, by a foul-smelling sewer in Prenton-road West. The evidence for the plaintiff was that in August last his daughter suffered from ulcerated mouth of an infectious character, and it was alleged this was due to the sewer-gas escaping from the grids in Prenton-road West, about which there were frequent complaints. Dr. H. L. Pearson, who attended the girl, stated in evidence that he thought the illness was caused by the gas from the sewer grids. A number of witnesses were called to meet the allegation of the corporation that the gas was escaping from the defendant's own pipes, as proved by the smoke test, the plaintiff's case being that though there was an escape of the smoke applied under pressure, there was no escape of gas under normal conditions. Mr. Coard S. Pain and Mr. J. Wood, surveyors and engineers, were called to uphold this contention. Mr. Sutton contended for the defence that there was no case to go to the jury, as the remedy provided, if a public authority did not keep and maintain their sewers, was not a civil action of this kind, but an inquiry by the Local Government Board, as stipulated by section 299 of the Public Health Act. The Judge said he must agree with Mr. Sutton, for there was nothing quoted to show that such an action as that could be taken. He must, therefore, nonsuit plaintiff, but would give his reasons for his judgment if required, for the purposes of appeal.

**DETAILED PARTICULARS AS TO PARTY-WALL ALTERATIONS.**—HOBBS, HART, AND CO. (LIMITED) v. GROVER.—In the Court of Appeal, on Wednesday, the Master of the Rolls and Lords Justices Chitty and Vaughan Williams heard and gave judgment in this appeal by the plaintiffs against a decision by Mr. Justice Channell, as Vacation Judge, on October 19 last, and which was reported in our issue of the 21st ult., p. 591. The plaintiffs are the owners of the house No. 76, Cheapside; the defendant, a well-known builder and contractor of Hackney, has lately purchased the adjoining house No. 75, which he intends to pull down and rebuild. Between the two houses is a wall, which is admitted to be a party-wall. The defendant, on September 2, served on the plaintiffs a notice which purported to be a party-wall notice under section 90 of the London Building Act, 1894. By that section "a building owner shall not, except with the consent in writing of the adjoining owner and of the adjoining occupiers, or in cases where any wall or party structure is dangerous (in which cases the provisions of Part IX. of this Act shall apply), exercise any of his rights under this Act in relation to any party-wall or party-structure, other than a party fence wall, unless at least two months before doing so he has served on the adjoining owner a party-wall or party-structure notice, stating the nature and particulars of the proposed work, and the time at which the work is proposed to be commenced." The notice served by the defendant upon the plaintiffs was as follows:—"I, the undersigned, being the building owner of No. 75, Cheapside, in the City of London, hereby give you notice that upon the expiration of two months from the date hereof I intend to exercise the rights conferred upon the building owner by section 88 of the above

Act in respect of the party structure separating No. 75, Cheapside, from No. 76, Cheapside, adjoining thereto on the east side thereof—that is to say, to execute such of the following works to the said party structure as may on survey be found necessary or desirable—namely, to make good, underpin, or repair the same where defective or out of repair; to pull down and rebuild the same wholly or in part if (1) so far defective or out of repair as to make such operations necessary or desirable; (2) not conformable with the regulations of the said Act; (3) of insufficient strength for the intended new building; to raise or underpin the same, or any external wall built against the same, as may be necessary or desirable for the intended new building; to cut into the same for any lawful purpose; to cut away any footings, chimney-breasts, jambs, flues, or other projections as may be necessary in order to erect the intended new building; to cut away or take down such parts of any wall or building of the adjoining owner as may be necessary in consequence of the same overhanging the ground of the building owner in order to erect the intended new building; to perform any other necessary works incident to the connection of the said party-wall with the premises adjoining thereto, the work to be commenced on December 27, 1898." This notice was in substance a copy of section 88 of the Act, which confers various rights upon a building owner. The plaintiffs objected that this was not a sufficient notice under section 90, because it did not state "particulars of the proposed work," and he applied for an injunction to restrain the defendant from pulling down, cutting into, underpinning, raising, or otherwise injuring or interfering with the party-wall between the two houses, and from appointing any surveyor under section 91, subsection 3, of the Act, until the trial of the action or further order, otherwise than in accordance with the provisions of the Act. The learned Judge thought that the earlier part of the notice was good, and was not clear that any part of it was bad; but he had some doubt whether the defendant ought not to give fuller particulars as to the raising of the party-wall. But the question of raising the wall might not arise for many months. An order was made that, upon the undertaking of the defendant not to act upon that part of the notice which dealt with raising the wall without giving the plaintiffs further notice (without prejudice to any question), and to give the plaintiffs inspection of the plans, and a further period of ten days in which to appoint a surveyor, there should be no order upon the motion, except that the costs should be costs in the action. The plaintiffs appealed. Mr. Mulligan, Q.C., and Mr. Gatey, instructed by Messrs. Savory and Stevens, were for the plaintiffs; Mr. D. L. Alexander, Q.C., and Mr. Jessel, instructed by Mr. G. Emanuel, appeared for the defendant. In the course of the arguments, the Court intimated an opinion that the defendant's notice was not as clear in its terms as it should have been, and indicated the manner in which it ought to be amended, and the defendant consented to an order in accordance with their lordships' opinion. The Master of the Rolls said that the notice ought to be so clear and intelligible that the adjoining owner might be able to see whether he ought to give a counter notice under section 91 of the Act. This was the key to the whole matter. The Lords Justices concurred. An order was made that each party should bear his own costs.

**RE H. E. STEER.**—A first meeting of the creditors was held on Wednesday before Mr. A. H. Wildy, Official Receiver. The debtor was a builder and contractor, carrying on business at St. Dunstan's Hill, City. He filed accounts showing total liabilities £32,671, of which £6,161 were expected to rank, with no available assets. The Official Receiver reported that it was a case which was, unfortunately, only too common in that court—viz., that of a speculative builder taking an agreement which he was unable to carry through with profit, and which eventually brought the builder to the court, with the result that the trade creditors were left out in the cold. The matter required, and would receive, careful investigation. The case went into bankruptcy, Mr. Flaxman Haydon, accountant, being appointed trustee.

**ESTATE AGENT'S COMMISSION.**—Mr. Justice Bruce gave judgment on Wednesday in an action in which a Mr. C. F. Nosotti, estate agent and auctioneer, sued Mr. Julius Auerbach, of 35, Sloane-gardens, S.W., for commission. The defendant had instructed the plaintiff to find a purchaser for his leasehold interest in his house at the price of £4,000. The plaintiff found a Mrs. Singleton, who agreed to the defendant's terms, but required possession not later than March 15 last, and the negotiation fell through on this point. The plaintiff claimed his commission, and the jury found in his favour on a defence that the defendant had stated that he could not give possession before the end of the London season. His Lordship now held that the plaintiff had done all he was bound to do to entitle him to his commission, and gave judgment in his favour.

## WATER SUPPLY AND SANITARY MATTERS.

**THE LONDON WATER SUPPLY.**—The meetings of the Royal Commission on this subject were resumed on Monday, when Mr. W. B. Bryan, chief engineer to the East London Water Company, was examined, and gave detailed statistics as to the supply of water in the company's district during the present scarcity. He asserted that there had been much waste from taps being kept continually running, and that the lack of storage in the district greatly aggravated the hardships of the drought, which had exceeded all previously recorded droughts. He estimated that in the event of the recurrence of a similar scarcity, the company, with the assistance of 12,000,000 gallons daily from other companies, would be able to keep up a constant supply. They were taking measures for increasing their storage, and hoped to be independent of the other companies in two years, as they intended to apply to Parliament in the ensuing session for power to construct the remaining part of the Lea Valley storage scheme. On Tuesday, Mr. Bryan gave some further evidence. In cross-examination by Mr. Balfour Browne, Q.C., for the London County Council, the witness said the company's supply of water from its own sources was in September last less by 17,343,000 gallons per day, and in October less by 18,640,000 gallons, than in the corresponding months of 1897. Sir A. R. Binnie, engineer to the London County Council, said that body strongly objected to being saddled, in the event of purchase, with the half-million which the companies proposed to expend on the intercommunication scheme. Further evidence on the question of intercommunication was given by Mr. M. W. Harvey, engineer to the West Middlesex Water Company, Mr. Richard Hart, chief engineer to the Chelsea Water Company, and Mr. W. Morris, engineer to the Kent Water Company. Having concluded the hearing of evidence upon the question of establishing a system of intercommunication between the various companies—with reference to which a private sitting will be held on Monday next for the purpose of considering the form of their report—the commission adjourned until Tuesday, when further evidence will be called upon the general question of the water supply.

**BOMBAY.**—The measures proposed to prevent a recurrence of the outbreak of plague in the city of Bombay in the future have been embodied in an enactment of the Bombay Legislative Council, which recently received the approval of the Secretary of State, and is now law. The design is to deal effectually with the insanitary conditions of a great part of the city by the removal of rookeries and slums, and the opening out of wide thoroughfares in overcrowded localities. The scheme, however, goes further, and includes provision for the extension of the city by reclaiming large areas on the foreshore of the island, as well as the opening out of wide roads, the removal of insanitary dwellings, and the provision on an extensive scale of new dwellings for the poorer and working classes. The work contemplates, in fact, the practical rebuilding of a large portion of the present overcrowded native town. The work is to be intrusted to a special board of trustees, subsidised by the corporation and endowed with the usufruct of certain valuable building areas belonging to the Government and the corporation, within the city limits, and with the right of reclamation on the foreshore outside the limits of the port. The operations are to be controlled by Government. The general principles of the English Housing of the Working Classes Act have been closely followed in relation to dealing with insanitary areas.

**CLAPHAM ROAD, S.W.**—At Sir Joseph Causton and Sons' new printing works in Clapham-road, nearly opposite Albert-square, a 15in. internal diameter tube well has been sunk through the following strata to the depth of 425ft.:—Topsoil, 8ft.; gravel, 20ft.; London blue clay, 77ft.; black pebbles, 1ft. 6in.; green sand, 3ft.; bed of shells, 1ft. 6in.; dead grey sand, 10ft.; mottled clay, 6ft. 6in.; loamy sand, 5ft. 6in.; hard mottled clay, 14ft. 6in.; congealed pebbles, 3ft.; green sand with black pebbles, 6ft. 6in.; green sand, 5ft.; hard grey sand, 9ft.; dark green sand, 11ft.; dark grey sand, 13ft.; black flints with chalk, 225ft.; hard grey chalk, 5ft. The tube well is all the more remarkable as the yield obtainable is 840,000 gal. per day, more than has as yet been obtained by any single well in any part of London. A novel feature in this instance is the raising of the water, which is done by means of compressed air, entirely dispensing with all pumping and complicated machinery. Messrs. C. Isler and Co., London, are the engineers.

**DERBYSHIRE WATER FOR LEICESTER.**—The water committee of the Leicester Town Council unanimously decided, on Monday, to recommend the corporation to promote a Bill in Parliament to acquire the water of the Upper Drwent and the Ashop at an initial cost of a million and a half sterling. It is proposed either to assume the entire responsibility for the vast undertaking and supply the Derbyshire authorities, or to form a joint board



with Derby and Derbyshire. The watersheds yield 50 million gallons daily; but at first three reservoirs would be constructed to yield 10 to 12 millions daily, or sufficient for Derbyshire, and then to convey the water a distance of 66 miles to Leicester.

**MAIDSTONE.**—The members of the Maidstone Corporation visited a few days ago the sewage works of the town, situated at Allington, in order to inspect the filter-beds which have recently been constructed there for the purpose of experimentally dealing with the sewage of the town. The filters are on the lines of those adopted at Sutton, Surrey, and other places on the advice of Mr. W. J. Dibdin (late Chemist to the London County Council), and they were decided upon by the Maidstone Council after consultations with, and reports from, him. The action of the filters is simple, and does away with the necessity for using lime or pressing the sludge—the two principal items of expense at a precipitating works. A difficulty will arise should the system be adopted, since Maidstone's being a low-level system of sewerage the whole of the sewage will have to be pumped for the purpose of filling the filters. The bacteria beds are two in number, constructed of concrete. They are filled with breeze or clinker and consists of a coarse and fine bed; the material in the former having been rejected by a sieve have a mesh of  $\frac{1}{2}$  in., while the latter has all passed through a  $\frac{1}{4}$  in. mesh with the fine dust removed. The beds are 45ft. long by 39ft. wide, and 3ft. 6in. and 4ft. 6in. deep respectively, and hold from 12,000 to 15,000 gallons at one filling. The sewage which is treated upon these beds is conveyed to them in the same condition that it arrives at the works, without any mixing with lime, in a perfectly crude state. A new sewer had to be constructed through the works from the southern end to the filters, a distance of over 800ft. The sewage is raised by means of a 4in. Gwynne's centrifugal pump, which fills the beds in 1½ hour. It is first pumped direct from the coarse bed and spread over its surface by distributing troughs. After filling it is allowed to remain for two hours, when it is gradually drawn off by opening the penstock at the outlet and run into the fine bed. The second bed having been filled, it is allowed to stand in the same way for two hours, after which the effluent is drawn off and runs into the main outfall sewer, which empties itself just below Allington locks into the river. The experimental beds deal with about nearly a twentieth part of the Maidstone sewage.

**YORK.**—With the view of obtaining reliable data as to the effect of various methods of treatment of the York sewage and effluent, the York Sewerage Committee have approved of a recommendation of the city engineer to lay down experimental works at Naburn, so as to provide facilities for treating the sewage and effluent (a) by land filtration, the land being properly drained, trenched, and prepared; (b) by the construction of artificial filters; in addition to which the committee have added the further method of (c) a septic tank on a small scale. The city engineer estimates the cost at about £1,000.

A block of two buildings has just been added to the Liverpool Homes for Aged Mariners on the bank of the Mersey at Eyremont. The cottages are built from designs by Messrs. Walker and Strong, of Liverpool. The treatment is in the Old English style, with solid oak framing introduced in the gables, &c., relieved below by pebbledash and Ruscon bricks, the roofs being covered with red Staffordshire tiles. The cost of the cottages is £1,000.

St. Paul's Cathedral organ is being reconstructed. When complete, it will possess 101 draw-stops and 76 speaking stops of full compass. The pedal organ will be divided, one-third remaining where it is, and two-thirds being placed in the north-east quarter gallery, in the dome. This gallery will also contain three stops, which are to be added to the tuba organ. The solo organ is to be greatly enlarged, and will be partly within and partly without a swell-box. Another feature will be a small swell organ placed under the middle arch of the north side of the choir, mainly to be used for accompanying the Celebrant; it will be controlled from the key-board of the solo organ.

A largely-attended gathering of subscribers to the Actors' Orphanage Fund was held at the Haymarket Theatre on Tuesday afternoon, to consider the offer of Mr. J. Passmore Edwards to build an Actors' Orphanage Home. Sir Edward Lawson, who presided, said the main point to be considered was whether they would be able to maintain such an institution if the offer were accepted. Communications from Sir H. Irving and Mr. Charles Windham were read, expressing doubt as to the wisdom of accepting the responsibilities attaching to the splendid gift; but Mr. Beerbohm Tree and others wrote in favour of accepting the offer. It was stated that £30,000 would be required to start the home. Numerous offers were made by those present, and a list of between £2,000 and £3,000 was made up. But eventually Mr. Passmore Edwards's offer was regretfully declined.

## STATUES, MEMORIALS, &c.

**EXETER.**—The Miles Memorial drinking fountain and clock-tower, in Queen-street, was unveiled on the 2nd inst. The design, which is Renaissance, is carried out in Chudleigh limestone and red Corseh-hill. The lower portion of the tower is essentially a fountain, square in plan with angle and flying buttresses. Four flying buttresses, of four clustered columns of Chudleigh limestone with bases and caps of Corseh-hill, form also standards for lamps, and are surmounted by wrought-iron frames and electric lamps. These buttresses are connected to the main building by small arches and curved trusses, above which are small cornices and carved pediments which support carved groups of horses. There are three horses in each group. On the north side is fixed the existing cattle trough, and on the south side another large drinking trough for cattle, executed in granite with curved and moulded front. On the east is placed the fountain for wayfarers, which is also of granite, and on the west side is the door for access to the tower. Above the troughs on three sides are moulded recesses corresponding with the opening on the fourth for the door, with hood-moulds, key-stones, and cornices over, all carved. The shaft of the tower, which is of Chudleigh limestone, is circular with clustered columns at the angles. There are also lancet windows on each side of the tower with circular heads and hood-mould. The clock chamber, which is built of Bath stone, is square on plan and projects somewhat beyond the face of the shaft, and has wide splay on the four angles, to which above the centre of the clock face are added small octagonal shafts terminating above the main cornice with moulded finials. The clock faces, of which there are four, are 4ft. 6in. in diameter and have projecting hoods, also terminating above the cornice with carved finials and scrolls. The clock chamber is surmounted by an octagonal cupola with circular-headed openings in each face and with carved trusses at the angles. The height is 52ft., exclusive of wrought-iron and copper vane. The carving has been executed by Mr. F. Nelson, and the work has been carried out by J. Easton and Son, of Northernhay-street, Exeter. Mr. T. A. Andrews, is the architect.

## CHIPS.

Mr. Robert Ketchen, builder, has been unanimously re-elected provost of the burgh of Bonnyrigg.

In the case of the application for discharge of Denis Lee, of Manchester, timber merchant, the order of discharge has been suspended for five years, ending October 21, 1903.

A new infants' school in connection with Hunslet Carr board school, the fifty-sixth school built by the Leeds Board, was formally opened on Friday. Situated in Woodhouse Hill-road, on a site containing 3,649sq. yds., the new premises will accommodate 530 children. They have been built from plans by Mr. W. S. Braithwaite, the architect to the board.

The Lichfield City Council having applied to the Local Government Board for sanction to borrow £1,033 for works of sewerage extension in Lichfield, Col. W. Langton Coke, M.Inst.C.E., inspector from the department, held a public inquiry at the Guildhall on Thursday in last week. Mr. C. J. Corrie, the city surveyor, explained the plans.

The Blackman Ventilating Co., Ltd. (head office, Fore-street, London, E.C.), in order to meet the demands of increasing business in the Midlands and the West, have opened new showrooms and offices at 1, Colonnade-passage, Birmingham.

The new pontoon added to the Royal Pier at Southampton, replacing one erected in 1864, was opened last week. It has been constructed at a cost of £10,000 from plans by Mr. E. C. Poole, surveyor to the Harbour Board, the contractors being Messrs. Fay and Co., of Southampton.

The negotiations for the municipalisation of the Stockport water supply were completed on Thursday in last week. It is estimated that £771,000 will be paid for the rights and plant.

The death of Mr. Edmund Taylor, builder, took place last week at 46, Castlemere-street, Rochdale, at the age of 56. A native of Bridlington, he removed to Manchester early in life, and eighteen years ago he went to Rochdale, where he had resided ever since. As a builder he was the head of an extensive business. Many of the houses in the freehold district were built by him, and he had also carried out many important contracts.

Messrs. Bayer and Co., C.B. corset makers, of London and Bath, have purchased several acres of land near Stapleton-road Station, Bristol, for the purpose of erecting a stay factory and about 80 workpeople's dwellings. The cost of the factory, which has already been commenced, will be about £16,000. The plans have been prepared by Mr. F. Gardener, architect, of Queen-square, Bath, and the work has been intrusted to Mr. A. J. Beaven, of Bedminster.

## Our Office Table.

We understand that numbers of candidates have presented themselves for the important appointment of superintending architect to the London County Council, rendered vacant by the retirement under the age limit of Mr. Thomas Blashill. The salary offered is £1,500. As might have been anticipated, only a few, if any, of the applicants really represent what may be regarded as the artistic side of the architectural profession; but the great majority may fairly be classified as surveyors pure and simple, conversant with the intricate details of the London Building Act, and well qualified to deal with questions of street gradients, legally defined lines of frontage, and the thicknesses of walls; but not as a consequence necessarily keen in perception of what tends to add to or detract from the amenities of the Metropolis broadly regarded—to say nothing of the architectural beauty of a great city like London. Among the candidates are several well-known district surveyors. In view of the fact that the Works Committee meet to-day (Friday) to consider the applications, the officials at Spring Gardens found themselves unable to comply with our request for a full list of names, as they felt its publication by us would by some hours forestall the committee.

DEAN BRADLEY has issued an appeal to all lovers of Westminster Abbey to assist in completing the beautiful carved oak organ-case designed by the late Mr. J. L. Pearson, R.A. The northern portion of the instrument, he says, has been erected at a cost of about £1,200 as a memorial of one of the famous worthies of the Abbey, the great organist and composer, Henry Purcell, at whose bicentenary festival a moiety of this sum was raised. The rest was provided by the Chapter and by private subscription. The side of the southern half which overhangs the south aisle of the choir has recently been presented by a munificent donor in memory of her brother-in-law, to whom the Abbey is indebted for the gift of the celestial organ in the triforium. The sum of £1,000 is still required to clothe the unsightly pipes of the swell which face the ornamental northern section containing the great.

SOME of the new clauses in the Glasgow Building Regulations Bill to be introduced into Parliament next session are of general interest, especially in certain provincial cities. It is proposed to take power to disallow all building to a greater height than 80ft., with a view to secure that when such building is permitted there shall be adequate construction; and to give a right of appeal against it to owners of other buildings or of land within a hundred yards of the site. For this latter purpose there is to be a tribunal similar to that constituted by the London Building Act of 1894. As one means of limiting the damage that may be done by fires, there are certain regulations proposed with respect to the size of warehouses, &c. No building is to contain more than 250,000 cubic feet within party-walls, unless the owner be able to show that greater space is necessary for the purposes of his trade, and that he can make "proper arrangements for lessening danger from fire so far as may be reasonably practicable." In buildings of larger contents, party-walls 13in. thick of brick or stone must be inserted, with wrought-iron doors of certain dimensions; and even where the owner gives the assurances above described, the limit of contents will be 450,000 cubic feet, and the building must not exceed 60ft. in height, or be used for "explosive or inflammable materials." As the draft clauses now stand, "inflammable materials" are not defined, so that if the Bill should pass in this form the interpretation of that term will rest with the corporation. Another important clause of general application is that "buildings shall not be united except where they are wholly in one occupation, or are constructed or adapted to be so."

THE Local Government Board announce that with respect to the wheels of locomotives on highways, they have issued an amending order further varying the provisions of sub-section (4) of section 28 of the Act of 1873, by the substitution for the condition numbered 6 in the order of November 26, 1897, of the following condition:—"No such wheel shall be used any block of which is so worn that any metal rim surrounding the block protrudes beyond the surface of the block." Circulars have been issued by the Board to the councils of counties and



county boroughs, to boroughs other than county boroughs, and to urban and rural districts calling attention to the Locomotives Act, 1898 (61 and 62 Vict., c. 29), by which important change have been made in the law with respect to the use of locomotives on highways and to extraordinary traffic.

ACCORDING to a German report, Belgium exports a sort of black marble which is nothing else than prepared slate. The slate suitable for this purpose is first polished very smooth with a sandstone, so that no visible impression is made on it with the chisel; this is the rough polish. After this it is finely polished with extremely light natural pumice stone. The polished surface now presents a velvet-like soft appearance. The surface is then dried and heated thoroughly, whereupon the finely-polished surface is impregnated with a heated mixture of oil and fine lamp-black. This is allowed to remain for twelve hours. According to whether the slate used is more or less grey, the process is repeated until it loses its grey appearance. It is then polished thoroughly with emery, which is taken on a linen rag, and finally polished with tin ashes, to which is added some lampblack. After the polishing is finished wax dissolved in turpentine is spread over it, and it is allowed to remain some time before it is rubbed off vigorously with a clean linen rag. The slate thus treated now has a deep black appearance, and looks like black marble, and the polish is just as durable as the latter. The polished surface can be etched, engraved, gilded, and silvered, just the same as genuine marble.

A FEW years ago successful efforts were made to induce the Treasury to purchase from Sir J. W. Ellis the Bute-house Estate at Petersham, which he was laying out with a view to development as a building estate. This property, lying as it does immediately below the Thompson walk in Richmond Park, and forming the foreground of the magnificent view, has now, we are glad to hear, by generosity of an inhabitant of Petersham, been preserved from the hands of the builder, the lady in question having purchased the whole 21 acres, with the intention of preventing building thereon, with the exception of a new church and parochial room for Sunday-school and institute purposes, which she proposes to erect in memory of her father. The Georgian high-pewed and galleried parish church, with its monuments of Vancouver and others, will still be retained and used.

THE old quarry on the borders of Dartmoor, from which the granite was obtained to build London Bridge, has recently claimed some attention. This now deserted quarry is situated on the side of Hey Tor, one of the rocky hills that fringe the southern side of the moorland, near Bovey Tracey. London Bridge was opened some seventy years ago, and since then the curious granite tramway that led from the quarry to the highway near Bovey Tracey has been disused. Now, almost the last traces of it are being carted away, for the local farmers find the great slabs of granite exceedingly useful for gate posts. The stone was quarried here, and run down in trucks along the grooved slabs; then carted to the town of Newton Abbot, eight miles away, and thence barged down the estuary of the river Teign to Teignmouth, six miles distant, whence it was transhipped, and taken by sailing vessels to the Port of London.

The London County Council considered on Tuesday a recommendation from the Technica Education Board for the purchase of Oxford Mansions for £35,750, for the establishment of a Central School of Arts and Crafts. Objection was taken that a free school of that kind would be a serious rival to the Polytechnic, and the matter was referred back to the committee to endeavour to secure a freehold site.

At a meeting of the Arts and Crafts Club held at the Dean Studio, Edinburgh, on Monday, Mr. G. S. Aitken, architect, delivered the second of a course of twelve lectures on Mediaeval architecture. The special branch of the subject, which embraced Italian, Lombardic, and Rhenish Romanesque, was illustrated by diagrams and photographs.

The limited competition for the Shattuck Prize, offered by the Mechanics' Charitable Association of Boston, Mass., for the best design for workmen's houses has been decided by the award of the prize to Mr. R. C. Sturgis, of Boston. The open competition has also been decided in favour of Messrs. George E. Barton and George G. Willis. The vote of the jury was unanimous.

## MEETINGS FOR THE ENSUING WEEK.

MONDAY.—Royal Institute of British Architects. "Comparative Value of Documentary and Architectural Evidence in Establishing the Chronology of English Cathedrals," by Francis Bond, M.A. 8 p.m.  
Society of Arts. "Acetylene." Cantor Lecture No. 1, by Professor Vivian B. Lewes. 8 p.m.

Liverpool Architectural Society. "Liberalism and Conservatism in Architecture," by Edmund Rathbone. 6 p.m.  
TUESDAY.—Institution of Civil Engineers. "Electrical Transmission of Power in Mining," by William Beedie Esson, M.Inst.C.E. 8 p.m.

WEDNESDAY.—Society of Arts. "Long Distance Transmission of Electric Power," by Professor George Forbes, F.R.S. 8 p.m.

FRIDAY.—Architectural Association. "Oriental and Bay Windows," by Paul Waterhouse, F.R.I.B.A. 7.30 p.m.

## THE ARCHITECTURAL ASSOCIATION.

NOVEMBER 25th.—ORDINARY MEETING at No. 9, Conduit-street, W., 7.30 p.m. Mr. PAUL WATERHOUSE, M.A., on "ORIENTAL AND BAY WINDOWS."  
E. HOWLEY SIM, Hon. Sec.  
G. B. CARVILL

## The Society of Architects.

Founded 1884. Incorporated 1893.

THE FIRST ORDINARY MEETING of the Society of Architects for the Session 1898-99 will be held at the Rooms of the Society, at St. James's Hall, Piccadilly, W., on THURSDAY, November 24th, 1898, at Eight o'clock p.m., when the INAUGURAL ADDRESS will be delivered by Mr. T. WALTER L. EMDEN, J.P., L.C.C., President.

ELLIS MARSLAND, Hon. Sec.  
C. MCARTHUR BUTLER, Sec.

## The Society of Architects.

Founded 1884. Incorporated 1893.

THE SOCIETY OF ARCHITECTS, St. James's Hall, Piccadilly, W., will hold an EXAMINATION in Architecture and Construction on APRIL 12th, 13th, and 14th, 1899, in the following subjects:  
Section I.—ARCHITECTURE. Subject (a), Planning and Design. Subject (b), Architectural History.  
Section II.—BUILDING CONSTRUCTION AND MATERIALS. Subject (a), Construction. Subject (b), Materials.  
Section III.—PRACTICE. Subject (a), Specifications. Subject (b), Measurements and Valuation. Subject (c), Contracts.  
Section IV.—SANITARY SCIENCE.

The latest date for entering for the Examination is March 23rd, 1899. Syllabus free. Copies of the last Examination Papers, one shilling. To that Candidate who shall pass the Highest Examination, the GOLD MEDAL of the Society will be presented, a SILVER MEDAL to the second in merit, and BRONZE MEDALS for special excellence.  
ELLIS MARSLAND, Hon. Sec.  
C. MCARTHUR BUTLER, Sec.

## CHIPS.

A new theatre has been erected at Hammersmith from the designs of Mr. Bruton, architect, Trafalgar-square, and special consideration has been given to the ventilation, which has been carried out on the Boyle system.

At Lambeth police-court, on Tuesday, Abraham Baker, 45, a builder, was charged, on remand, and on his own confession, with unlawfully and maliciously setting fire to the dwelling-house, No. 139, Victoria-road, Peckham, persons being therein at the time. He was committed for trial, the magistrate offering to accept bail.

A stained-glass window is about to be placed in Revelstoke Church, as a memorial of the first Baron Revelstoke. Messrs. Fouracre and Co., of Stonehouse, Plymouth, are the artists.

The County Infirmary, Downpatrick, is being warmed and ventilated by means of Shorland's patent Manchester grates, the same being supplied by Messrs. E. H. Shorland and Brother, of Manchester.

The urban district council of Wembley, Middlesex, have elected as surveyor, Mr. Cecil R. W. Chapman, who for the last four years has held a similar appointment under the Swaffham Urban District Council. There were 120 candidates for the post.

Kensal Rise has been selected by the Dean Vaughan Memorial Committee as the neighbourhood in which they will erect their memorial church. The committee met last Saturday at the Church House, and approved the designs of Messrs. J. E. K. and J. P. Cutts, and the building will be erected next year. It is to cost £7,500, exclusive of the tower and spire, which are to be left as a second section of the work.

Great havoc was wrought at Boughton Monchelsea on Friday by an outbreak of fire which occurred on the premises of Messrs. Wood and Son, builders and contractors. Messrs. Wood's premises are situated in the centre of Boughton village, and nearly the whole of the material which was on hand, as well as valuable machinery, was destroyed. The fire broke out in the engine shed, and was caused by the lamp under the ignition tube of the driving engine exploding.

## LATEST PRICES.

IRON, &c.		Per ton.	Per ton.
Rolled-Iron Joists, Belgian.....	28 0 0	to	28 10 0
Rolled-Steel Joists, English.....	8 10 0		7 0 0
Wrought-Iron Girder Plates.....	5 15 0		6 10 0
Bar Iron, good Staffs.....	7 5 0		8 5 0
Do., Lowmoor, Flat, Round, or Square.....	17 0 0		17 5 0
Do., Welsh.....	5 15 0		5 17 6
Boiler Plates, Iron—			
South Staffs.....	7 17 6		8 5 0
Best Snedshill.....	10 0 0		10 10 0
Angles 10s., Tees 20s. per ton extra.			
Builders' Hoop Iron, for bonding, &c., 26 15s.			
Builders' Hoop Iron, galvanised, £15 10s. 0d. per ton.			
Galvanised Corrugated Sheet Iron—			
No. 18 to 20. No. 22 to 24.			

8ft. to 10ft. long, inclusive	Per ton.	Per ton.
gauge.....	£10 15 0	£11 0 0
Best ditto.....	11 5 0	11 10 0
Per ton.		Per ton.
Cast-Iron Columns.....	£8 5 0	£8 15 0
Cast-Iron Stanchions.....	6 5 0	8 15 0
Rolled-Iron Fencing Wire.....	7 0 0	8 0 0
Rolled-Steel Fencing Wire.....	7 0 0	7 10 0
Galvanised.....	10 10 0	11 10 0
Cast-Iron Sash Weights.....	4 2 6	4 5 0
Cut Clasp Nails, 5in. to 6in.....	8 15 0	9 15 0
Cut Floor Brads.....	8 10 0	9 10 0
Wire Nails (Points de Paris)—		
0 to 7 8 9 10 11 12 13 14 15 B.W.G.		
9/0 9/8 10/10 10/9 11/6 12/6 13/6 15/8 17/8		per cwt.

Cast-Iron Socket Pipes—		Per ton.
4in. to 6in.....	£5 10 0	to £5 15 0
6in. to 8in.....	5 0 0	5 10 0
8in. to 10in. (all sizes).....	4 15 0	5 0 0
[Coated with composition, 2s. 6d. per ton extra; turned and bored joints, 6s. per ton extra.]		

Pig Iron—		Per ton.
Cold Blast, Lilleshall.....	105s.	to 110s.
Hot Blast, ditto.....	57s. 6d.	to 62s. 6d.
Wrought-Iron Tubes and Fittings—Discount off Standard Lists f.o.b. —		
Gas-Tubes.....	per load	75p.c.
Water-Tubes.....		70
Steam-Tubes.....		62½
Galvanised Gas-Tubes.....		55
Galvanised Water-Tubes.....		55
Galvanised Steam-Tubes.....		45

Zinc, English.....		Per ton.
Do., Vieille Montagne.....	£27 0 0	to £27 5 0
Sheet Lead, 3lb. per sq. ft. super.....	28 5 0	28 10 0
Fig Lead, in 1cwt. pigs.....	15 10 0	16 10 0
Lead Shot, in 25lb. bags.....	14 15 0	15 15 0
Copper Sheets, sheathing and rods.....	13 7 6	14 7 6
Copper, British Cake and Ingots.....	65 0 0	66 0 0
Tin, Straits.....	55 10 0	56 0 0
Do., English Ingots.....	83 2 6	84 2 6
Spelter, Silesian.....	86 5 0	87 5 0
Do., English Ingots.....	21 0 0	22 0 0

T I M B E R.		Per ton.
Teak, Burmah.....	per load	£13 0 0 to £15 10 0
" Bangkok.....		10 10 0 to 14 10 0
Quebec Pine, yellow.....		4 2 6 to 6 0 0
" Oak.....		4 2 6 to 6 0 0
" Birch.....		3 10 0 to 5 10 0
" Elm.....		4 10 0 to 5 10 0
" Ash.....		3 15 0 to 5 10 0
Dante and Memel Oak.....		2 2 6 to 4 2 6
Fir.....		2 15 0 to 4 15 0
Wainscot, Riga p. log.....		4 15 0 to 6 5 0
Lath, Dante, p. log.....		4 10 0 to 5 10 0
St. Petersburg.....		4 0 0 to 6 10 0
Greenheart.....		8 0 0 to 8 10 0
Box.....		4 5 0 to 15 0 0
Sequoia, U.S.A. ....	per cube foot	0 1 8 to 0 1 10
Mahogany, Cuba, per super foot		

lin. thick.....	0 0 5	0 0 6
" Honduras.....	0 0 4	0 0 6
" Mexican.....	0 0 4	0 0 5
Cedar, Cuba.....	0 0 4	0 0 4
" Honduras.....	0 0 3	0 0 4
Satinwood.....	0 0 9	0 1 6
Walnut, Italian.....	0 0 3	0 0 7
Deals, per St. Petersburg Standard, 120—12ft. by 1½in.		

by lin. —		
Quebec Pine, 1st.....	£18 0 0	to £24 10 0
" 2nd.....	13 0 0	16 10 0
" 3rd.....	6 0 0	9 10 0
Canada Spruce, 1st.....	8 10 0	10 10 0
" 2nd and 3rd.....	7 0 0	8 10 0
New Brunswick.....	7 0 0	8 0 0
Riga.....	7 15 0	8 15 0
St. Petersburg.....	9 5 0	13 15 0
Swedish.....	9 5 0	16 5 0
Finland.....	9 5 0	9 15 0
White Sea.....	10 5 0	17 10 0
Battens, all sorts.....	5 0 0	16 0 0

Flooring Boards, per square of lin. —		
1st prepared.....	£0 9 9	to £0 16 3
2nd ditto.....	0 8 3	0 13 3
Other qualities.....	0 6 6	0 7 6
Staves, per standard M:—		
Quebec pipe.....		
U.S. ditto.....	£35 0 0	to £42 10 0
Memel, cr. pipe.....	210 0 0	223 0 0
Memel, brack.....	180 0 0	190 0 0

O I L S.		Per ton.
Linseed.....	per ton	£16 17 6 to £17 7 6
Rapeseed, English pale.....		23 0 0 to 23 5 0
Do., brown.....		21 0 0 to 21 10 0
Cottonseed, refined.....		14 15 0 to 15 0 0
Olive, Spanish.....		28 15 0 to 29 0 0
Seal, pale.....		21 5 0 to 21 10 0
Cocconut, Cochiti.....		27 10 0 to 28 0 0
Do., Ceylon.....		24 15 0 to 25 0 0
Palm, Lagos.....		22 10 0 to 22 15 0
Oleone.....		18 15 0 to 19 15 0
Lubricating U.S.....	per gal.	0 6 3 to 0 7 6
Petroleum, refined.....		0 0 6 to 0 0 6
Tar, Stockholm.....	per barrel	1 0 0 to 1 5 0
Do., Archangel.....		0 12 6 to 0 15 0
Turpentine, American.....	per ton	23 15 0 to 24 0 0



# THE BUILDING NEWS

## AND ENGINEERING JOURNAL.

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FRIDAY, NOVEMBER 25, 1898.

### MODERN DEMANDS.

**S**TRUCTURAL details claim a larger portion of the attention of the architect than they did when buildings were mainly composed by the draughtsman with the aid of Vitruvius and Palladio. The planning and design of a building now involve a constant reference to Building Act regulations, protection from fire, the exigencies of exit, modern comfort, manufacturers' catalogues, and data. There is no cessation from the demands of the engineer, whether he be called "constructional," "heating and ventilating," "sanitary," or "electrical." No doubt the demands are perplexing and bewildering to the architect of an artistic bent. In the construction of complex buildings, like large hotels, mansions in flats, municipal edifices, and the like, the architect has not uncommonly to assume the rôle of consulting architect, and under his generalship direct an army of specialists and sub-contractors at work. We have lately referred to the consequences of this condition of affairs: how it will reconstitute the profession, by compelling the architect either to follow the art branch of his profession, or to become a "general" of craftsmen each having his own sphere and responsibility in the work, instead of mere machines in the hands of a capitalist builder. The author of a paper read before the American Institute of Architects proposes the employment of the engineer by the architect. But we are now not so much concerned with the probable result of the disintegration inseparable from specialism, or the splitting up of the architect's profession into a number of independent engineers and artists, as the tendency this implies to break up the harmonious relation of one business with another. The architect has to struggle with a number of opposite forces, bringing them into something like agreement; and if he can, so to speak, determine the "resultant" of these many forces, so much the better for him. His hands are by no means free; he is hampered by by-laws, by manufacturers, and by patented inventions, and by a number of technicalities inherent in the conversion of materials or the manufacture of goods. The principal forces that appear to conflict with the city architect are the demands for tall buildings on narrow or cramped sites, fireproof construction, the exigencies of light, various apparatus and fittings for buildings, the popular taste for cheap decoration, and the like. We cannot now dwell on more than one or two of these demands. The absolute demand to utilise ground area in our cities is perhaps the most far-reaching of the factors that are moulding our town architecture; for this demand entails many very specialised forms of engineering and construction—steel construction or frame building, such as developed in Chicago and New York, lighter and thinner "filling-in" in the place of thick walls, fire-resisting floors and arrangements, good lighting, rapid means of transit from floor to floor, &c. The London Building Act restricts the height of buildings to 80ft., exclusive of roof and other features, and it has prescribed thicknesses of external and party-walls, regulations that will prevent any approach to the tall "sky-scraper" of the American city. Practically, however, these rules are evaded by front walls perforated by window openings, iron shop-fronts and plate glass often rising two or more stories, and by light iron construction within. In fact,

with the exception of the party-walls, a building may become a skeleton structure; and it is one of the exigencies of crowded city life. The architect has only to make the best of it. He cannot produce anything that is architectural in a front crowded with windows or of iron framing and plate glass; but he can make an agreeable glass case, and so dispose his iron pillars or stanchions and girders within in the least objectionable or awkward manner. With the assistance of such useful fittings as Hayward's "Luxfer Prisms," and iron staircases, he can, even in a narrow city lane, produce a light or agreeable interior. But directly he tries to build a Florentine or Venetian palace, or introduce an unmitigated "Queen Anne" façade, to a modern shop within, he makes the whole thing ridiculous. Is not this the usual cause, however? In such a case we see the architect struggling hopelessly against his conditions, disappointing his client, and provoking the satire of the public. No doubt it is a bold thing to do—to defy the public sense of propriety; it may be even a clever and highly artistic frontage, showing the master in every detail; but unless it can be carried throughout consistently with the requirements of the building, the art is misapplied. We are speaking of narrow frontages. It is questionable whether it is justifiable to attempt to make a building of this kind architectural in the usual sense of the term, or to apply any traditional style to it. Rather, we should say, let the architect treat it as a piece of independent construction—of iron or brick as the case may be, simply aiding the constructional engineer or bricklayer to put his work into the best form he can.

The profession have now to face a surplussage of materials, scientific systems, and invention. There are limits beyond which the architect cannot go: he cannot, for example, employ concrete in large masses either as slabs or beams, unless reinforced with other materials—iron or steel—in the form of bars or rods to assist in resisting tension. The fireproof or iron and concrete floor is a case in point. He cannot have a span or unbroken distance between his rolled iron joists or girders of more than 7ft. or 10ft. Directly he oversteps these limits of cohesive strength, he is exceeding the natural strength of the material, and it would be better for him to employ timber or iron in the usual manner, protecting his iron-work or timbers by a ceiling such as that which the Expanded Metal Company provide—namely, a suspended ceiling hung from the steel or wooden joists, composed of a thin concrete slab and expanded metal lathing imbedded in the lower side, by which considerable tensile strength is secured. In other cases the concrete slabs with imbedded metal lathing or bars are placed above the joists or steel joists, which are also incased in concrete, thus forming a series of coved panels below; or arched ribs of channel-iron and concrete are carried by the flanges. Such ceilings admit of decorative treatment: the incased iron joists can be made to assume the appearance of beams, or, if so desired, their flanged form can be retained by simply plastering on a casing of metal lathing close to, or within an inch of, the metal. Confining our attention here to the decorative treatment of modern floor systems, various kinds of metal lathing, like the "Jhilmil," the "Expanded Metal," and of special plasters, as the asbestos, call for the architect's attention. These means of incasing enables him to surround his beams and girders with a fire-protecting material that would be impossible with wood—in short, to apply plaster to features formerly covered by wooden casings. He can form handsome cornices, coves, and inside domical ceilings that may fitly vie with stone. But there are limits. It is neither prudent nor honest to employ these plastic decorations by

themselves—in other words, to use them without any reference to construction behind. We have seen lately many instances of what we mean. A new restaurant buffet is partly lighted by a domical lantern, which is shaped to represent a dome by deep covings and enriched plasterwork cradled out from the flat roof. Deep coves spring also from rich cornices round the room; but there is no construction behind to warrant such decoration. The whole has been "constructed" or bracketed out. In the decoration of the auditorium ceilings of theatres devices of this kind are often used. Metal-lath moulded concrete or plaster may easily fall into this mistake as a means of "constructing decoration," thus exceeding the proper limits of incasing. The very exaggerated cornice, and covings above, one sees in many new assembly halls and concert rooms look crushing. They diminish the apparent size of the interior. We should not complain if such a coving was to conceal iron corbels or brackets unsightly in themselves, though we should rather in this case incase each bracket singly. In short, we forget the limit of the material, in this case concrete or plaster, by using it in thin curved slabs: we exceed the proper and honest use of the material. We can refer to other examples of this tendency to apply to wrong or false uses a material or an invention designed for another object. Are not many of the useful ornamental fabrics in the market intended for dadoes and ceilings sometimes used to exceed the limits of honest decoration, as when we find them used round piers, pillars and ceiling beams, &c., quite regardless of the embossed pattern, which is often cut across in every direction? All surface decorations are open to this misuse, and on this account they need to be sparingly introduced. The misemployment of such materials for ceiling decoration is common enough, and is already carried to such an extent in restaurant, hotel, and cheap shop decorations as to disgust the architect with them. When we see the pattern cut close round lantern lights, chandeliers, cross beams without any margin or even moulding, and pillars and everything covered by it, we begin to ask where is this kind of decoration to stop? Modelled plaster-work, panelled wood ceilings, and the like are out of the reach of the many, and it is a strong temptation to employ cheaper imitations of the plaster and wood-carving of our Old English and Tudor houses; and it is only by observing the limits of honest construction that we can stop the abuse.

### MODEL SPECIFICATIONS.—XL.

#### THE TILER.—PLAIN TILING.

**T**ILING is very much in favour just now, and has many advantages over slate for steep-pitched roofs. Of the many kinds of ordinary tiles the Broseley have a high reputation. They are 10½in. long, 6in. wide, and ¾in. thick. They are made with three ribs cast on the head for hanging. As to quality, the kind to use are those of a hard vitrifiable nature; the tile should also have a metallic sound when struck. Those of bright red are often absorbent. Hip and valley tiles should also be made to lie flat on the adjoining roof-planes. In specifying for any important piece of tiling, it is a good plan to require that the angles of all roofs for gables, hips and valleys, octagon roofs, dormers, and the like should be sent to the tile-maker, so as to secure the right angle for hip or valley tiles and ridges. Hip-tiles and valley tiles should have a greater angle than the real angle between the two sides of roof, and they are generally made about 10° more, to allow for the tiling and the thickness of the eaves-tiles. If the angle of hip-tile is not made larger, the result is that it sticks up above the roof awkwardly, while a badly-fitting valley tile is even worse, and



cannot lie flatly on the adjacent surfaces. Another point required is that the horizontal and vertical joints or "perpendiculars" be kept true. The latter should run in regular vertical lines from eaves to ridge, each vertical joint coming in the centre of the tile below it.

Tiles are usually hung on battens bedded in lime and hair mortar, placed at the distance of gauge apart, and these battens are sometimes fixed to vertical battens which are spiked through the layer of felt and boarding. Another modern system is to have feather-edged boards, 6in. wide, with the top edge  $\frac{3}{4}$ in. thick, upon which edges the ribs of tiles are hung, thus combining boarding and battening. In all cases roof boarding and felting before the battens or laths are laid are desirable. For ridges the tiles may be alternately tile and tile and a half. Avoid narrow strips of tile. The plainer the ridge tiles the better. Those we show (sketch 1) are effective. The vertical joints should be drawn up solid with cement. In bedding tiles on mortar the tops only should be thus treated, or the capillary attraction would suck up the moisture. Our sketches illustrate plain tiling for roofs and walls, 1 and 2; one and half tiles, 3; hip-tiles, 4; angle and ornamental tiles and ridge-tiles, 5, 6, 7.

#### INSTRUCTIONS.

Give description of tiles, the maker's name, the gauge, how laid, whether with pins or ribs cast on; also if the tiling is laid dry, if bedded in lime-and-hair mortar or cement. The tile-laths should be described and taken with tiler. Specify if tile and a half to be used, the valleys, and if hips and valleys are to have purpose-made tiles; if there are hip-knobs, how the verges are formed.

Several excellent tiles are to be had, such as the Brosely plain tiling, showing 3in., 3 $\frac{1}{2}$ in., and 4in. on the face, with ribs cast on to hang on double fir or oak laths; J. C. Edwards' (Ruabon) machine-made and pressed tiles; the Hartshill Brick and Tile Co. (Stoke-on-Trent) interlocking tiles, and other makes.

On flat roofs the gauge should not be more than 3in. A 4in. gauge allows a 2 $\frac{1}{2}$ in. lap, a 3 $\frac{1}{2}$ in. gauge 3 $\frac{1}{2}$ in., and a 3in. gauge 4 $\frac{1}{2}$ in. lap. For ridges and hips, purpose-made tiles are made, to work with ordinary tiling. We can recommend the Ruabon ridge-tiles in red, brindled, blue, pink, and buff, and of artistic design. No flatter pitch than half is safe for tiles.

Tiles are also made of ornamental shape at the bottom. In specifying ornamental tiling, state the distance of ornamental courses apart, how many courses wide, or state the number of plain and ornamental courses.

Tiles are hung sometimes on laths of oak or fir by wooden pins, often by ribs cast on the top edge of tile. Sometimes only every third or tenth course is nailed. For walls, battens nailed or plugged to walls are the best mode of fixing for vertical tile-hanging, the top of each tile being bedded in hydraulic mortar, and the bottom double course bedded and pointed in cement on a tilting fillet.

The following data may be useful. For tiling laths or battens use 1 $\frac{1}{2}$ in. by  $\frac{3}{4}$ in. to 2in. by 1in., and oak laths 1 $\frac{1}{2}$ in. by  $\frac{3}{4}$ in. A square of tiling requires 800 plain tiles laid to a 3in. gauge, or 700 tiles laid to a 3 $\frac{1}{2}$ in. gauge, or 600 tiles to a 4in. gauge, and one square of plain tiling weighs about 15 cwt. Well shaped tiles should be rather hollow in their length, so that the tail of each course may lie close on the band of course below. In asphalted felting the joints should have a lap of 2in. or so, and be nailed at intervals of 2in., with clout nails about 1in. long and dipped while hot in oil.

Pins or nails are made of oak, iron, galvanised iron, zinc, &c.

Hip-hooks for securing hip-tiles are made

ornamental, and a sketch should be given; also of hip knobs.

We append a few general clauses:—

1. *Tiling to Main Roof.*—Cover roofs with best Brosely (Aylesford Pottery Co.'s pressed roofing tiles or other approved tiles) of true shape and even colour, free from fire-cracks and other defects, laid to a 3 $\frac{1}{2}$ in. gauge, with two stout 1 $\frac{1}{2}$ in. zinc (or copper nails) to each tile on red fir sawn laths 2 $\frac{1}{2}$ in. by  $\frac{3}{4}$ in.

2. *Hip and Valley Tiles.*—The hip and valley tiles to be purpose-made, accurately fitted to slopes of roof, and to course and bond with the tiling, and to be cut as required. The eaves-course to be double, and bedded in cement.

The ridge to be covered with Edwards' (Ruabon) No. 26 tile ridge, bedded and jointed in cement, and splay and fit all ends, and make accurate three or four-way intersections, and fix Edwards' No. — hip knobs in cement.

3. *Common Roofing.*—Cover the roofs with tiles of true shape, free from fire-cracks and other defects and of uniform (or approved) colour, with double course at eaves, laid to a 4in. gauge in lime and hair, just sufficient to bed them. The tiles to be fixed with stout galvanised wrought-iron pins and broad heads in 1 $\frac{1}{2}$ in. by  $\frac{3}{4}$ in. strong sawn fir laths, to be cut closely to hips, ridges, &c. Put to all verges, hips, and valleys tile and a half to break joint, and the verge tiles to be bedded and pointed in pointed cement. Or—

Cover the roofs with J. C. Edwards' (Ruabon) tiles of best quality, or the Hartshill Brick and Tile Co.'s (Stoke-on-Trent) pressed, smooth-faced roofing tiles (or sandy faced plastic tiles) laid to a 3 $\frac{1}{2}$ in. (or 4in.) gauge, bedded in hydraulic lime and hair mortar (or cement). The horizontal and vertical joints to be kept true, and to be cut and dressed to hips, ridges, valleys, and verges, and the courses to be properly bonded, and to be hung to 1 $\frac{1}{2}$ in. by  $\frac{3}{4}$ in. sawn red fir laths, spiked to 2 $\frac{1}{2}$ in. by 1in. fir battens from eaves to ridge, 12in. apart spiked through felt to boarding. Put half-tiles to eaves, and tile and a half to verges, and double course at eaves. Or—

4. *Special Tiling to Roofs.*—The roofs are to be covered with Brosely (or Ruabon) plain tiles, even in thickness, square, and free from cracks and defects (or of approved quality, as per specimen), laid to a 3 $\frac{1}{2}$ in. gauge and bedded in lime and hair mortar, but not to reach to the tail of the tile. The eaves to have a double course bedded in cement. The horizontal and vertical joints to be straight, and the courses to be neatly cut to the hips and ridges, gables and valleys. The courses to properly bond, to be laid flat, and to be hung (if with cogs cast on) on double fir horizontal sawn laths 1 $\frac{1}{2}$ in. by 1in. (or fixed with stout galvanised wrought nails with broad heads). Put to all verges, hips and valleys, tile and half to break-point, and bed and point the verge tiles in cement, and leave roof water-tight at completion.

5. *Dormer.*—Cover cheeks of dormer with the same tiles on double fir laths fixed to upright battens 2 $\frac{1}{2}$ in. by  $\frac{3}{4}$ in., 12in. apart, spiked through the felt to boarding.

6. *Hips and Valley Tiles.*—The hips and valleys to have purpose-made tiles (Brosely or Ruabon), made to an angle of 10° greater than that between the adjoining roof planes, so that the tiles may fit closely on the backs of the plain tiling. The tiles to course and bond with the roof tiling, and to be nailed with 3in. nails.

7. *Ridges and Hip Knobs.*—Finish the ridges with an approved pattern tile ridge (or No. — tile ridge in J. C. Edwards's, Ruabon, or other catalogue), bed and joint in cement. The apex of each hip to be finished with No. — Ruabon hip-knob, bedded and jointed in cement. Or—

The ornamental ridge tile cresting to be as shown on sketch, jointed together with oak dowels and bedded in cement. The hip ends, as shown, bedded in cement. (Valleys are sometimes formed in lead, and also hips and ridges, but when close-fitting tiles can be obtained lead is unnecessary.) Or—

8. *Gable Ends.*—The gable ends to have a finial as shown (or No. — in catalogue of maker, or if no finial, the ridge tile at end to be secured by ornamental wrought-iron hooks to design (allow p.c. cost for same).

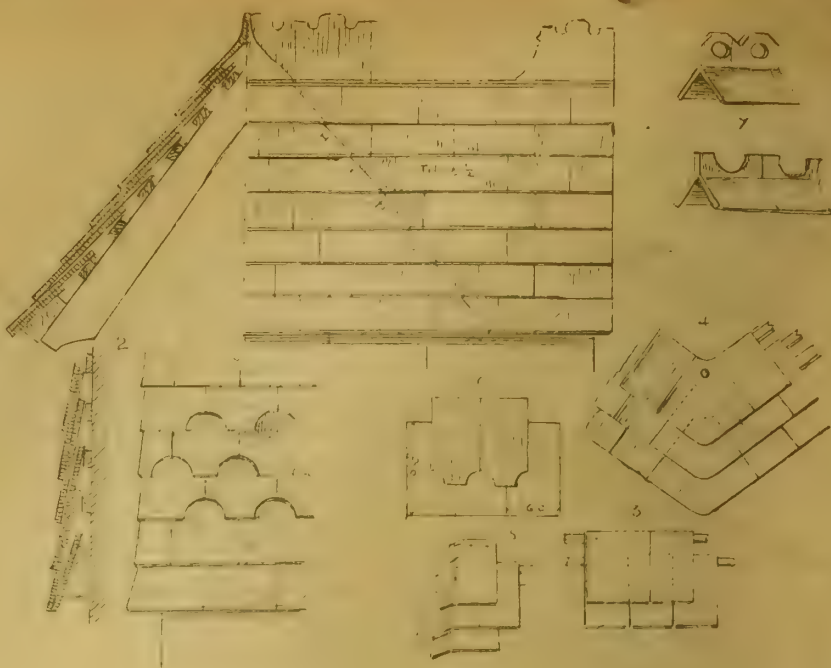
9. *Superior Tiling.*—Cover the roofs with the first quality hard-burnt pressed Brosely patent interlocking (or other approved) tiles, true in shape and of uniform colour (or equal to samples submitted), with ribs laid to a 4in. gauge, hung on battens; each tile bedded at top in lime-and-hair mortar, with hip and valley tiles of correct pitch, double course at eaves, and execute all cutting to hip valleys, gutters, dormers, chimneys, &c.

10. *Hips, &c.*—The hip tiles to be nailed with stout zinc nails and bedded and pointed in cement, with hip-knobs No. — in Edwards' Catalogue. The ridges to have tiles of approved design (or to No. — pattern) of proper pitch, the vertical joints lapped (or jointed with cement), with all mitred intersections, &c. Or—

11. *Ridges.*—The ridges to be of approved make and design, or to sketch, with lapped joints and of proper pitch, bedded in hair mortar and pointed in cement, with mitres, intersections, &c. (Sometimes a ridge cresting or plain ornamental blade of cast iron or tile is fixed into a groove at the top of wings.) Or specify the Aylesford Pottery Co.'s (Maidstone) ridge tiles and hip knobs, stating number of pattern.

12. *Wall Tiling.*—The upper story to be tile-hung with Brosely (Edwards, Ruabon, or Hartshill Brick and Tile Co., Stoke-on-Trent), or other approved tiles, bedded and pointed in hydraulic lime and hair mortar (or hung dry), nailed with copper or galvanised-iron nails to fir battens, 2in. by 1in., plugged to brickwork. The bottom course to be laid double on tilting fillet, as shown. The angle tiles to be of the best make, close fitting to sides, bedded and pointed in cement, and nailed with copper nails.

13. *Ornamental Tiling.*—The upper part of walls to be hung with plain and ornamental tiles, the latter on courses three or more wide (or state pattern in Edwards, Ruabon), or other maker, with angle tiles bedded and pointed in lime and hair mortar (or hung dry) and nailed with copper





or galvanised-iron nails to fir battens 2in. by 1in. fixed to vertical pieces built in walls 14in. apart (or if with cast ribs) hung on battens as before.

14. *Leave Perfect.*—Clear out gutters, and leave all roofs perfect and waterproof.

We append here a few clauses relating to slate mason's work, not given in our last issue.

#### SLATE MASON.

10. *Slate Cistern.*—Provide and fix 1½in., rubbed both sides, slate cistern, to hold 200gals., grooved together at angles, jointed in red-lead cement, and secured by ½in. galvanised-iron bolts, with all necessary holes for service and waste. Or—

*Slate Cistern.*—Provide and fix on proper deal bearers under roof a slate cistern, 5ft. by 4ft. by 2ft. 6in. deep (or other dimensions in clear), with 1½in. or 1¼in. planed outside Bangor slate slabs, grooved together at angles, with red-lead cement, and secured by four ½in. galvanised-iron rods, nuts, and washers, with cut holes for supplies and wastes.

11. *Slate Sink.*—The slate sink to be of 1½in. Bangor (planed both sides) slate, 4ft. by 2ft. by 6in. deep, with rounded top edges, grooved at angles in red-lead cement, and secured at ends by two ½in. galvanised iron bearers and nuts, and drilled for waste pipe.

The lavatory to be provided with a 1in. (or 1½in.) rubbed one side slate slab, rounded on front edge, with holes cut for basins, soap-dish, &c., fixed on 3in. by 2in. cut and shaped slate or galvanised-iron bearers, with a 6in. by ½in. rubbed slate skirting round three sides, quadrant ends, rebated to top in red-lead cement, fixed with brass screws, drilled and plugged to walls in oil cement.

12. *Larder Shelves.*—Fix Valentia slate shelves 1½in. thick, sawn and rubbed both sides, 5ft. long and 2ft. 6in. wide in larder (or dairy), pinned into walls on proper galvanised-iron or wood bearers. The joints to be rebated and set in oil cement, and the corners rounded.

13. *Slate Skirting.*—Fix 8in. by ½in. slate skirtings, round back or side, let into rebate in red-lead cement, plugged and screwed to walls, with countersunk heads.

14. *Chimney-pieces.*—Provide black (or other imitation marble) enamelled chimney-pieces, p.c. £6, and fix the same in library or dining-room with necessary iron cramps.

#### "BUILDING NEWS" DESIGNING CLUB.

##### A COUNTRY HOUSE.

SEVENTY designs, or thereabouts, sent in for the first subject in the new session of our perennial Club certainly augur well for the continued prosperity and popularity of its work during the coming year. We cannot, of course, hope that all who have thus entered the lists will continue; but we note with pleasure that several old members are persevering in their endeavours, some under new mottoes, with their former energy, determined to win places in the long-run. There is the advantage, seeing that by renewed trials of their skill, where there is a fair field and no favour, merit is bound to meet with a recognition sooner or later. Beyond, too, these limits of immediate success come the experience and knowledge gained by repeated attempts in design, which otherwise might, most probably, never be entered upon at all. We say this to encourage the rank and file of our club in their earlier efforts, when, by the very nature of things, it is impossible to afford them individual criticism. To notice all would fill the pages of the *BUILDING NEWS*; but with the space at the referee's disposal, the best that he can do shall be done in reviewing the designs, and we promise that every design shall have the attention it deserves.

With such an array of designs for this, the first subject, "A Country House," it is not surprising that we had some little difficulty at arriving at a choice. The result we illustrate to-day: "Thistle" comes in first, "McGilligan" second, and "Trefriw" third. The following were the instructions issued for the guidance of competitors:—

"A.—A country house in brick and half-timber, to be erected on a hillside site at a cost of about £6,000. The accommodation to include a good hall adapted for use as a living-room as well, and to have a gallery connected with the first floor at one end, with space for a small chamber-organ. The area of this apartment to be, roughly, 24ft. by 19ft., and to open from a porch, and to have

a good bay window besides. The drawing-room may be 15ft. square, opening out of the hall as an adjunct to it. The dining-room to be 20ft. by 16ft., or of that area. There must be five bedrooms and a night nursery. Two good bedrooms for maid-servants. The man's room may adjoin the butler's pantry. Two bath-rooms and two w.c.'s in the house, one being intended for gentlemen. The kitchen and offices and servants' w.c. outside to be of the usual character in keeping with such a house; but the isolation of smells from cooking to be provided for. The main accommodation to be on two floors. The chief suggestions to be observed in planning this house are comfort in arrangement and refined considerations as to practical and artistic contrivance of the rooms in relation to each other, recognition of aspect, a sense of spaciousness without forgetting economy of space. Wasteful landings and cramped head-room in staircases to be avoided. The height of ground-floor rooms to be 11ft. 6in., and first-floor rooms 9ft. 6in. The hall to run up through both floors. The house to face south, but the entrance may be on the north side. View of north side, elevation of south side, and one end elevation, as well as one good section required. The geometrical drawings to be drawn to ¼th scale; the plans may be to ½ scale. Quiet simplicity picturesquely treated will have a preference, rather than ornate elaboration of design. Site falls one in twelve from north to south. From east to west it is level, and this is to be the long way of the building."

There would be little advantage in generalising upon the designs as a whole, though some may wonder what the prevailing type of work may chance to be illustrated on the whole in such a numerous display of schemes for one house planned on the same set of conditions. To such an inquiry we may briefly say that no prevailing mannerism is evinced. The designs come in from all parts of the kingdom, and they are equally diversified, and although very few indeed are really good, there is a higher degree of merit, looking at the matter in its widest sense, than would have been possible a quarter of a century ago. Now, as then, really clever work is as rare as ever. To expect students in our class to do work equal to past masters of the craft, would be unreasonable; but this we may confidently assert, that not a few of these designs put many a man, calling himself an architect, and practising as such, to shame. So much by way of preamble.

"Thistle" leads off, and gains no little advantage by being able to make a pretty drawing, and he has arranged his sheet nicely. The best draughtsmen generally make the best designers—a statement which some love to controvert. We will not go so far as to say that "Thistle" has made a model design for a country house; but he has handled it in some ways at any rate rather well—so much so that we shall hope to see him do better. His outer hall is not very light—indeed, it would be dark. A glazed front door might have improved it in this respect. The inner hall is fairly well screened from the outside; but, like a good many of the other plans, this hall is not well adapted as a living-room—one of the conditions. The light, at any rate, is ample, and the staircase is not too much in evidence. The "bay" scarcely realises our intention. The organ gallery encroaches unduly upon the upper part of the apartment for good effect; but this is due to the way in which the first-floor landing is contrived out of the hall. The billiard-room is ingeniously managed, and as an adjunct the garden-door suggested would be an improvement. The w.c. and lavatory for men work in very well, but the master's own room is badly lit. The service from the kitchen is ingenious, the kitchen is fairly well isolated, and the fatal mistake of bringing the servants round through the hall every time they go up and down stairs, as some of the plans before us render inevitable, has been avoided by "Thistle," who puts in a back stairs. The dark cramped h'e of a stairway to the so-called "turret" is a fault, and the turret itself is no improvement. Artistically so big a window as that to the hall seems to want a plainer treatment above it. Probably a plain brick gable would have looked the best. The turret grows out of nothing, and is meaningless. The absence of R.W. pipes is noted, and the way in which the building is put on the land has not been overlooked.

"McGilligan" spoils very much of the effect of his design by drawing on the stone slates so painfully. His view is conventional and

pretty. The squat tower with the domed roof is a matter of taste, which seems to us a little strained. The work shown by the section displays refinement and good taste. The plan provides no billiard-room; but then none was insisted on, and this design does show the drawing-room more as an adjunct to the hall, as asked for. The lobby to this smaller apartment crowds the room, and the angle does not besit the space well. There is an awkwardness, too evident in the plan, in the lobbies and passage adjoining the dining-room. There is better space for the organ; but we are not very charmed by the arrangement generally, and the walls on the first floor do not fit over those below in all cases—for instance, what becomes of the kitchen chimney-flue?—and the bedrooms above the butler's pantry have fireplaces over a void. These, and such as these, are faults enough to spoil any plan.

The third design, by "Trefriw," has its faults, and the view being in pure outline scarcely adds to the attractiveness of the building. It would strain the money limit which we stated; but we have chosen the scheme because it seemed to be the best of the more ordinary examples of a regulation type of half-timbered work sent in on this occasion. The plan is far from perfect;—the study should be near the library, and in other ways the house is too much divided by the big hall. The staircase hall is dark, and the second staircase off the hall is wasteful and clumsy. The drawing-room is not dignified, and the dining-room faces the south, while the morning-room could never obtain any sunshine, always so welcome at breakfast time in this country. The porch is poor. These are some of the faults which we have noted. It has a common-sense air about it, however, as a whole, and for this we thus give it a preference.

"Swan" in some ways is better than the last named, and, as a matter of fact, we felt very inclined to place him third; but his house is too much of a bungalow in type for a country house, and the planning of the hall with the verandah at the end, to say nothing of the ugly staircase and lobsided well-hole over the hall, could not be overlooked although the building happens to be shown by a more telling perspective. As a matter of fact, "Swan's" exteriors are not in the least degree in harmony with the inside of his house, and the plans are wasteful of space. He ought really to do better than this, and we hope he will. "Emma" exhibits taste and quaintness, coupled with an ingenuity of planning which, however, is a little too cut up. His treatment of the half-timber work to the left of his south front is very poor. The organ was not intended to be on the ground floor. The cottage-like effect of the exterior would more besit a farmhouse; the chimneys are paltry. "Vigornia" has a wasteful staircase hall, and sends a rambling plan divided by an ugly corridor down the centre of it on both floors. His elevations are better, being homely and quiet; they are neatly drawn, but should have been arranged on one sheet. The house is really too big. "Grip" is more in harmony with our conditions; but he wastes room over a staircase hall, and his organ, packed away in the corner over the porch, is a poor contrivance; otherwise his living-room hall is one of the best. Indeed, the plan is rather compact and clever. The elevations are commonplace and bald, though we see merit in the odd queeriness of the entrance front. The drawings lack vigour, and ought to have been contrived on one sheet. "Unknown" comes next with a compactly arranged plan, with many good points about it, showing a sense of fitness; but the hall, though very convenient in itself, is spoiled by the meaningless gallery on three sides, the organ being fixed in a sort of fireplace. The exterior, with the exception of the quasi-tower, is marked by taste. The perspective is an indifferent performance. "Unknown" ought soon to do better, and become less unknown. "Will-o'-the-Wisp" ranks among the first class in our list; but the ugly porch mars the entrance front. The plan is made to sit on the site more in accordance with our intention by taking it longways from east to west. The hall is nicely screened from draught. The organ-gallery is reached off the landing in an adroit way, and the garden-porch to the hall is a pretty idea. The folding-doors between the hall and the drawing-room would spoil the room when open, and quite mar its bay. The dining-room is an unhappy apartment sacrificed to the balancing of the bays on the exterior. It is all doors and windows. "The Auk" shows skill; but we do not admire his semicircular drawing-room, and think his hall



would be a very uncomfortable apartment. The hooded pent to the fireplace would always look dusty from the gallery, and the gallery would appear ungainly from below. The exterior, drawn in brown ink, is neat, and not wanting in some degree of domestic appropriateness; but it looks rather tame. There is more dash about "Scruton's" work, though his perspective is too all-over in drawing, thus losing point and effect. The chimneys are mean, but the south front approaches a success. The plan is concentrated and adroit, if not equal to more roomy proposals. The author is workmanlike, and has limited his scheme by an anxiety not to exceed the cost limit of £6,000.

We reckon upon his advance, if he will accept our criticisms and act upon them. "Pup" sends an ugly section of a pleasing design, and not a bad plan. He, too, is a promising contributor; but the west front is far better than the south, which is spoiled by the silly breaks at the eaves-level over the bays. They look so trumpery. Either good big plain gables should have been employed, or a bold cornice in a line with or below the eaves. In the latter case, the bays in perspective would form quite enough break. The present contrivance is neither one thing nor the other. The chimney on the main ridge is too squat. Look at some of Mr. Norman Shaw's houses, and see what he does with his chimneys. Skylines are sadly neglected by many architects, but never by Mr. Norman Shaw. "Merlin" draws neatly, and makes a great feature of his big hall; but we wish he had left out his smug circular bay turret with the extinguisher roof over the drawing-room. Such conceits are all very well for the detestable villadom of the speculating builder. Do let us build sensibly, and realise the beauty of well-proportioned simplicity. This circular bay is grand enough outside, whereas, within, a badly-planned little awkward bedroom is carried away by the contrivance. "Nothe" is the motto of a painstaking contributor, very well planned and neatly drawn. Three sheets of paper, however, are used, and so if we decided to publish the design we should be compelled to cut up the sheets and rearrange the parts. The author of this design knows, however, what he is about. The ingle nook to his admirable hall is rather ugly outside, as shown by the view, which is lacking in "go." "Jonnie" tilts up his rounded bay very badly in perspective. His plan is wasteful in stairway halls. His elevations are very nice in parts, but generally are overdone. The plain gables over the hall bay and above the entrance evince taste, though the section dispels all sense of such a quality. "Isis" of Ilford is inky. He is a serious competitor who will improve. The inside treatment of his house does not harmonise with the exterior, which in many ways is very good, but the octagonal bay on the angle of the hall gives the idea of a glass-house, with a cockloft over it. "Espoir" is a most painstaking contributor, who sends a rather successful design. We cannot praise his plan with the ugly central corridor, though the house would be far from inconvenient. The garden-door out of the dining-room is too ambitious, and the elevations are overdone rather in features. "Don't Know" merits praise if this is our old friend by that name, for he has greatly improved. The battered chimney stacks are ungainly, but his end elevation, otherwise, is effective. The perspective is too sharp, and the wavy tile lines are horrid. His plan, though compact, is crude. "Arc" gives a bird's-eye of a disjointed-looking composition, which looks like two houses. "Dachs" makes a high set-up sort of a house which, if built, would really look very well with its plain vertical timbered gables, and the hall is not badly designed in section. His plan is not without merit either. We wish he had done better, as he ought to do, and no doubt will. His drawings do not quite accord him justice. "Attician" gains nothing by drawing on tracing-paper. His design is among the best of the sort of up-to-date school. The entrance front is not improved by the lean-to over the hall angle. The dining-room bay would have been better carried down to the ground. "Casual" is spotty in his drawing, and he seems to have located his rooms in the plan in the same spotty way, without much reference to their uses. Professor Kerr's "English Gentleman's House" illustrates some good plans, and gives some suggestive notes about the relative uses of rooms which "Casual" would do well to read; only do not follow the professor's remarks about exterior design. For a guide in

that direction, look up examples by some of the best contemporary Domestic buildings by leading architects in England. Avoid Americanisms, and do not copy the French. "Bedouin," though the last of the series of designs which we have put "first class," is by no means the least in merit. Internally we do not like his work. It is inconsequential and thin. His plan is deficient in scheme, and his external features come very much as they may, without much regard to relative values. Still, he draws with a touch indicating an artistic sense, and his work is not bad. Let him take care to make it better.

Of the second-class designs we have not left room in which to say much, and they are so numerous. Many display no little merit, and a good deal of pains has evidently been taken which we are anxious to give credit for. "Rotter" is one of these, and we hope he will rank higher next time. "Trojan" wastes space above his hall ceiling; he plans poorly, always locating his fireplaces wrongly, but his elevations have merit. "The Old Firm," with the row of gables and poor chimneys, comes next, and then "Tie-beam," with an ambitious bird's-eye and massively-built plans. The south side bespeaks a seaside hotel of the very "modern" type. "Sportsman" spoils his work by poor drawings, and his plans are rather mixed in merit. "Troy Town" comes next, and then "Rooksbury" with four sheets showing a plan carefully contrived. "Oberon" we should like to see advancing, as we recognise a touch of taste worthy of a higher place. The view here has minimised his chance this time. The organ was to have been on the gallery. "Philomel" has a thin plan wasteful in corridors. "Notts" has a nice south front, excepting the porch turret on to the terrace. "Leonidas" has also a fairly effective façade to the garden, but a sadly poor sectional treatment. "Little Ray of Sunshine," with the ornamental Tudor brick chimneys, has lost no effort to come in well. The kitchen wing sits badly on to the three gables along the entrance front, and the kitchen itself is excessively badly planned. "King Crow" over-labours his penwork, and scamps the details of planning. "Jos" handles the pen more firmly; but the figure of a ghost on his stair-hall gallery landing is an index to some of the meaningless uses to which his pen is put. We cannot like his plan. Let him look at his drawing-room again, and not be vexed at what we have said. "F." has a pretty south front, and the section of the hall is suggestive of a good effect; but the view from the north-west is excessively poor. "Brush" comes next, and then follow in order "Rikki," "Bat," "Jay," "Isis" (Rochester), "Hoopoe," "Bull-nose," "Ariel," "Alexem," "Astragal," "Claude," "Chin Chin," and "Whitefriar."

The third series of designs may thus be tabulated: "Lodgings," "Tokio," "Piper," "X. L. C. R.," "Cyclops," "Cambria," "Balbus," "Socrates," "Plevna," "Hope," "Goat," "First Attempt," "Eros," "Souris," "Dr. Nikola," "Cainam," "Apex," and "Fan."

#### THE SOCIETY OF ARCHITECTS.

THE inaugural meeting of the fifteenth session of the Society of Architects was held last (Thursday) evening at St. James's Hall, Piccadilly. The President, Mr. T. WALTER L. EMDEN, J.P., L.C.C., occupied the chair, and delivered the opening address. In his introductory remarks he touched upon

#### THE WORK OF THE SOCIETY.

The way in which this society has dealt with the question of registration of architects is, he observed, a proof of its determination to persevere with its work in the face of many difficulties. During the past year the society has made some progress with this question of registration, and, indeed, slow as the process of education in this direction may seem, there is no doubt an Act will eventually be passed for the protection of the public by the procuring of properly-qualified architects. Voluntary examination may be all very well in its way, but there should be in all professions where the lives and pockets of the public are so much at its mercy as they are in building operations, no volunteering about the qualification, but an absolute certainty that the qualification has been obtained by the necessary

examinations being passed. The council have instituted a bureau for the employment of clerks, so that those requiring clerks, and clerks requiring appointments, can have an easy channel of communication. It is also proposed to establish under the Society's control a system of tests. In this present age, when every year sees large numbers of improvements and patents of all kinds added to the list, a very useful purpose will be served if some thorough and independent tests are from time to time obtainable with regard to their value and serviceability. The great difficulty in dealing with improvements is sifting out the good from the bad, and the usual process through which the public have to go is an extremely expensive one. They have indeed to buy their experience. They purchase and use what may, and often indeed, proves afterwards to have little or no value, and by such expensive experiences are discouraged from taking any further risk, and thus leave much which might in their work or business prove a valuable economy untouched. The tests, however, will not be limited to new inventions. There are constantly new materials coming into the market which have their special attractions in price or manufacture, and which at the same time being untried, want of experience prevents being freely used.

#### RIGHTS OF LIGHT AND AIR.

Another practical work, and that of the first importance, which is undertaken by the Society is that of bringing about some change in the law which (without affecting the rights of property) shall prevent the vast waste of time and money which there is every year in negotiating and litigating over questions of light and air. Every architect and surveyor knows well the annoyance which his client and he also is put to when proposing to erect buildings in any town. In some cases a building which may greatly improve the surrounding property by its being erected is attacked on all sides by questions of light and air, and a crop of ten or a dozen cases may be raised against it, often many of them of the most trivial nature, and it must be an especially lucky building owner who commences and completes his building without any such claim being made. Almost all these cases arise from the uncertainty as to what does or does not really affect the rights of an adjoining owner and what can legally be held to materially affect it, and, beyond this, the desire of gain largely affects the claims made—not only professional costs, but the larger gains contained in the question of whether, rather than have his building stayed by an injunction, and risk the large amounts necessary to fight an action on nothing more than trivial rights, or even imaginary ones, the building owner will not pay a sum of money or blackmail. This must often enough curtail building enterprise, as does the state of uncertainty seriously impede those who legitimately wish to rebuild or improve their premises. Every one seems to think that a building owner is fair game for compensation. It is only natural that each surveyor should desire to look first at his client's interest and desire to do well for him, and necessarily in dealing with the business in hand they do not trust the other side to look after their clients; and the state of uncertainty as to what are, or what are not, a client's exact rights under the law as it stands, all tend to prevent a settlement and produce a law suit. The same affects the solicitors when they come on the scene, and consequently not only do the professional costs get piled up by the law's uncertainty, but a law suit becomes almost inevitable. In order, therefore, to protect the interests of a client an injunction is obtained, and I fail to see that the architect or solicitors can be blamed if, in their client's interests, they obtain an injunction where the case may be of a trivial character, if they think their client is likely to obtain a monetary benefit by so doing, which may even be larger than the real value of the damage. These cases, too, depend so much on technicalities, while the necessity to bring home to judge and jury the facts as they are is so great, that models and numberless plans have to be prepared, and experts at expensive rates called, in order to prove fully the views of each side to those who have to try and decide the case. What wonder is it, then, that these cases become enormously expensive, and thousands of pounds are every year more or less wasted in costs on them? This very expense is the opportunity of the man with rights, great or small, to obtain from the building owner a sum



of money rightly, or as a blackmail, as, at all events, it leaves the building owner better off than to try the case with its attendant risks and costs. The Council of this Society has set itself to work to make a determined effort in the direction of preventing this useless waste, which affects not only the public, but the honour of professional men. No doubt the question is a difficult one to deal with when first approached, because it is not desirable that people's vested interests and rights of property should be interfered with; but the object which we have in view can be obtained without any such interference, and yet justly and effectively prevent the waste which has been and is a growing evil in England. In Scotland, the Court of the Dean of Guilds deals with these questions, and the canny Scot is saved the annoyance and expense; and, conservative as we may be in England, there can surely be no reason why we should not adopt some similar or suitable means to accomplish the same end here. The Building Act Tribunal, which, in dealing with Building Act cases in London has shown that there can be no difficulty in appointing a technical court to deal with these matters, and the payment of its cost, would be the merest fraction of the costs to which building owners are now put. The secret of this wasteful and improper system lies in the uncertainty of the extent and value of the rights affected. The suggestion which I would make, and which I think this society should adopt, is that a technical court under the London County Council in London should be established, and every building owner should be compelled to deposit a full set of the plans of any new building or material alteration of a building with the central authority, paying some such fee to cover the expense of dealing with them as may be deemed necessary, and that the authority should then require the owner to give notice to all the adjoining owners who may be affected, so that if, after examining the plans, they think there is interference with their rights of light and air or other easements, then the tribunal, after seeing that all interested had had notice, should proceed to hear the objectors and the building owner, and, after hearing, decide as to what height, &c., the building can be carried without interference with the lights and easements of the objectors. The fact that such a decision is given before building operations are commenced and before the building owner is pledged to his contract with his builder, would of itself be a substantial boon, apart from the great saving of time and money, and apart also from the saving made by its being made an absolute preventive of blackmailing by factious and petty cases being raised, and the fighting of expensive actions. I fail to see that any one could suffer injury by this course, and the good arising from it must undoubtedly prove a valuable incentive to the public and professional men alike in the numerous building operations which in this great city are constantly necessary. I in no way wish to pledge myself or the Society to the details or the exact methods by which this beneficial change should be brought about, but I suggest what must appeal to all as advisable and simple means, such as an extension of the powers of the Building Act Tribunal in London, by which to accomplish it. The fees charged could be made to cover all the expense of the court and its attendant officers, and would then be moderate enough to prove a mere drop in the ocean, compared to the present wasteful process. The Society have presented a petition to the Lord Chancellor, and I have also laid before the London County Council a notice of motion for the Building Act Committee to consider this important question, and I hope for the hearty and substantial support of the whole of the Society. The only difficulty is that the question does not appeal directly to the great body of the public who, though they may suffer in certain ways, only suffer occasionally, and for the most part indirectly; but those who build and have built will feel the force and necessity for the remedy which we advocate. I trust, too, that the efforts of leading men in the professions of both architect and surveyor, as well as those of the legal profession, will not be wanting in the necessary effort to bring about a reform so greatly needed, and which will once and for all sweep on one side the exaggeration of claims of a petty and improper character with all the attendant waste of clients' money which comes in its train.

#### OVERLAPPING OF LOCAL AUTHORITIES.

There is in London much overlapping of

authorities, and a multiplication of applications totally unnecessary for the protection of the public, and, indeed, tending rather to befog it, and to leave loopholes. A valuable reform might be made in this direction, and perhaps when we have the New Municipalities Bill of the Government, this might find a place. A simple reform could be made by extending in the Council's hands their powers as a Court of Appeal, with power also for the making of rules and regulations, but place entirely (except as to the necessary inspecting officers to check the local authority) the administration of such rules and regulations, and the passing of plans in the hands of the district or local authorities. Let the district surveyor also be the surveyor of the local authority; let there be but one surveyor, with a competent staff in each division of the County of London, and only one administrative authority, the local or divisional one, to pass the plans of buildings, both as to structure and sanitation, and indeed for all purposes. Appeals from the decisions of the local authority could then well and properly lie with the London County Council as the central and head authority. Now, not only have plans to be passed through several authorities, but there is the absurdity of the London County Council hearing appeals against itself, a course which, in my opinion, good as has undoubtedly been its work, is calculated in the long run to lower its authority and prevent that public confidence which there should be in its decisions.

#### THE STATE OF SANITARY WORK.

There is another subject, vast in its proportions and far-reaching in its effects upon the health of the public, which requires urgent attention. No one can fail to know that in the smaller towns and in the provinces very little inspection goes on, and houses are drained and allowed to keep or use appliances of a most dangerous class—a fact which not only keeps up, but spreads disease to an extent which many will hardly believe. The remedy lies in the law enforcing a strict uniformity of requirements adapted to town and country buildings, with a regular and full inspection, and with power to enforce requirements. We are told to leave the town and go to the country for health, but the health statistics will show London and other large cities, taken as a whole, have a lower death-rate than many a country town and many a country district. It cannot be said the large towns are perfect; indeed, they are far from it, and must so continue while the apparatus and system approved in one district are disapproved in the next (merely across the road), and while this uncertainty and confusion exist this imperfect state will not decrease, but will probably increase. The remedy is simple: let the battle of systems be fought out before some competent and independent authority appointed by the Local Government Board, and then let us have uniformity. By so doing, we should not discourage improvement, but rather encourage it, as the same authority could have power to examine at the instance of any sanitary authority any suggested improvement, and to certify it as suitable for use. Of course, the system for London or in large towns cannot be the same as for a country district; but there are equally good systems of drainage for country houses as for London houses: all that is necessary is that their use shall be defined and enforced.

#### LONDON IMPROVEMENTS.

Sir J. Wolfe Barry, in his address to the Society of Arts, has suggested great improvements in thoroughfares of London. I do not question the need for the great and growing necessity for widening main thoroughfares, but I fear that before the authorities have the courage, or possibly the inclination, to spend such vast sums as the proposals he makes will cost, the necessity will become unbearable. No doubt, with our present knowledge, we could lay out a city on much better lines than those on which London at present exists (though there is much to be said for the picturesque and quaint appearance of many of our streets), but it is, and would be, too costly to try the means suggested, and the disturbance of trade centres and existing business premises would affect in a very detrimental manner the occupiers and the ratifiability of the districts through which the improvements were carried. It seems, therefore, that we must meet the growing want and present pressure by some less costly method. No doubt we must press on the widening of some of the various great thorough-

fares where feasible. No one will suggest that where the cost is such as the community can reasonably bear that there should not be further and well-considered improvements, but it is clear these will not meet the pressure. The increasing traffic caused by those who work in and whose business brings them in increasing thousands to this great city must be met, and we must, therefore, examine into other means for meeting the difficulty, within the power of the ratepayers' pockets. It is no doubt a fair question to ask: "Are we, because great new streets are too costly, to sit still?" It is some years ago that I first suggested subways for London to prevent the great inconvenience to traffic and business by the constant upheaval of the road surface for the laying and repairing of pipes, wires, and drains. My suggestion went so far as to propose that the whole width of the roadway should be a subway, which could be well used for and would amply accommodate not only all the pipes and wires, but would also leave good broad ways for pedestrians, and, if it should be necessary, for bicyclists too. The advantage of subways in saving the road surface is great. The benefit to companies for water, gas, or electric in the facility for examining, testing, and attending to their pipes and wires must be evident, and would, in my opinion, prove such a saving as to make the rent to the authorities well worth paying. Thus not only could a very much increased traffic be covered by the same roadway, with its subway under, but an outlay of much less capital would be required, with considerable prospect of some return by rents. There would be much less disturbance to business, there would be no good wills of business, or leaseholders' or freeholders' interests to pay for; indeed, the land would be obtained without cost, while the cost of the subways being almost entirely that of building, the expenditure would give employment to the great numbers of workers who live in this city, and who spend their earnings in it; and thus those who had to find the cost would obtain some return benefit from its expenditure. I must conclude, however, and content myself with what has already been said, in the hope that some of these great and pressing questions of reform which are before us may commend themselves to those whose duty it is to take note of public opinion and public necessities.

#### ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE second fortnightly meeting for the present session of the Institute was held on Monday evening, Mr. H. L. Florence, Vice-President, in the chair.

#### THE COMPARATIVE VALUE OF DOCUMENTARY AND ARCHITECTURAL EVIDENCE IN ESTABLISHING THE CHRONOLOGY OF ENGLISH CATHEDRALS.

A paper on this subject, illustrated by between fifty and sixty lantern slides of unusual excellence architecturally considered, was read by Mr. FRANCIS BOND, M.A., F.G.S., Hon. Associate. The author referred to his own researches at Waltham Abbey Church, which had led him to the conclusion that no portion of the work was of the early date assigned to it by Professor Freeman and other authorities—viz., the 11th century; it had nothing in common with either English or Norman work of that period. Wells Cathedral was another example of what the lecturer termed archaeological aberration. Some authorities dated the nave after the west front, though the nave was far more archaic in character; Professor Willis dated the west front after the nave, but put both a whole generation too late. Many instances of similar error might be cited, pointing to some flaw in the methods of research. The cause was to be traced to the wrong estimate of the comparative value of documentary and architectural evidences. Documentary evidence consisted of the references, direct or indirect, to the history of the building, in annals, monastic chroniclers, fabric rolls, registers, wills, &c.; architectural evidence was to be sought in the stones and mortar. Discussing Professor Willis's opinion in favour of documentary evidence, the lecturer observed that few of the statements as to building operations in the cathedrals were made by contemporaries; frequently the authors lived generations or even centuries later. The ascription of the choir, transepts, and nave of Wells, as well as the west front, to Bishop Jocelin was based on a statement of



Bishop Godwin, who lived in the 16th century, which was itself based on an anonymous MS. written in the 15th century. Contemporary evidence could not always be trusted. Monastic and Mediaeval chroniclers had likes and dislikes, and sometimes deliberately misrepresented and falsified their history—Matthew Paris's own admission was a case in point. Any good work, any fine building, erected by the unpopular, may have been attributed to the popular abbot or bishop. In this connection the lecturer referred to Bishop Aquablanca's work at Hereford Cathedral, which had been ascribed to Bishop Swinfield, and disproved the statement of Swapham and Abbot John, monastic chroniclers of Peterborough, that Abbot Benedict built the whole nave from the central tower to the west front. The chroniclers were not architects, nor were they writing for the information of architects—their language lacked precision and definiteness; and it was dangerous to build theories on their curt and nebulous statements. They were often unintentionally misleading. The lecturer referred to a possible instance in the record in Simeon's *Continuator* of Flambard's work at Durham. Again, the chronicler's statements had been applied to the wrong building, or a different portion of it—an instance at Ripon Minster was cited where work carried out at the east end was credited by modern writers to the west front. There were huge gaps in the chronicles; some of the biggest works were not mentioned at all. It did not follow because there was no record of work by a particular bishop or abbot that therefore he did nothing. New evidence might be forthcoming, and the prelate who had been credited with no work might turn out to have been building busily all the time. As examples of the danger of building theories on negative evidence, the lecturer showed how such theories had been upset in the cases of Wells and Worcester Cathedrals. Dates of consecration were not always of value; there were dozens of examples which had no reference to the completion of a cathedral or of any important part of it. Neither was it safe to infer that, because services commenced in a certain year, the building or any particular portion of it was completed; inferences of the kind were proved incorrect at Durham and Peterborough. The evidence, however, of contemporary fabric rolls, charter registers, &c., was of the utmost value if it could be properly read and understood. But the Latin of those documents was not easy to read; the abbreviations had proved a fertile source of error. MSS. had been carelessly copied or carelessly printed; in some cases terms had been altogether misunderstood. Striking instances of error from one or other of these causes were referred to in connection with Lincoln, Exeter, and Hereford. Examples were further quoted showing that implicit confidence could not always be placed in mural inscriptions. Concerning architectural evidence, the comparative rather than the historical method of investigation, the lecturer considered that nowadays this class of evidence, subject to certain minor reservations, might safely be relied on. Allowance must be made for the progressive tendencies of the monks of the 11th and 12th centuries, for the conservatism of those of the 13th. The Benedictine monks of Peterborough and Norwich retained their Romanesque minsters almost unaltered to the last. The canons of Lincoln, York, Lichfield, and Exeter swept away almost every trace of Norman work. The abbey church of St. Germer, near Beauvais; Oxford Cathedral, and Wimborne Minster, furnished further examples of conservatism. Builders of the first half of the fourteenth century showed reverence for old work, and refused to impair the effect of good old design; but they put their own trade mark on the detail. Various instances were given, and some examples of "architectural forgery" referred to, as at Rochester, Durham Galilee, and notably the gateway of College Green, Bristol, and the church of Ottery St. Mary—buildings deliberately designed in the spirit of a bygone style. The detail, however, prevents the students misinterpreting the evidence of the architect. It was possible to be misled by the precocity and cleverness of a mediaeval designer. Here and there a great original genius sprang forth, such as Suger's architect at St. Denis, who gave the world fully developed and harmonised Gothic construction in 1140, two generations before the choir of Lincoln Minster was produced. St. Urbain, Troyes, represented the full and final consummation of Gothic architecture, which was

not reached elsewhere for more than a generation. Gloucester Cathedral afforded another instance of precocious genius. In conclusion, the lecturer expressed his conviction as to the general trustworthiness of architectural evidence, and quoted in support the authority of Mr. Barr Ferree and Mr. Edmund Sharpe. The architectural should be studied before the documentary evidence, and if the former conflict with the latter, then the latter should go to the wall. At the close of the paper a discussion took place, in which Messrs. W. H. ST. JOHN HOPE, WILLIAM WHITE, F.S.A., H. H. STATHAM, and E. W. HUDSON took part.

#### WIND PRESSURE.

SEVERAL experiments have been made regarding the amount of possible wind pressure. Tredgold laid down the amount to be provided as 40lb. per square foot over the whole surface, and this estimate has been largely adopted. Since the destruction of the Tay Bridge by a gale of wind, a considerable increase on this pressure has been provided for railway bridges, and the Board of Trade ordered that these and similar structures should be designed to resist 56lb. of horizontal wind pressure on the whole exposed area, with the ordinary factor of safety for the materials. Experiments made on wind gauges at the Forth Bridge have shown that with increase of surface the unit of pressure was 38.7 per cent. less per square foot than that registered by the small gauge. Sir John Wolfe Barry, at the Mechanical Science Section of the British Association, detailed experiments made at the Tower Bridge, and has shown that the wind pressure on the bascules in certain cases, as measured by the power exerted by the engines was only 1½lb. to 1lb. per square foot (we presume lifting force) at a time when small anemometers registered 6lb. to 9lb., the area of bascule being about 5,000sq.ft. The great tornado at St. Louis, which wrecked many structures, led to experiments being made that are recorded in the *Transactions* of the American Society of Civil Engineers. One of these showed that the lifting force of the wind on that occasion was at least 43lb. per square foot; in another case a wall surface 180ft. by 18ft. high, 60lb. per square foot was registered. A chimney 162ft. high was broken at a point 40ft. from the ground, and, according to the area exposed, a wind-pressure of more than 80lb. per square foot was estimated. These different estimates suggest some imperfect data. Unless the actual resistance of these several structures destroyed by the wind can be discovered, we can form a very imperfect opinion as to the real pressure. If, for example, the chimney-stack was weak or built of crushable material at a certain point, we cannot positively say what the actual wind pressure was; but a pressure of 50lb. to 60lb. per foot is not too much to provide for in lofty structures.

#### WORK AND WORKMEN.

MR. A. O. COLLARD recently read a paper with this title at a meeting of members and friends of a workmen's club at Staines. Mill, Ruskin, and other writers have each dealt with this theme in masterly fashion, and even, said Mr. Collard, if they have not exhausted it, it would be presumptuous for me to attempt to say anything fresh or instructive. Work every day is becoming harder to find, and harder to do; life's struggle becomes altogether more severe, the problem of continued existence, involving the survival of the fittest, provides thought for very serious consideration. It is scarcely possible to suggest methods for easing the strain and lightening the burden of any one of you; but to quietly discuss the matter, and perhaps take an encouraging view of it, may be of some slight advantage, and not altogether waste of time. The necessity of producing, nowadays, what is cheap and plentiful, and yet profitable, has led to the introduction of machinery in every branch of work and manufacture. Even the word manufacture is now a misnomer, for it means something made by hand, and how few things are now made without the help of machinery! Then, again, the distribution of all articles of commerce, to insure a profit, tends to depreciate the quality of those articles, so who can take a lively and real interest in things which he knows to be inferior in quality to what they

should be? These and other causes cannot but help to deprive us of some of that zest and enjoyment in work which formerly accompanied it. Take, for instance, the manufacture of furniture, now so largely produced by the aid of machinery. Examine carefully any old chair, bench, or bureau. See of what good material it is made, how beautifully it is tenoned together, how tenderly and with what loving patience its curves and outlines are moulded and formed. What an absence of fussy and useless ornament and detail! Why are people with means buying up all these old things? Chiefly because they know they cannot be matched for beauty or use, as compared with modern machine-made articles—not even if long prices are paid. In these old examples we see combined the two things—art and labour. Though it is difficult sometimes to draw the line between what is art and what is labour, in a general way art may now be described as the result of head-work, and labour of hand-work, mostly assisted by mechanical means. Yet, after all, there is some art in the most ordinary everyday work. In cutting grass, for instance, the scythe in the hands of a novice is not only dangerous but useless. Three labourers in turn bringing down their huge sledge-hammers on the iron peg which penetrates and breaks up the roadway, show skill, the absence of which would be serious to the fourth man, who holds the peg steady. So with the laying of bricks and mortar; indeed, the list is inexhaustible. The simplest operations require some intelligence, and I sometimes wonder at the apparently low estimation some workers have of their own skillfulness. All work should bring its satisfaction, and does so most certainly to the industrious. Who has not marked in himself the refreshing effect of a change of work, so well described by Lewis Morris the poet?—

For this of old is sure,  
That change of toil is toil's sufficient cure.

Those who have to use their heads find ease to the brain in actual manual labour, or in some lighter form of handicraft or outdoor exercise. And the artisan and others who live by physical toil would, if they only tried it more frequently, find delightful change recreation in some form of headwork, mental study, calculated to improve their own minds and of those around them. How much better this than the brainworker lounging half-asleep in his club or home, or the handworker lolling over a public-house bar.

Coming, as an architect, much in contact with men engaged in the various interesting branches of the building trade, I would emphasise the pleasure and profit derived by direct intercourse with those who help to carry out one's plans. Much useful information is gained in this way; but it also serves to remove the shyness frequently so evident. The hearty reception given to friendly remarks and inquiries, during the progress of the work, have often opened up pleasant intercourse, which the completion of the work has too soon ended. To observe the different methods of tackling a fresh idea and putting it into shape, to receive or give hints where the work can be improved, is real pleasure, not only to the designer, but, I firmly believe, to the worker as well. This stand-offishness, as it may be called, between workers in one common interest is more conspicuous in old countries, I am told, than new. Newly civilised continents, perhaps, avoid—at any rate for the present—this state of affairs, though possibly even in their case the classes may gradually draw further apart and become less sympathetic. It is worthy of passing comment that many English firms are now finding it advantageous to seek the co-operation of their workmen by offering them some interest in their business, thus gaining their sympathy and encouraging them to put forth their best energies for what then obviously becomes the common good. Who among us do not wish for success in life? Who would not look forward with satisfaction to a slackening of the laborious processes by which we earn our living, hoping that the sunset of our lives may be passed in comparative ease and well-earned repose? It was a remarkable saying of the great Napoleon that "every soldier carries a Marshal's baton in his knapsack," meaning that every man in his army could raise himself from the ranks, if he firmly and constantly held that object in view. The common class of day labourers has given us Brindley, the engineer; Cook, the navigator; and Burns, the poet. Masons and bricklayers



can boast of Ben Jonson, who worked at the building of Lincoln's Inn, with a trowel in hand and a book in his pocket, Edwards and Telford, the engineers; Hugh Miller, the geologist; and Alan Cunningham, the writer and sculptor; while among distinguished carpenters we find the names of Inigo Jones, the architect; Harrison, the chronometer maker; John Hunter, the physiologist; Romney and Opie, the painters; Professor Lee, the orientalist; and John Gibson, the sculptor. From the weaver class have sprung Simpson, the mathematician; Bacon, the sculptor; the two Milners, Adam Walker, John Foster; Wilson, the ornithologist; Dr. Livingstone, the missionary traveller; and Tannahill, the poet. Shoemakers have given us Sir Cloudeley Shovel the great admiral, Sturgeon the electrician, Samuel Drew the essayist, Gifford the editor of the *Quarterly Review*, Bloomfield the poet, and William Carey the missionary; whilst Morrison, another laborious missionary, was a maker of shoe-lasts. Admiral Hobson, who broke the boom at Vigo in 1702, was originally a tailor. After wonderful successes, it is related that he returned as admiral to his native village full of honours, and dined off bacon and eggs in the cottage where he had worked as a tailor's apprentice. Cardinal Wolsey and De Foe were sons of butchers; Bunyan was a tinker; Baffin the navigator began life before the mast; Sir Thomas Lawrence was the son of a tavern keeper; Faraday, of a poor blacksmith. Our own memories and the daily Press provide us with many instances of equally successful rises from obscurity to fame. Let me express a hope, in conclusion, that however imperfect and disjointed this short paper may be, it may lead to further reflection among us of the immense possibilities which are at our command. There is an old French proverb which, translated, says "Help yourself, and Providence will lend a hand." Intelligently directed, those efforts should lead to success, and it is, as a rule, only the slothful and dissolute who will be heard to declare that they have never had the chance of getting on, when the whole truth is they have not taken advantage of their opportunities, nor properly employed their time and energies and talents.

#### THE ADVANTAGES TO BUILDERS OF INSISTING ON BILLS OF QUANTITIES.

A PAPER on this subject was read by Mr. W. ION before the Grimsby Master Builders' Association last week, the chair being occupied by Mr. J. Hewins, the president of the association. Mr. ION recommended that the members should take definite steps to secure what he considered was only just to all parties concerned—viz., that there should be bills of quantities for all work above a certain money value, or for such work as it might be thought necessary to have quantities for. Such work as hotels, restaurants, offices, shops, villas, and schools, and, above all, alteration jobs ought to have quantities even if their money value was low, because there were so many complications in the work and so many unforeseen things were likely to arise which it was impossible for a contractor to see in the short time allowed him for tendering. Warehouses, workshops, and engineering works were very simple, and might be placed at a higher rate. What were the reasons for wishing for bills of quantities? In the first place, he did not think any respectable man wished a contractor to do work for which he was not paid, and no respectable contractor wished to be paid for work he did not do. When quantities were supplied deductions on extras could be made, and allowed for according to the schedule. Moreover, he thought quantities were useful to the architects in superintending building operations, and especially at the settling up with the contractor. If an architect refused to have quantities—which would be very rare, he believed—this should be a warning to the contractor that something was wrong with the plans or specifications. At the present time a contractor was expected to do in a few hours what a professional quantity surveyor would require several days for, and had to take all the risks; and then he stood the chance, after all his work, of his tender being refused. As to the clauses and conditions found in quantities in this district, they were fair to all parties; but he urged that the contract ought to include a clause as follows:—"Should any error be found in the detailed bills of quantities supplied, such error shall be rectified, and an addition be made to the

contractor, or deducted from him, as the case might be in respect to such error." There was one clause which was rather unfair, but it was not much in use in this district. The law on bills of quantities and all connected with them seemed very uncertain, and it had been suggested by a number of men that a court specially appointed for the settlement of disputes in connection with contracts, bills of quantities, &c., would be of great service to the building trade. Trade customs were generally taken as deciding the matter; but difficulties arose when contractors had work in various parts of the country. He urged that quantities should always be taken out only by professional quantity surveyors, and submitted other details which he thought would be helpful. He thought public bodies would do well to adopt a schedule of prices for their work, to be revised every four years, which would be as good as bills of quantities, and would avoid considerable trouble. The paper went on to deal with the method in which specifications of bills and quantities were made out, and made many suggestions. As regards drainage he thought the schedule should give the pipes and digging separately. As to the brickwork, he thought the method in the North was the better—viz., that the quantities should be given "per yard super. of a certain thickness." Masonry work did not take up much room in bills of quantities, and he thought sketches of what the detail would be were of great service to the mason in getting out his tender. The chief items came under carpentry and joinery. There were different ways of giving the quantities, and he thought the simplest method would be to give the timber in lineal feet with specifications as to size and class of work—that was, of course, for floors and roofs. Doors were generally given per super. foot, and the class of doors specified or the details given, and windows generally the same. Having pointed out certain difficulties with regard to these, and also with regard to staircases and shop-fronts, the writer of the paper touched upon ironwork and plumbing, and concluded his paper by proposing that steps should be immediately taken to obtain bills of quantities on contracts, or work on, or over a certain money value, say, £300; or in any case where it was considered that bills of quantities were necessary.

In the discussion which followed, the President observed that one great defect in drainage specifications and bills of quantities was that it was usual to state the average depth of drainage and not the actual depth, as at one part it might be 5ft., another 15ft., and the average would be given as 10ft. This caused great injustice to the contractor, as it was much more expensive to carry out the work where it was deeper than the average quoted, and a contractor had no details from which to estimate the expense of the work.

Mr. Marrows, vice-president, stated that as a rule builders and architects were in favour of bills of quantities, but that architects were often afraid to recommend this course to their clients as they might lose their patronage owing to the expense; but he urged that builders held the key of the position, if they refused to tender unless quantities were supplied. Formerly, 2½ per cent. was allowed for quantities; but now, as a rule, it was 2 per cent., but the accuracy of the quantities was not guaranteed. He also said another strong reason why bills of quantities ought to be given was, as a rule, the vagueness of specifications, and he also thought that in complicated work and highly finished interiors, shop fronts, &c., full sized details ought to be given. The master builders ought to let the architects know that with regard to work above a certain value, quantities would be required; but he thought that a distinction might be drawn between different classes of work.

Mr. Thompson, also a vice-president, said it was only fair that Mr. ION's suggestion should be adopted, as builders only wanted to be paid for what they had done, and they were willing for deductions to be made for work not done. He said no one could afford to do work for which they were not paid, because in the long run such a course could only lead to one result. He certainly thought that in an estimate for a competitive contract quantities should be supplied. He thought, if it were a private estimate, and without any competition, quantities might be dispensed with.

Messrs. Rushforth, Green, and Duke also took part in the discussion.

The resolution, proposed by Mr. ION, seconded

by Mr. Marrows, was submitted to the meeting, and carried unanimously. A small sub-committee was formed to consider the best way of carrying the resolution into effect.

#### THE ARTISTIC APPLICATION OF HERALDRY.

AT the Scottish National Portrait Gallery, Edinburgh, on Friday, an address on this subject was given by Mr. Balfour Paul, Lyon King at Arms, being one of the present course of Rhind Lectures on Archaeology. One of the favourite objects for the display of heraldic art was the decoration of tombs. In Scotland the recessed tomb was the favourite pattern, and Mr. Paul knew of no free table tomb standing by itself under a pillared canopy as is often the case in England. Most of our Scottish ancient tombs were, he said, made of stone, few of marble, and we have no specimens of enamel work on them; but they were often coloured and gilded. After alluding to the tombs of Sir Alan Swinton in Swinton Church, those of the Douglasses in St. Bride's, and the Foresters in Corstorphine, it was pointed out that the marshalling of the arms in sepulchral shields was often incorrect, possibly from the carver having got the matrix of a seal to copy from, and omitting to take into consideration the fact that the positions of charges should be reversed in his cutting. The finest tomb in Scotland, though it is so late in date as not to be so distinctively armorial as some others, is that erected by Sir Robert Montgomerie of Skelmorlie in the church at Largs in 1636. Not only members of knightly families but ecclesiastics displayed their arms on their tombs, or on the walls of the churches; but after the Reformation, from various causes, the custom of displaying armorial bearings in churches became less common; it was, in fact, looked upon with marked disfavour by the Church, and an Act of Assembly was passed in 1643, prohibiting honours or arms, or any such-like monuments being affixed to the wall of any kirk in honour or remembrance of any person deceased. But tombs, after all, formed but a slight medium for heraldic display; it was rather to be looked for in the surroundings of every-day life. The introduction of systematic heraldry into Scotland was almost simultaneous with a great improvement in castle-building in consequence of the prosperous state in which the country was during the thirteenth century, and on the large number of knights from England who came to seek their fortunes in the North. The probability is that arms would be carved on the buildings then erected, though we cannot absolutely point to any examples with certainty. One of the earliest existing examples of a coat of arms carved in a building is that of Sir Simon, above the entrance doorway of the keep of Craigmillar—but this does not date before 1374—and there are some interesting coats, though some of them are nearly illegible, built into the wall of Dundonald Castle, in Ayrshire; these date from about 1390. In the 15th century there was a distinct advance in architectural art, and, in consequence, greater luxury prevailed in the inside of the house, and some fine armorial fireplaces date from this period. In the succeeding century a still further advance was made, and finely-carved panels of arms are not infrequently found over the doorways of castles. Painted heraldic work began to be used as a means of decoration; the pine ceiling in St. Machar's, Aberdeen, was put up between 1518 and 1531, containing the arms of the principal European potentates, some of the Scottish nobility, the Pope, and Scottish bishops, and some others. The pine ceiling in Queen Mary's audience chamber in Holyrood also belongs to this period, and we can tell from the manner in which the arms are blazoned that it must have been executed between April 1558 and the middle of the following year. The roofs of Marischal College, Aberdeen, and an old house in Linlithgow, both now destroyed, belonged to the 17th century, as does, too, the curious roof in the long gallery at Earls Hall. The number of armorial carvings on wood which survive to this day is not a large number, but among them mention was made of a large panel or screen now in the parish church at Grantown, which contains well-executed shields of eight of the leading families of the district. The finest specimen of armorial woodwork to be found in any church in Scotland is the gallery in Kilbirnie Church, erected by John, first Viscount Garnock, but it is of compara-



tively late date. Of armorial wood-carving not in churches the best specimens are to be found in the custody of the Incorporated Trades of Aberdeen, and also in the University there. But if armorial wood is scarce, armorial glass is still scarcer. The oldest in existence in Scotland is that in the Magdalen Chapel, Cowgate, put up in the 16th century, and containing the arms of Michael Maqueen, the founder of the chapel, his wife, Janet Rynd, the Queen-Regent Mary of Lorraine, and the Royal arms of Scotland. Full-size drawings of these windows, executed by Mr. Boss, glass-stainer, Union-street, Edinburgh, were exhibited. Another interesting piece of glass is a panel dated 1574, representing a knight bearing a shield charged with the *fess chequy* of the Stuarts doing battle with a lion, while a hand above, rested on a sleeve bearing three *fleurs-de-lys*, holds a shield on which is the same fess with an inescutcheon bearing a lion rampant debriused with a staff raguly. What the meaning of this design is has never been satisfactorily solved. There is some painted glass at Fyvie Castle, the chapel at Stobhall, and Woodhouselee; but the amount now spared to us is very little indeed. But this is hardly to be wondered at, considering the fragile nature of the material itself. An account was given of the various ways in which heraldry had been pressed into the service of decorating comparatively subordinate articles. Fine armorial door-knockers appear at Munn Castle, Shetland, and Fyvie Castle. At Mount Stuart House, Bute, there is an ingenious application of armorial bearings to the decoration of the metal straps in the rain-pipes which extend down the sides of the building, a kind of ornament which is also to be found at St John's College, Cambridge. Armorial weathercocks, though frequently met with on the Continent, never seem to have become popular in Scotland. A curious adaptation of heraldry to uncarved masonry occurs in the case of the garden wall at Edzell, which is divided into compartments, showing by means of three rows of small recesses the fess chequy of the Lindsay's, while the shot holes above are arranged so as to represent the three stars on the same coat. The lecturer concluded by reference to book stamps (super libros), book plates, of which we have no Scottish example which can be definitely referred to a date earlier than 1639, and heraldic playing cards.

#### WATER-COLOUR DRAWINGS.

AN interesting collection of water-colour drawings, chiefly architectural, by Mr. Herbert J. Finn, are now on view at the Modern Gallery, in Bond-street. These embrace a great variety of subject, and from every part of the kingdom. Mr. Finn is a water-colour painter of architectural subjects, and his works have the merit of combining architectural truth with pictorial effect. Many architectural colourists fail in landscape and breadth, their drawings are tinted or washed in with colour, but possess no pictorial merit apart from the drawing. Mr. Herbert Finn's views of St. David's Cathedral and of Harlech Castle are vigorous in drawing, bold and sketchy in handling. One of the best interior views in this collection is the "Interior of St. David's Cathedral." The fine Norman arcade with its capitals and arch-moulds, and the aisle, the grey tone of the stonework and the flat timber roof of nave are very broadly and feelingly drawn. Then we have several very interesting drawings of Winchester. "The City Cross" (28), restored by Scott, is a very beautiful and well-known example of a city cross in a recess of the old High-street, and Mr. Finn has done justice to its elegant proportions and situation. The West Front and Interior Views of Winchester Cathedral (29 and 32), the latter showing one aisle and two of the noble chantries, are very truthful as drawings, while the management of light and shadow and colour are admirable, and free from all restraint. The best exterior view is that of the south-east view, showing the fine east end or Lady Chapel (33), with the blending of Late Perpendicular windows and Early English arcing. The tones of the old mouldering masonry, grey and brown lichen-covered stone, are deftly given. In the distance is the old Norman transept. "Winchester College Chapel" (36) is a bold and forcible drawing showing the cloisters; there is also a view of "Old Rectory, Cheeshill," and "Old Houses" (39), very picturesque renderings. A very good

drawing is hung also of the "Market Hall, Shrewsbury," one of the few old market halls left, an isolated building picturesquely situated. But the drawings which form the *pièce de résistance* of the collection are those of Canterbury Cathedral. The large drawing representing a sharp perspective of the cathedral and cloisters, with north transept and lantern tower (58), is powerful in drawing and colour. The transept and tower are bathed in warm sunlight, and contrasts with the broad and deep shadows of the grey cloisters, with their rich tracery and moulded work. The technical merit of the architecture is subordinated to the breadth and powerful handling of the traceried cloisters. The author gives the idea of mouldering stonework with admirable effect. "The Bell Harry Tower," the Crypt, Cloisters (60), Dean Boys' Tomb in the Dean's Chapel, and South-West View (61), St. Gabriel's Chapel, &c., with its frescoes, are other able drawings. All show strength of light and shade, and a sense of grasping masses without losing detail. A few broad landscapes and coast scenes, such as "Harlech Sands" (10), "Near Cader Idris," "Cornish Sands," "Barmouth," and other studies and sketches are of interest.

#### EDUCATION AND REGISTRATION OF PLUMBERS.

A CONFERENCE on the subject of the education and registration of plumbers was held on Friday at the Carpenters' Hall, London-wall, E.C. The conference was called by the National Association for the Promotion of Technical and Secondary Education in response to a suggestion made by Mr. T. W. Russell, M.P., the Parliamentary Secretary of the Local Government Board, to a deputation of educationists and administrators who submitted to him certain objections to the Plumbers' Registration Bill, introduced into Parliament last Session. Among those present at the conference were Mr. J. Clason Preston (Master of the Carpenters' Company), who presided, Sir Henry Roscoe, F.R.S., hon. secretary of the National Association, Sir Owen Roberts, Sir Douglas Galton, F.R.S., Mr. Edward Bond, M.P., Mr. M. Austin, M.P., Dr. Garnett, Professor Banister Fletcher, Mr. Alfred Preston, Sir Walter Pridaoux, Mr. E. J. Halsey, Mr. W. R. E. Coles (the clerk to the Plumbers' Company), Mr. T. A. Organ, and the bodies represented included the County Councils Association, the Sanitary Institute, associations relating to public health and to educational organisation, as well as county councils and county boroughs and master and operative plumbers.

Sir Henry Roscoe made a statement regarding the circumstances which had led up to the conference. He further said that the association had endeavoured to secure that the conference should be thoroughly representative of the various interests concerned, and their one aim had been, and still was, to effect a satisfactory settlement of the differences which had arisen.

After considerable discussion, the following resolutions were adopted: "Without prejudice to the question of whether any Bill for the national registration of plumbers should be introduced into Parliament or not, it is resolved that if a Bill be introduced it should provide: (a) That there shall be placed upon the registration council (1) directly-appointed representatives of local municipal authorities aiding plumbing classes at least equal in number to the representatives of the various branches and interests of the plumbing trade, and (2) an adequate number of directly-appointed representatives of teaching institutions and of such additional organisations as are specially interested in the education and registration of plumbers, including the following, among others:—City companies connected with the various sections of the building trade, the Sanitary Institute, the Royal Institute of Public Health, the Royal Institute of British Architects, the City and Guilds of London Institute, the Institute of Builders, the London Polytechnic Council, the Association of Technical Institutions. (b) That the registration council be instructed to accept, as qualifying for registration, the certificate of such public examining body or bodies approved by a Government department, and that such acceptance be not withdrawn without due notice nor without the consent of the Government department concerned. (c) That only a small fee for registration be charged to operative plumbers, and that the registration

council shall not remove from the register any operative plumber once entered thereon solely by reason of his failing to pay a subsequent fee. (d) That the examination for the purposes of registration should test the candidates' general knowledge of other sections of the building trade in addition to their special knowledge of plumbing. (e) That in any Bill the council created by the Bill should be the actual managing body and have direct charge of the registration, and, further, that the conduct of the Bill should not be left in the hands of any one body."

It was further resolved to transmit the foregoing resolutions to the Local Government Board and to the principal members of her Majesty's Government.

#### THE COST OF THE BROOK HOSPITAL, SHOOTER'S HILL.

AT Friday's meeting of the Asylums Board a letter was read from the Local Government Board inclosing a copy of the report of Mr. W. E. Kuolys on the recent inquiry held by him by direction of the Board with reference to the Brook Hospital. In this it was stated that of the excess of £50,100 the managers had assented to an expenditure of rather over £20,000, and it might be held that that expenditure, although not included in the original contracts, was practically necessary in connection with the erection of the hospital. There was a further expenditure in different items of somewhat over £1,000 incurred with the consent, or, at any rate, with the knowledge, of the hospital committee; but there remained an expenditure of at least £25,000, which was incurred on the architect's own responsibility without any consent or knowledge on the part of the managers or the hospital committee. This amount included the sum of £14,000 in connection with extra foundations which were found to be necessary. He (the inspector) had been much struck in the course of the inquiry by the view that seemed to be taken of the helplessness of public bodies to control expenditure. The continuing expenditure of public money, amounting as in this case to very large sums, must clearly not be left in the hands of a single individual. It was evident that the expenditure of the ratepayers' money had been considerably in excess of what would have been requisite if further time could have been given to the choice of a site, and that further excess had been caused by the architect exercising his own discretion in his wish to provide a hospital in every respect the best obtainable, as he supposed, instead of one in accordance, as far as possible, with the contracts entered into by the managers.

The Local Government Board, commenting on this report, said it was admitted that Mr. Aldwinckle, the architect employed by the managers in connection with the hospital, underestimated the cost of the building to a serious extent; that works which should have been included in the contracts were omitted; that as regarded foundations and the substitution of fireproof floors for others, his reports were most misleading; and that he authorised deviations from, and additions to, the works specified in the contracts, involving a large expense, on his own responsibility, and without any authority whatever from the hospital committee or the board of managers. The board had not failed to consider the explanation offered by Mr. Aldwinckle; but they could not but regard his proceedings as deserving of grave reprobation, and in the opinion of the board he altogether failed to realise what was due to the committee of the hospital, and also to the managers as the architect appointed by them. In their opinion there was not such supervision of the works by the committee as was desirable, while, with respect to the managers, they considered that the practice of drawing cheques for the amounts included in the certificates of the architect, without any information being furnished to them by the architect or the hospital committee as to the works, &c., for which the certificates were given, was open to serious objection.

The chairman moved a resolution referring the letter and accompanying report to the Brook Hospital committee, with instructions to consider and to report to the managers on the points dealt with in the letter—namely, the supervision of building works in progress and the payment of contractors upon architects' certificate. Mr. J. Brown, the late chairman of the committee, seconded the motion. He said that if there was one thing the committee did more than another it



was to exercise supervision over the works in progress. But he failed to see how any committee or any board could take upon itself the work of the professional expert, and supervise in all its details the work that was placed in his hands. He never knew of a case where a professional man granting a certificate of payment on account of work in progress was able to define exactly all the points of the work upon which the certificate was to be granted. Mr. J. K. Brass said that a very large sum had been wasted in consequence of the defective nature of the site at Shooter's-hill which the managers had been compelled to purchase owing to the opposition of the Local Government Board to the acquisition of cheaper and better sites. Mr. F. Purchase contended that there had been gross mismanagement and a reckless waste of public money in the construction of the hospital.

After further discussion the motion was agreed to, and it was decided to send a copy of the Local Government Board's letter and report to Mr. Aldwinckle.

In a second communication the Local Government Board, advertising to the managers' application for an order authorising the borrowing of a further sum of £101,830 14s. 4d., in connection with the erection, &c., of the Brook Hospital, stated that, under the circumstances, they deemed it right to omit from the order the amount due to the architect in consideration of the extra works (ordered on his own responsibility), and that as that amount appeared to be £375, the order would authorise the borrowing of the sum of £101,456, instead of £101,830 14s. 4d.

#### THE BUILDERS' BENEVOLENT INSTITUTION.

THE fifty-first annual dinner of the Builders' Benevolent Institution took place on Thursday, the 17th inst., in Carpenters' Hall, London-wall. Mr. B. I. Greenwood (president) occupied the chair, supported by Messrs. Trollope, Colls, Mansfield, T. F. Rider, Holloway, Nightingale, Hall, Holliday, Ellis, Sherrin, Robinson, Randall, Bart, Wall, Higga, Hill, Ritchie, C. Bussell, C. A. Bussell, J. T. Bolding, Griffiths, Lough, T. Stirling, T. Stirling, jun., Ansell, Grover, and numerous other supporters of the charity.

After the usual loyal toasts had been duly honoured, Mr. T. F. Rider, in a humorous speech, proposed "The Army, Navy, and Auxiliary Forces," Major R. A. Bruton (secretary) responding for the Army and Navy, and Colonel Trollope, V.D., for the auxiliary forces. The President, in proposing "Success to the Builders' Benevolent Institution," contended that the charity was deserving of all the support they could give to it. In these days the rush of life and the fierceness of competition seemed to become greater and greater, and it was not at all surprising that some should fall behind, and be left prostrate by the wayside of life. This institution acted the part of the Samaritan, and afforded such assistance as to make life less burdensome. Since its formation, nearly 300 people had been assisted, and so far as its principle was concerned it was not capable of improvement. Some of the pensioners had at one time been in affluent circumstances, and that was an additional reason for sympathy with the aims of the institution. It was the most skilful man who ran the greatest risk, so that no one was certain that he might not some day be in need of help. In consequence of the great age of some of the candidates, the committee had decided to elect all those who were eligible without the necessity of canvassing. He hoped the institution would continue to prosper until the dawn of Old Age Pensions, when, he supposed, such charities would become things of the past. If that were so, he trusted the scheme would be done on more equitable lines than in the case of the Employers' Liability Act. The toast was drunk with enthusiasm. Mr. J. Howard Colls next proposed "The Worshipful Company of Carpenters," who so kindly gave their hall for these annual banquets, and were at the same time good supporters of the institution. Mr. Jacob, Warden of the Company, replied. Mr. H. Holloway, in proposing the toast of "The President," said that Mr. Greenwood was not only a good speaker, but an excellent worker. He also referred to the great loss the charity had sustained by the death of Mr. George Plucknett, who had so long acted as its hon. treasurer. Mr. J. S. Holliday gave "The

Architects and Surveyors." Speaking as a contractor, he might say that he had got on uncommonly well with the architects with whom he had been associated in business. The surveyors were imbued with the same spirit, and their only desire was to act fairly and honourably. Mr. George Sherrin replied for the architects. He considered that they had generally to act as advocates on behalf of the contractors, as clients were not conscious of the difficulties to be overcome in carrying out work of an important nature. Mr. Sydney Young responded for the surveyors. The quantity surveyor, he added, was a man who did a great deal of ordinary work, and who applied himself to the unravelling of complicated details. One of his chief qualifications was that he should have a fair mind, and he believed that that was usually the case. Mr. S. B. Depree proposed "The Vice Presidents, Committee, and Stewards," to which Mr. J. T. Bolding replied. In the course of the evening subscriptions were announced amounting to £875, of which the president's list represented £718, including £105 from the president and his firm.

#### OBITUARY.

WE regret to announce the death of Mr. JOHN G. LIVESAY, A.R.I.B.A., which took place at Ventnor on the 19th ult. Mr. Livesay was the eldest son of the late Augustus F. Livesay, F.R.I.B.A., and had been an Associate of the Institute since 1882; but for twenty years before that date he had practised his profession at Ventnor. In 1864 he was appointed by the local board as town surveyor, and on his resigning that office eleven years later he took the position of consulting engineer to the board. During his tenure of office he inaugurated and carried out an extensive sewerage system, extended the sea-walls, and undertook several other important public works. In addition to this and to the general practice of his profession, Mr. Livesay was for twenty years manager of the Ventnor Gas and Water Works, of which company he was a director. He was also surveyor to several large properties in the neighbourhood, among which are included the Steephill and Lowther-Ville Estates, in which, during the term of his agency, great developments have been made. Mr. Livesay was also a member of the following societies:—Meteorological Society (Fellow) 1860, British Association Advancement of Science 1864, Institution of Civil Engineers 1866, Associate of Municipal and Sanitary Engineers and Surveyors 1873, Surveyors' Institute (Fellow), Associate R.I.B.A. 1882, Gas Institute. His eldest son, also an Associate of the R.I.B.A., is practising at Bournemouth.

THE death is announced, in his 80th year, of Mr. JAMES MURRAY, F.R.I.B.A., of 25, Portman-street, Portman-square, W. Mr. Murray joined the Royal Institute of British Architects as an Associate in 1851, became a Fellow in 1867, and retired from the practice of his profession nine years ago. The funeral took place on Wednesday at Marylebone Cemetery, Finchley.

SIR JOHN FOWLER, BART., K.C.M.G., the designer (with Sir Benjamin Baker) of the Forth Bridge, who died on Monday at Bournemouth, after a long illness, aged 81 years, was one of the last survivors of the great engineers who came to the front during the exciting days of early railway enterprise. Born in 1817 at Wadsley Hall, Sheffield, he became, at the age of 17, pupil to Mr. J. T. Leather, the hydraulic engineer, with whom he was associated in many of the engineering schemes carried out for the water supply of Yorkshire and the surrounding districts. After two years, spent as assistant to Mr. Rastwick in the preparation of drawings and contracts for the London and Brighton Railway, he returned to Mr. Leather as responsible resident engineer on the Stockton and Hartlepool Railway, and was appointed, at the age of six-and-twenty, engineer, manager, and locomotive superintendent of that railway. He started on his own account, and became chief engineer to a number of railways which were then passed through Parliament, notably the Sheffield and Lincolnshire and the Great Grimsby Railways, which he successfully carried out. He was the designer of the Metropolitan Railway—the first underground line—and was also the engineer of the Metropolitan District and the St. John's Wood lines; the Victoria Station and Pimlico Railway, on which the first railway-bridge was built over the Thames in London; the Edgware, Highgate, and London;

the Manchester, Sheffield, and Lincolnshire; the Oxford, Worcester, and Wolverhampton; the Severn Valley; the Mid Kent; the London, Tilbury, and Southend; the Great Northern and Western of Ireland; the Much Wenlock; the Great Eastern Extensions in Cambridgeshire and Essex; the Isle of Wight; the Launceston and South Devon; the Moretonhampstead; the Weymouth and Portland; and the Wellington and Cheshire Railways. He was also engaged with Mr. Rastwick in the construction of the London, Brighton, and South Coast Railway. He was engineer in respect of important Government works in Egypt and the Soudan, and in 1870 took part in a commission sent to Norway by the Indian Government to examine the railways there. With almost all the recent clever tunnel schemes—for instance, the City and South London, the Waterloo and City, and the Central London Railways—Sir John Fowler's name has been associated. Another great work upon which Mr. Fowler was employed was to investigate and report upon the most suitable gauge for the less important Indian railways, and it was his recommendation of a 3ft. 6in. gauge, as compared with the 2ft. 9in. gauge recommended by his colleagues on the commission, which influenced the Indian Government to choose the metric gauge. He was president of the Institution of Civil Engineers in 1866, and delivered an address on the requirements of a complete engineering education. In 1890 he received the honorary degree of LL.D. from Edinburgh University.

ALDERMAN SIR STUART KNILL, BART., Lord Mayor in 1893, who died on Saturday at Blackheath, aged 74 years, was a painstaking and well-read archaeologist and antiquarian, and last year served as the president of the Society of Dilettante, known as Ye Sette of Odde Volumes. He was a leading member of the Plumbers' Company, of which he had been master, and he took a leading part in the establishment of the scheme for the examination and registration of plumbers. He also promoted the cause of technical education. In respect to his memory, the annual banquet of the company fixed for Wednesday last to meet the Lord Mayor and Sheriffs has been postponed.

MR. DEWITT C. CREGIER, ex-city engineer and ex-mayor of Chicago, Ill., died in that city on November 9. He was born in New York City, and was chief engineer of the waterworks at Chicago for 23 years, and afterwards city engineer and commissioner of public works. Leaving municipal work, he engaged in the management of some of the Chicago street railways. In 1889 he was elected mayor of Chicago, and his administration was remarkable for municipal improvements and for annexations which increased the city's territory from 40 to 181 square miles. He was conspicuous in the early work in the Columbian Exposition plans. He designed the two largest pumping engines at the north side waterworks, Chicago, and was identified with the construction of the first two lake tunnels. He was a past-president of the Western Society of Engineers.

#### CHIPS.

Mrs. Eliza Brewer, widow of the late Mr. Richard Brewer, architect, of Richmond, Surrey, died at Parade Gardens, Epsom, on the 13th inst., aged 85 years.

The foundation-stone of a new Established church in Walker-road, Torry, Aberdeen, was laid on Saturday. The church will contain 818 sittings, and the cost will be £3,000.

The dedication of the lych-gate which has been erected as a memorial of the Diamond Jubilee at Longdon took place on the 10th inst. The gate is of oak, from plans prepared by Messrs. Gotch and Sanders, Kettering, the work having been done by Mr. T. Marshall, of Longton. The ceremony was performed by the Bishop of Shrewsbury.

The consecration of St. Edward's Church, Birmingham, took place on Monday night, the ceremony being performed by the Bishop of Coventry. The church and schools were bought from the Presbyterians for £1,700, and given to the Church of England. The rebuilding and refurnishing cost upwards of £1,300.

Great activity prevails at Assouan. All the workmen's dwellings, hospitals, hotels, and other buildings necessary for Messrs. John Aird and Co.'s enormous staff have been finished. At the present time more than 2,000 natives are employed in blasting operations, and about 250 Italians are busy in quarrying and dressing the building material.



## Building Intelligence.

**BRISTOL.**—A new factory has been built at Messrs. Wathen, Gardiner, and Co., wholesale clothing manufacturers, at Staple Hill. It covers an acre of ground, the main building measuring 210ft. by 150ft. The whole of this is lighted from the roof on the north-light principle, using upwards of 13,000ft. of plate glass set in steel bars. The roof is supported on iron columns, with light steel trusses and framing. A corridor runs through the centre of the factory, leading to a machine-room 150ft. by 42ft., which has been fitted up by Messrs. Singer and Co. with machines for 400 workers. The building is warmed by a hot-water apparatus. The elevations are of Pennant stone, with Cattybrook brick dressings and cornices, the central block being entirely of brick, with Broseley tile roof. The contractors are Messrs. Cowlin and Son, and the sanitary engineering is by Mr. G. Tuckey. The architects were Messrs. La Trobe and Weston, F.R.I.B.A., of 20, Clare-street, Bristol.

**CALEDONIAN FIRE AND LIFE INSURANCE COMPANY.**—Considerable structural alterations have recently been made at the London offices of the above company, in King William-street. The alterations have mainly taken place in the life department of the office, and consist of the removal of heavy cross-walls and a stone staircase from the ground floor, and the substitution of an internal mahogany staircase leading from the general offices on the ground floor to the secretary's and other offices situated upon the first floor. The new life office has been refitted with massive mahogany counters and fittings. The premises have been heated by low-pressure hot water. The general contractors for the works were Messrs. Thompson and Beveridge, of Albany-street, N.W. The alterations were designed and carried out under the personal supervision of Mr. Howard Chatfield Clarke, of Bishopsgate-street Within.

**CARDIFF.**—A new chapel added to Nazareth House was opened on the 16th inst. It is Early English in style, in keeping with the rest of the structure. The building, which abuts on Colum-road, is 62ft. in height and 90ft. long. The upper story is devoted entirely to the chapel, which is 33ft. wide, and extends the whole length of the building. At the southern end of the nave is the sanctuary 30ft. 6in. by 21ft. On the east of the sanctuary is the sacristy, 17ft. by 14ft., and on the western side, divided from it by two arches and a carved wood screen, is the choir. The roof is open-timbered, of pitch pine. The floor of the nave is of pitch-pine wood blocks, while that of the sanctuary is of oak. The woodwork of the interior of the chapel is stained in three different shades. The lower floor is devoted to sitting-rooms, dormitories, &c. The walling is of blue Pennant stone, with Bath stone dressings. The new building is connected with the old one by a staircase, and leading to a new corridor, bathroom, bedroom, a visitors' room 21ft. by 36ft. 6in., and a small infirmary. To the left of the corridor are a cloakroom and domestic offices and small bedroom. Beyond this is the old men's sitting-room (16ft. 3in. by 30ft. 6in.) and old men's dormitory, having accommodation for fourteen beds, and next to this is another room 26ft. by 18ft. The architect is Mr. E. W. M. Corbett, and the contractors are Messrs. W. Thomas and Co., whose clerk of the works is Mr. Shelley.

**CHATHAM.**—A new theatre is being built in the High-street, the contractor being Alderman C. E. Skinner. The stage will be on a level with a private roadway 15ft. wide, so that if necessary horses may walk straight on. A promenade from the grand circle will measure 80ft. by 26ft. There will be a broken-backed pit; thus from the orchestra 35ft. back the pit will slope  $1\frac{1}{2}$ in. to the foot, and start again another 35ft. to the back  $2\frac{1}{2}$ in. to the foot. There will be an extra exit from every part of the house, including stage and dressing-rooms. A subway will be formed leading to right and left of the stalls. The dressing-rooms, green-room, &c., are outside the main walls of the building. The management will utilise both gas and electric light. The chief dimensions are:—Stage, 75ft. by 45ft.; pit, 65ft. by 78ft., distance from back wall of stage to back of pit about 115ft. The amount of the builder's contract is £16,100; while the decoration and furnishing have been intrusted to Messrs. A. R. Dean, Limited, of Birmingham. The architect is Mr. G. E. Bond, M.S.A., of Rochester.

**CLONTERT CATHEDRAL.**—Messrs. John Hardman and Co., of Birmingham, have erected two stained-glass windows with figures representing St. Peter and St. Paul at the east end of Clontert Cathedral. The ornamentation is Celtic in design. The work of restoration of the chancel of the cathedral has recently been accomplished: the floor of the chancel laid down with tiles of a special design; the modern plaster removed from the walls of the chancel, and the ancient stonework pointed; red paint removed from the stonework of the east window and chancel-arch; the belfry tower, the buttresses, and the roof of the cathedral repaired; the sacristy has been restored; the plaster removed from the walls and ceiling, bringing to light the marks of the old hurdle roofing. A thorough system of drainage has been carried out around the cathedral. A Communicable and bishop's throne, both of carved oak, designed by Mr. Fuller, have been presented to the cathedral. Clergy and choir-stalls of carved oak have been placed in the chancel, and brass Communicant-rails erected. The greater part of all this work has been carried out under the supervision of Mr. J. F. Fuller, F.S.A. The work is being done in sections as money is subscribed. It is proposed, if sufficient funds are forthcoming, to undertake the work of restoration of the nave; to re-tile the floors of the sacristy, nave, and baptistery; to provide a new lectern, and also to provide suitable vestry furniture for the sacristy. A sum of £1,000 would do all this. There were originally two transepts—one is now in ruins, the other is completely gone, and another £1,000 would be required to rebuild them.

**CROYLAND ABBEY.**—The rector of Croyland has issued a further appeal on behalf of the restoration of Croyland Abbey. The roof requires immediate attention, and the third bay, on the north side of the north aisle, rebuilding, like the first and second bays, which have been just rebuilt. The late Mr. J. L. Pearson, R.A., reported on the state of the roof of the north aisle thus:—"The north aisle, which forms the parish church, also needs considerable repairs, and, indeed, some part of the walls and buttresses will need some addition to their foundations to stop the settlements which are going on. The roof of this aisle is one continuous slope from what was the clerestory wall of the nave to the outside wall of the aisle, and is in a very bad state indeed, and will require to be entirely taken off and probably extensively renewed; the lead will have to be recast and relaid. In its present condition this roof is injuriously pressing on the outer walls, and in this way it has been the means of developing cracks in the groining below." The rector adds that through the inclination of the wall on the north side some of the large beams have little hold on the south wall. The estimated cost for the remaining work is £874.

**NEW SUBURBAN THEATRES.**—The following theatres are being erected from designs by Mr. W. G. R. Sprague: Coronet Theatre, Notting-hill-gate, which is on the eve of completion, and the Princess of Wales Theatre, in Kennington Park-road, is to be opened in December. This house occupies almost an ideal site, having a frontage of about 80ft. to Kennington Park-road, 150ft. to South-place, 90ft. to De Laune-street. The whole of the main frontage is of white Portland stone. The elevations are of Italian Renaissance character. The more expensive parts of the house are entered from Kennington-road by a few broad steps running the entire length of the 50ft. wide stone colonnade into a vestibule or lobby, and thence to the grand crush-room. This apartment is one of the features of the building, having a length of 42ft. and a width of 22ft. The Empire Theatre of Varieties, in the Broadway, Stratford, is already roofed in, and will be opened in the coming spring. At the new Empire, which is being erected in the Holloway-road, the gallery level has almost been reached, and this house is also expected to be ready for opening by the spring. At the Royal Duchess Theatre at Balham the builders have already reached the dress-circle level, and the theatre will be opened next spring. At the Terriss Theatre at Rotherhithe the foundations are dug, and the house will be erected and opened as early as possible next year. The plans of a new theatre at Camden-town for Mr. Saunders have also been prepared by Mr. Sprague.

**NEWTON ABBOT.**—On Tuesday next the new hospital will be opened. It is situated in East-street, between the old and new Baptist chapels.

It has a northern aspect, and is about 200ft. in length and 48ft. in width, exclusive of offices. The exterior is faced with Stoney Coombe limestone with Kingsteignton and Bath stone dressings, lined internally with hollow brickwork. The administrative block is situated in the centre of the building, having a vestibule, hall, two convalescent-rooms, matron's room, kitchen, &c. On the first floor there are four bedrooms, nurses' sitting-room, bath-room, &c., and the attic contains three good bedrooms. The west wing has a ward for twelve beds, 48ft. by 24ft., a nurses' duty-room, scullery, private ward, board-room, and convalescent-room, with all the necessary lavatories, scalding-sinks, and bath-rooms. The east wing is similar to the west, with the exception of having a linen closet and an operating room, with the medical officer's room adjoining. The large wards are heated by Manchester grates, but all the other wards and rooms, except the bath-rooms, have open fireplaces. The corridor, which is 96ft. by 6ft. 6in., as well as the lavatories, are heated by radiators from a boiler in the cellar, which also provides hot water for the baths and scalding-sinks throughout. The buildings are ventilated by fresh-air inlets and Boyle's exhaust. In connection with the hospital there are a mortuary, a doctor's private room, and an out-patients' room. These are built of similar materials to the hospital itself. The work has been carried out by Mr. Hugh Mills, builder, of Newton Abbot, from the designs and under the superintendence of Mr. Samuel Segar, architect, of Newton Abbot.

**PRESTON.**—The new theatre which Mr. W. Johnson has built in Fishergate was opened last week. The receiving capacity of the house has been greatly increased. The pit, stalls, and gallery command an unobstructed view of every part of the stage. Advantage of the cantilever principle of support has been taken, not a pillar being introduced. The heating is effected throughout by means of low-pressure apparatus, and the lighting is by electricity. The architect is Mr. John P. Briggs, of London, and the general contractor was Mr. J. Walker, Preston.

**SALFORD.**—The memorial-stone of a school that is in course of erection by the Salford School Board in Langworthy-road, Pendleton, was laid on Friday. The school will contain three departments, accommodating respectively 376 boys, 376 girls, and 442 infants, making a total of 1,194. The boys' and girls' departments will each contain a schoolroom and four classrooms divided by movable partitions, together with cloakrooms and rooms for teachers. The infants' school is being built on the central hall system, a large assembly hall being provided into which seven classrooms open, each accommodating from 50 to 60 children. Special provision is being made for instruction in cookery and laundry work for girls, and in manual instruction for boys. A caretaker's house is also being erected at one corner of the site. The playgrounds will be ample in extent. It is proposed to light the school with the electric light. The architects are Messrs. Potts, Son, and Hennings, of Manchester. The contract for the main building is being carried out by Messrs. Storrs, Sons, and Co., Ltd., Stalybridge; the iron and steel work by Messrs. Dunkerley and Co., Manchester. The cost of the site, including the paving of the surrounding streets and legal charges, has been £3,680; and the building, including the furnishing, caretaker's house, and all other expenses, will cost £13,000.

**STIRCHLEY, KING'S NORTON.**—The memorial-stone of the Church of the Ascension was laid in the High-street, Stirchley, on Saturday. The church has been designed in the Later Decorated style, and consists of a nave 82ft. by 35ft. in the clear, with north and south ambulatory aisles, each having five low arches from the nave. The chancel will be 32ft. 6in. by 22ft. On the south side of this will be the clergy and choir vestries, the latter being carried up as a tower, in which will be the organ-chamber over the vestry. At the western end of the nave, and connected to it by a triple arcaded and traceried opening, will be the apsidal-shaped baptistery, and north and south porches and inner porches, and above the triple arcade will be a large window. Over each of the nave arcades will be ten two-light traceried windows, and carved corbels and shafts supporting eleven hammer-beamed principals and intermediates, having traceried spandrels; while bold flying buttresses, whose arched soffits will be visible inside the shallow aisles, will stiffen the walls carrying the wide spanned roof. The



chancel will have a seven-light east window, and two windows of two lights each on the north side, and one on the south side. The roof of the chancel will be waggon-shaped, and divided by ribs into panels. All the walls will be built of brick throughout; the external dressings are to be of red terracotta, and the internal piers, arches, and other dressings will be in selected Farleigh Down Bath stone. There will be kneelings for 578 adults. A heating-apparatus vault is provided in the tower basement. Mr. William Hale is the architect, and Mr. Thomas Smith the builder, both being of Birmingham. The estimated cost is £8,000.

**STOCKPORT.**—At the meeting of the board of guardians, on Monday, it was decided to reply to the Local Government Board's letter inquiring what was being done in the matter of providing increased workhouse accommodation, that it was under consideration to enlarge the site of the present workhouse at Shaw Heath by  $1\frac{1}{2}$  acres, thus making nearly 7 acres on which to provide a workhouse to accommodate 1,100 persons. It was explained that the object was to ascertain whether the Local Government Board would consent to the erection of a workhouse for 1,100 persons on 7 acres at Shaw Heath, or whether they would require the guardians to remove to Stepping Hill, near Hazel Grove, where the guardians purchased, some time ago, 20 acres of land. Discussion ensued on a recommendation of a committee to pay Mr. W. H. Ward, architect, of Birmingham, £2,000 on account of commission for preparing plans, estimates, &c., of the proposed new workhouse at Stepping Hill, £2,000 having been paid already in respect of getting out the quantities. It was urged on one hand that the architect was entitled to charge commission on the amount of the accepted tenders, whether the scheme was dropped or not; and, on the other hand, it was contended that the commission should be only on the modified outlay on the scheme yet to be decided upon. Eventually it was decided to pay £1,000 on account.

**WESTBOURNE PARK.**—The Bishop of London opened on Thursday, the 17th inst., the National Schools of St. Stephen's, Westbourne Park. The work of completion has consisted in carrying over the old building (erected in 1858) a story of similar character to that of the newer portion of the schools built in 1896-7, and of considerable alterations of the older structure. In carrying up the new story, only the external walls of the old structure have been raised, forming an L-shaped boys' schoolroom, 56ft. by 20ft. in the long arm, and 48ft. by 24ft. in the short arm of the L, by about 17ft. to the collar of the semi-open timbered roof. The internal walls of the old first floor below are replaced in this new second floor by folding screens, so that besides forming one large room, the new floor area is also divisible into three classrooms, with a wide corridor. The interior of this room is finished with stock brickwork and stone mullioned windows. The floor is laid with wood blocks on a steel and concrete floor, covering in the old building. Externally, the old masonry (being badly decayed) has been restored by Messrs. Dreyfus, with their patent cement. Other works, in connection with strengthening the walls and floors, have also been undertaken. The cost of the whole buildings has been £7,000, exclusive of the cost of the site, making the total outlay about £10,750. The work has been carried out by Messrs. Rudd and Son, of Grantham, and other firms employed have included, for masonry, the Bath Stone Firms; coal lift, Waygood and Co. Mr. Arthur T. Bolton, A.R.I.B.A., is the architect.

The first list of subscribers to the fund for a memorial to the late Mr. Gleeson White, member of the Art Workers' Guild, has been published. Among those who have responded to the appeal are Mr. G. Frampton, £25; Mr. H. Walker, £10; Mr. E. J. Horniman, £10 10s.; Mr. Walter Crane, £10; Miss Alice Redcliffe, £10 10s.; and the New English Art Club, £15.

At the last meeting of the Southampton Town Council, the Estate Committee presented a report as to steps to be taken to preserve what remains of the old Town Walls on the Maret estate, which has been acquired for the purposes of the new roadway from the Royal Pier gates to West Quay. The cost was estimated at £150, which caused some councillors to protest against so extravagant "patching up" of these old walls. The report was referred back, and the committee are to consider the matter further.

## COMPETITIONS.

**BAILDON.**—In the recent open competition for schemes of sewerage and sewage disposal for the districts of Baildon Wood Bottom, Baildon Green, Lower Holme and Low Mill, the urban District Council, acting on the advice of the assessor, Mr. Geo. Chatterton, M.Inst.C.E., have adopted the scheme submitted by Mr. H. Bertram Nichols, C.E., of Birmingham.

**BURNLEY UNION WORKHOUSE.**—In a limited competition amongst the architects having offices in the Burnley Union, six sets of plans were sent in for the above. Mr. Littlewood, of the firm of Magnall and Littlewood, Manchester, was the assessor who adjudicated on the above and gave the premium of £50 to the motto "Experience," the only prize allowed. On opening the letters, it was found that the name of the architect was Mr. Samuel Keighley, of Burnley, who will be engaged to carry out the work.

**CASTLEFORD.**—The design of Messrs. Demaine and Brierley, architects, of York, has been selected in an open competition for proposed new church at Glass Houghton in the parish of Castleford. The design is in the Late Decorated style of Gothic architecture, is to be built of brick, is planned to accommodate 600 people, and is estimated to cost £6,000.

**LIVERPOOL.**—The committee of the Royal Institution received invited designs for reconstructing their buildings in Colquitt-street. The treatment most favoured by those architects who have responded is some phase of Renaissance. The set of drawings which gained first premium is in this style. The architects, Messrs. Briggs and Wolstenholme, of Lord-street, Liverpool, and Blackburn, have treated the design as two buildings, so that the portion first erected should in itself present a complete appearance, whilst the further structural alterations from the present plan were proceeding. As in the case of all the six sets of competitive drawings shown, the first-prize design made provision for a large lecture-hall capable of accommodating over 1,000 persons, and a small one, with a seating capacity of something like a quarter of that number. There are also provided a large museum, a sculpture and picture-gallery, and numerous classrooms. The Colquitt-street elevation has three entrances. The second premiated drawings, by Mr. Ralph W. Bedingfield, A.R.I.B.A., 5, Hotel-street, Leicester, display a front elevation of a rather ornate character. Stone balconies are provided to the first-floor windows, and oriels at the angles of the main front. The competitive drawings will be on view at the Royal Institution until December 15th.

**SINGAPORE.**—The Diamond Jubilee Commemoration Committee, who invited designs for a Victoria Town-Hall and Theatre to be built at Singapore, have just informed those who competed that they have made the following awards on the plans received by them:—First prize of £200 awarded to Messrs. Francis Sills, A.R.I.B.A., and W. A. Francken, A.M.I.C.E., of Norfolk-street, Strand, London; the second prize of £100 awarded to Mr. William A. Tunstall, of Colombo; the plans (design A) of Messrs. Swan and MacLaren, of Singapore, were highly commended, and those submitted by Messrs. Sevenoaks and D. G. Lavelle, A.M.I.C.E., of Bangalore, India, were commended.

**WIMBLEDON.**—The select competition for public baths at Wimbledon has been settled. The drawings were sent in early in August. There was to be no referee. The first prize has been given to Mr. R. J. Thompson, of Wimbledon; the second premium to Mr. F. J. Smith, of Westminster; and the third place accorded to Mr. G. A. Lansdown and Mr. A. R. Jennett, who prepared plans conjointly. It has not been settled when the competitors can see the drawings.

**WORCESTER.**—The competition for the proposed Hop Market Hotel seems to have been managed in an unsatisfactory fashion. For two hours and a half on Friday afternoon the Worcester Hop Market Guardians, at a special meeting held at the Guildhall, were considering the designs submitted for the new hotel. Four sets of plans had been sent in. The names of the competitors were supposed to be secret until after the decision had been made, but it was generally known by most of those concerned that the set of plans known as No. 1 was sent in by Mr. J. H. Williams, No. 2 by Mr. F. Hughes, No. 3 by Mr. A. H. Parker, and No. 4 by Messrs. Rowe

and Son, all local architects. An assessor was appointed some time ago, and had recommended that No. 3 should be accepted. A committee prepared a report recommending that the award of the assessor should be accepted, subject to the consent of the Charity Commissioners to the proposed sale of the land being granted, and that £50 should be equally divided among the architects who competed unsuccessfully. In the discussion which ensued on the reading of the report and recommendations, the names of the competing architects were freely mentioned. Objections were raised to the planning of the design No. 3 by the member who seconded its acceptance, and he proposed that it be modified after being adopted—a suggestion received with loud expressions of disapproval. An amendment was proposed and seconded that No. 1 be adopted, the mover, Alderman Caldicott, deputy governor and chairman of the Streets Committee, arguing that it was the only design complying with all the conditions whereas he asserted that No. 3 infringed these in seven particulars. Eventually the resolutions and amendments were withdrawn, and it was decided by 20 votes to four to vote by ballot on all four plans, the assessor's recommendation being thus ignored. The first vote resulted as follows:—No. 1, 12 votes; No. 4, 8; No. 3, 7; No. 2, 2. A second ballot was taken on the two plans receiving the highest number of votes, and the final result was: No. 4, 17 votes; No. 1, 12. No. 4 (Messrs. Rowe and Son's plan) was then declared accepted. It was resolved that the sum of £50 should be divided among the unsuccessful architects.

**WREXHAM COUNTY SCHOOLS.**—In this competition a number of architects of experience in school-planning were selected from various parts of England and Wales to compete, and as the result those submitted by Mr. J. H. Phillips, of St. John's Chambers, Cardiff, have been placed first. The schools were estimated to cost £8,000.

## CHIPS.

The urban district council of Littleborough have instructed Messrs. Clark and Hutchinson to prepare plans for a proposed town-hall and council offices.

A new Episcopal church in Torry, Aberdeen, was formally dedicated on Friday by the Bishop of Brechin. The church has cost about £5,000, and is seated for 600 worshippers.

A new isolation hospital has been erected at Winchmore Hill, and special consideration has been given to the ventilation, which has been carried out on the Boyle system.

At Tuesday's meeting of the London County Council, a recommendation of the Housing of the Working-Class Committee that the standing orders should be suspended in order to enable the Council to erect dwellings for 180 persons displaced by the Ann-street (Poplar) improvement scheme was carried, after discussion, by 69 to 30 votes.

The sum of £1,000 was paid into Messrs. Leatham, Tew, and Co.'s Bank at Wakefield last week as an anonymous donation to the fund for enlarging Wakefield Cathedral, as a memorial to the late Bishop Walsham How, the first bishop of the diocese. The amount now promised is over £7,500, and the first section of the work, for which Mr. Frank L. Pearson is the architect, will be commenced as soon as a faculty has been obtained.

The Bishop of Beverley laid, on Wednesday week, the foundation of the new church of St. John at Hessay, near York. The cost of erection of the church will be about £1,000. The structure will really be a church-of-ease for the parish of Moor Monkton, and accommodation will be provided for 75 worshippers. Mr. C. Hodgson Fowler, F.S.A., of Durham, is the architect, Mr. Anthony Lyons the builder, and Mr. T. A. Bolton, of York, clerk of the works.

Fines, amounting in the aggregate to £6, were imposed on the Ruabon Brick and Terracotta Company, at the Ruabon Petty Sessions on Friday, for offences against the Factory Acts by employing boys after proper hours, and by failing to report accidents that had occurred at the works.

A meeting was held at Plymouth, on Friday, under the presidency of the Bishop of Exeter, to receive a report from a committee which has been formed for the purpose of erecting seven additional churches in Plymouth and its vicinity. The Bishop said they had secured seven sites, five of which had been given, and two obtained by purchase. He hoped that in five years they would have built the seven churches. The Mayor of Plymouth, Alderman J. Pethick, a well-known local builder, offered to give the granite necessary for the erection of one of the churches.



### PROFESSIONAL AND TRADE SOCIETIES.

**BIRMINGHAM ARCHITECTURAL ASSOCIATION.**—The annual report for the 24th session, just issued, is of an encouraging nature, as there has been an increased vitality shown in the conduct of the association. The new rooms in Queen's College, Paradise-street, were acquired by the association at the commencement of last session, and have proved well adapted to the requirements. The council were approached in connection with the following local competitions:—"Municipal Asylums," "New Church at Sparkbrook," and "Leamington Free Library," and were instrumental in obtaining the appointment of an assessor in each case. There was also some correspondence with the secretary of the Blue Coat School, but the committee of that institution ultimately decided not to have a competition. Several trade questions have also been brought before the council by the Master Builders' Association, and recommendations have been made thereon. The attendance at the classes has betokened increased interest, the meetings having been well attended and much good work done, but there has been little or no competition for the prizes offered in connection with them. This being the case, the council have determined to abolish the present system of numerous small prizes, and to offer a travelling studentship prize of £15 15s. The report and "green book" is illustrated with several full-page sketches by members of the association.

**BIRMINGHAM MASTER BUILDERS' ASSOCIATION.**—The annual meeting of this association was held on Friday at the Grand Hotel, Mr. J. Bowen presiding. The annual report stated that the committee were able to record that the period of good trade mentioned last year had continued. With increased prosperity in the building trade there had been greater competition, in many cases the advance in contract prices obtained being insufficient to cover increased cost of material and labour. A notice had been received from the bricklayers asking for alterations in rules and a rise in wages to 10d. an hour. That notice would receive the careful attention of the committee, and it was felt that uniform working hours must again be secured. It had become year by year increasingly evident that to combat the ever-growing demands of the operatives, it was necessary that they should be dealt with by an amalgamation of towns rather than by individual associations. Federations of employers having been established in Lancashire and Cheshire and in the West of England, and the attention of the National Association having been drawn to this great need, England and Wales had been divided into four federation areas. The committee had had under their consideration the new regulation of the Public Works Committee of the City Corporation, that before making connections to the sewers a deposit should be made to cover the cost. A deputation waited upon the Public Works Committee, and endeavoured to obtain some modification of this arbitrary requirement; but their efforts were unsuccessful. The chairman congratulated the association upon the progress that had been made. The membership had increased during the year from 69 to 93. The desirability of every builder in the district joining the association could not be too strongly insisted upon, especially in view of the formation of the Midland federation. Now the Birmingham radius had been extended he hoped builders in the outlying districts would see their way to join the association. The following officers for the ensuing year were reappointed: President, Mr. J. Bowen; vice-president, Mr. F. G. Whittall; treasurer, Mr. G. Twigg; secretary, Mr. E. J. Bigwood. The secretary stated that financially the association was in a better position than ever it had been. The total receipts amounted to £311, and after all liabilities there was a balance of £172. The annual dinner was held in the evening at the Grand Hotel, Mr. John Bowen presiding. Mr. C. H. Barnsley gave "The City and Trade of Birmingham." Alderman Edwards replied. In responding to the toast of "The Association," which was submitted by Mr. W. Hale, the President said the association was making progress, for during the year the number of members had increased from 63 to 93. Other toasts were proposed or responded to by Mr. Whittall, Mr. E. Harper, Major Barnsley, Messrs. W. Sapcote, A. Smith, T. Johnson, and J. Price.

**EDINBURGH ARCHITECTURAL ASSOCIATION.**—The opening meeting of this association for the

session was held on the 16th inst. Mr. Thomas Ross, architect, the president, occupied the chair, and devoted his presidential address to the subject of "The Development of House-Planning in Scotland from the 14th to the 17th Centuries." It was shown that previous to the 14th century there was little remaining in Scotland to indicate in what kind of houses the people dwelt, the inference to be drawn being that such dwellings were of a slight and fragile kind. But from the 14th century onwards there was a vast body of evidence of a most interesting and instructive kind, and of an architectural value which had not received the attention it merited. In all parts of the country there were keeps, towers, and castles, as they were differently called, which, by their fancifulness of detail, by the excellence of their masonry, and ingenuity of construction, excited our admiration, and many of them were duly appreciated by those to whom they belonged. But, on the other hand, it excited one's astonishment to see the indifference with which many a stately tower was regarded and allowed to fall into ruin. The general characteristics of a Scottish keep of the simplest kind, and the various methods adopted to enlarge such a building, were explained by plans. It was shown that the original idea was one room on each floor, so as to leave the tower open on all sides, and that any addition proceeded by way of a single-chambered tower on one side, and the same thing if required on the other side, always so placed as to leave the original tower open and free on some part of its four sides. The singular plan of Borthwick, unique in Scotland, where both the additional towers are on one side, was described. In considerable detail, and with the aid of diagrams, the gradual growth of the mansion house from the keep was traced, and how the limited space of the latter, which was principally given up to the common hall, failed to satisfy the proprietors during the 16th and 17th centuries. In this connection Plocho Castle, near Perth, was shown to be a most typical example—a connecting link between the old and the new—absolutely unaltered, and in good preservation. Melgund, in Forfarshire, was cited as another instance of such a house. It at the same time exhibits a curious harking back to old ideas in having a keep built at one end, so that at first sight it appears to be a building of two periods, while in reality it is all of one period. Drochil Castle, Peeblesshire, which is erroneously supposed never to have been inhabited, was shown to be a most exceptional plan for a Scottish nobleman to adopt for his house at the end of the 16th century. Here, perhaps for the first time in Scotland, a complete departure was made from the old style of planning by the introduction of a central corridor, of great width, from end to end of the house, and from which rooms opened on either hand and on every floor. The country, however, was not ripe for such a sweeping change, and probably not till last century was the plan ever repeated. Maclellan's House, Kirkcudbright, and Kelly in Fife were illustrated as most interesting examples of Scottish houses of a moderate size. The remarkable ruin at Barns, near Longniddry, presented a very pointed example of the desire for a more spacious style of house than was common. Built about the same time as Drochil, but never finished, it was strongly fortified, and it had many features in its plan which brought it into touch with modern ideas. The culinary arrangements of these old buildings, as exhibited in the many curious kitchens which still remain, were fully described and illustrated with plans.

**LIVERPOOL ARCHITECTURAL SOCIETY.**—The Thompson-Yates Laboratories of pathology and physiology at University College were visited by the members of the Liverpool Architectural Society on Saturday afternoon. The party, which included Mr. Councillor W. E. Willink (president of the society), assembled in the hall of the Victoria building, where they were received by Professor Boyce and Professor Sherrington, who conducted them through the laboratories, and gave information regarding the appliances in the various departments. Subsequently a visit was paid to the School of Hygiene, Ashton-street, through which they were taken by Dr. Hope, medical officer of health for the city.

**THE SOCIETY OF ARCHITECTS.**—We give in another column, p. 742, the inaugural address delivered before the society by Mr. Walter Emden (President), last Thursday night, at St. James's Hall, Piccadilly. At that meeting the

following three new members were duly elected by ballot: John Francis Beardwood, P.O., Box 2028, Johannesburg, S.A.R.; Robert Hampton Clucas, Town Hall, Douglas, Isle of Man; and John George Gibb, Newmarket. The next meeting will be held on Thursday, December 15, and will take the character of a social smoking evening, and the subsequent fixtures are arranged to be held on January 26, February 23, March 23, April 27, May 25, and October 26, the last being the anniversary meeting.

### CHIPS.

The Martin-road Board Schools of the Middlesbrough School Board were formally opened on Friday by Sir George Kekewich, Secretary to the Education Department.

The finance committee of Aberdeen Town Council visited the fish-market on Friday for the purpose of inspecting the sites suggested for the proposed extension of the market buildings. It was decided to recommend the council to carry the extension along the Market-street wharf. The cost of the extension is estimated at from £3,000 to £4,000.

Mr. Thomas Winder, M.S.A., of the Norfolk Estate Office, Sheffield, has been appointed by the Earl of Effingham, agent to his lordship's Yorkshire estates.

Notification is given of an intended application to Parliament in the ensuing session for leave to bring in a Bill and to pass an Act to empower the governors of the London Hospital to purchase, by compulsion or agreement, Nos. 13, 17, 19, 21, and 23, Oxford-street, Whitechapel, and land forming the site of the Institution known as John Baker's Almshouses. The properties are required for the purpose of erecting additional buildings in connection with the hospital.

Shoreditch has achieved a brilliant success in connection with its utilisation of the dust destructor for the generation of the electric current. During the past year the price to the consumer has been reduced by no less than 33 per cent., and yet there remains a gross profit of close upon £6,000 upon 12 months' working.

At the Devon and Exeter Hospital, on Sunday, Mr. R. Selley, builder, of Church-road, St. Thomas, Exeter, succumbed to injuries received on Saturday morning. Deceased was engaged in repairing the roof of a house in the Alphonson-road, occupied by the Rev. Badington, when a rope attached to some scaffolding broke, and he fell to the ground, pitching on his head. He sustained a fractured skull and other injuries, and was conveyed to the Devon and Exeter Hospital in an unconscious state, in which condition he remained up to the time of his death.

A reredos erected in St. Faith's Church, Maidstone, as a memorial, was unveiled on Wednesday in last week. It is constructed of Caen stone with marble columns. In the centre panel, which is outlined with red marble, is a Lamb carved in alabaster, while at the sides are the emblems of the Four Evangelists. There are also side panels, on which are written respectively the Ten Commandments, the Creed, and the Lord's Prayer. The work has been carried out by Messrs. Jones and Willis, Great Russell-street, W.C.

A new chapel, erected by the congregation of St. Patrick's Roman Catholic Parish at the junction of Maitland-street and Arthurs-terrace, Dundee, was opened on Sunday. The style of the building, which cost about £7,000, is Modern Gothic. The external dressings are of red Dumfries stone, while the bull-nosed rubble is from Bormingmuirhead.

The ceremony of opening the new nurses' home attached to the Sunderland Infirmary buildings took place on Saturday. The home has been constructed in harmony with the rest of the buildings in Durham-road by Mr. Walter Scott, contractor, from plans by Messrs. J. Potts and Son, of Sunderland and Newcastle-on-Tyne.

The third of the series of fortnightly lectures on art subjects in connection with the Glasgow Corporation was delivered in the Art Galleries in that city on Saturday evening by Mr. Robert F. Martin, South Kensington Museum, whose subject was "Artistic Glass."

The death occurred on Sunday week, at the age of 80, of Mr. G. Plucknett, who was for 37 years the treasurer of the Builders' Benevolent Institution. Mr. Plucknett was at one time a partner in the firm of Cubitt and Co., of Gray's Inn.

The roof of the Free Church at Fortrose, built at the time of the Disruption, recently showed signs of failure, and it was decided to rebuild the edifice. The new church, which was dedicated on Friday, is Gothic in style, is lighted with acetylene gas, and has cost £3,500. Mr. John Robertson, of Inverness, is the architect.



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## ILLUSTRATIONS.

PROPOSED NEW CHURCH, MUNDESLEY, NORFOLK.—GARDEN FRONT, RANELAGH CLUB, BARNES.—FAIENCE DECORATION FROM STAMBOUL.—LONDON AND SOUTH WESTERN BANK, KILBURN.—DESIGNS FOR A COUNTRY HOUSE.—FURNITURE BELONGING TO THE LATE MR. J. T. DELANE.

## Our Illustrations.

## MUNDESLEY CHURCH.

THE church we illustrate to-day is to be erected on a very convenient site in the middle of the village, presented by the East Coast Estate Co., to take the place of the old church now partly in ruins, which stands on the hill close to the edge of the cliff. The new building is proposed to be erected with flint and stone dressings, and the roofs to be covered with green Westmoreland slates. A new railway line has been recently opened to Mundesley, and a very prettily designed station has been built. It is expected that Mundesley in the near future will become a formidable rival as a watering-place to Cromer on the north, and Yarmouth on the south.

## RANELAGH CLUB.

THE illustration shows the garden front of the Club House at Ranelagh, Barn Elms. The new wing, lately erected, comprises a dining-hall for 250 people, steward's office, service-rooms, and additional kitchen offices. The character of the old club-house has been followed as far as applicable to the requirements. The terrace is a special feature of this side of the club-house, and makes an attractive lounge after dinner. The interior of the dining-hall is decorated with pilasters, columns, coffered ceiling, and panelled dado, all painted white, and also green-toned walls, with medallions in gold of "Kit-Cat 1703" and "Ranelagh 1897." The floor is oak "Pavodilos." The band gallery is placed on one side of the hall. The two chimney-pieces have the arms of the club in their centre. Iron dogs carry plain iron baskets in the red-brick recessed fireplaces. The building was erected under contract by Messrs. Barker, of Kensington; the chimneypieces by Messrs. Geo. Jackson and Son, of Rathbone-place; all from the designs and under the superintendence of Mr. Alfred Burr, F.R.I.B.A., architect, of 85, Gower-street, W.C.

## FAIENCE DECORATION FROM STAMBOUL.

THESE drawings, made by Mr. A. E. Henderson last year, as Owen Jones Travelling Student, are chiefly of Mural Decorations in Faience from the Rustem Pasha, Jami Stambül. The upper general drawing gives the composition in repetition, and to the right of this figures a detail. The border tile below shows a graceful running pattern of elegant proportions. The remaining study is particularly well drawn, and all four seem thoroughly to accord with the purpose for which this useful studentship was established. Owen Jones himself could scarcely have wished to see his memory associated with more appreciative studies of historic ornament, and particularly as the Oriental styles had so special a

charm for him, as an ornamentalist. To all designers such drawings will be interesting, and to many useful.

LONDON AND SOUTH-WESTERN BANK, LTD.,  
KILBURN BRANCH.

THIS branch bank, which has lately been completed, occupies a prominent position in the High-road, Kilburn, and has been erected for the directors of the London and South-Western Bank from the designs of their architect, Mr. Edward Gabriel (Edmeston and Gabriel). Externally, the ground floor is of Portland stone, above which the walls are faced with "Red Bank" pressed bricks, with Portland stone dressings. The plan shows the general arrangement of the ground floor. The floors above are arranged for offices, and the basement contains the strong-room, clerk's room, lavatories, and heating apparatus. The contract for the bank and shops adjoining has been carried out by Messrs. R. A. Yerbury and Sons, of Kilburn, Mr. Ellison acting as clerk of works.

## "BUILDING NEWS" DESIGNING CLUB: A COUNTRY HOUSE.

(For review and awards, see p. 741.)

## SKETCHES OF FURNITURE.

THE illustrations this week are of exceptional interest. These, with many other fine pieces of work, formerly the property of Mr. J. T. Delane, late editor of the *Times* newspaper, were recently sold at Willis's Sale Rooms, King-street, St. James's-square, by Messrs. Robinson and Fisher. The Commode, a very beautiful Old English one with a swept front of satinwood, inlaid—the top with parqueterie and large oval medallion of flowers, the front with festoons and wreaths; chased metal handles at ends, the piece itself resting on metal feet. This and a companion commode were formerly at Windsor Castle, from whence they were removed between 1820 and 1830. The first Commode in our sketch was sold for 155 guineas, the companion fetched 105 guineas. The Escritoire of Louis XV. period is of very fine workmanship, with drawers, shelf, and well, fall-down front, draped ends on cabriole legs, the whole exquisitely mounted with finely-chased ormolu of beautiful design in scrolls and other decoration. An opinion may be formed as to its public interest, seeing that the price it fetched was 310 guineas. The Jacobean Table is also a very graceful design in oak, with brass handles and club feet, and containing three drawers. This was sold for £5 15s.

## CHIPS.

Among the adjudications announced in Tuesday's *London Gazette* is that of Edwin Fairchild, of St. Mary's-road, Harlesden, N.W., surveyor.

A stained-glass window, designed by Messrs. Fouracre and Co., of Stonehouse, is about to be placed in the council chamber of Plymouth Municipal Buildings, as a memorial of the late Alderman James.

The new cemetery at Ryhope, acquired for the township by the rural district council, was formally opened last week. The cemetery, which is about five acres in extent, has cost £5,145, of which sum £1,300 was paid for the land. There are two chapels, each with mortuaries and vestries, and at the main entrance the superintendent's lodge and offices are situated. Provision is made for 4,346 grave spaces of treble depth.

The Hastings Town Council have decided to apply to Parliament next session for power to construct and work tramway lines connecting the suburbs with the centre of the borough, but not touching the front line; and also for power to guarantee an annual sum towards the completion of the harbour.

Colonel A. G. Durnford, R.E., an inspector of the Local Government Board, held an inquiry at Heywood last week into an application by the town council for permission to borrow £18,000 for street improvements and for the provision of a fire-station, mortuary, and depot in Hind Hill-street, £1,700 for the purchase of land as a site for a town-hall, council-house, justices' room, and police-station, and £420 for a steam road-roller.

At a meeting of the health committee of Glasgow Corporation, on Monday, the Lord Provost intimated that at the next meeting he would move that an annuity of £250 be voted to Dr. J. B. Russell, who has retired from the post of medical officer of health to become medical member of the Local Government Board. The salary for the two offices is the same—£1,000 a year—but the new position carries no pension.

## THE PRESERVATION OF SCOTTISH ECCLESIASTICAL MONUMENTS.

THIS formed the subject of an address delivered by Archbishop Eyre, D.D., LL.D., as president of the Glasgow Archaeological Society, on Friday night. They might well, the Archbishop said, plead for the preservation of the old ecclesiastical monuments remaining in Scotland. Their society had been established for the encouragement of research into the monuments of the past and of care for their preservation. Members of that and kindred societies were interested in the preservation of such remains, and should look upon themselves as the natural guardians of these treasures. In travelling through the length and breadth of the country they could not fail to meet with much to study and admire in her old ecclesiastical buildings, and not to admire only, but they looked on them as precious relics of the past, and as "special ornaments of the land and glory of the realm." In confining his remarks to the larger churches and ruins still remaining, he said he did so because they formed the only source to which they could look in this country for the improvement of the art of architecture, and for models from which to study and to copy Gothic work.

They had good but simple examples of early work at Jedburgh, Kelso, Dunfermline, Leuchars, Kirkwall, St. Andrew's, Glasgow, Whithorn, Elgin, Brechin, Dunblane, Dornoch, Holyrood, Arbroath, Dryburgh, Paisley, Dundrennan, Manul, Kilwinning, Restennet, Crossraguel, Coldingham, Lindores, Fearn, Pluscadine, Cambuskenneth, Deir, Saduel, Ardchattan, and Oronsay. He then called special attention to the Scottish ecclesiastical ornaments that remained from the years 1060 to 1560, a period of 500 years, and confining himself to the cathedrals, abbeys, and priories. The cathedrals of Scotland were thirteen in number, and of these Glasgow and Kirkwall were the only two remaining in a more or less complete condition. Of the other eleven, five were now in use in a modified condition—namely, Brechin, Dornoch, Dunblane, Dunkeld, and Lismore. Six were only ruins, though Whithorn was used as a parish church until 1822. They had been ruthlessly dealt with in the past. It was their place and their privilege, however, to protect them further injury, for they called for their care on account of their archaeological interest and the relation they bore to the art and architecture of the nineteenth century, and as a means of stimulating interest in the existing ruins, he suggested that the members of the society and antiquarians in general should spend their holiday in making a round of the Benedictine houses.

A memorial stained-glass window has just been placed on the north side of Bradford Unitarian Church. The work is from the studio of Messrs. Powell Brothers, of Park-square, Leeds.

The new organ opened on Thursday at Lincoln Cathedral, built by the firm of Henry Willis and Son, of London, is one of the largest in England. It has cost, with the alterations to case, £11,850, and will be manipulated by the aid of electricity. The structural alterations have been carried out under the direction of Mr. J. J. Smith, the cathedral clerk of works.

Major Durnford held an inquiry at Shipley on Friday relative to an application by the urban district council for sanction to borrow £7,000 for works of street improvements. Mr. John S. Rhodes, the clerk, stated that the improvements in respect of which the loan was sought were rendered necessary by the largely increased traffic in Bradford-road, Valley-road, and Saltaire-road, and the council had been obliged to take immediate steps on account of the boom in building.

Building operations continue with phenomenal activity in Glasgow. Last year the new buildings authorised were valued at £1,851,000. This year that may be even exceeded. Among the most important undertakings is one about to be proceeded with by the National Bank, which is to erect a property on the site purchased some time ago at the junction of St. Vincent-street and Buchanan-street.

Colonel Smith, inspector of the Local Government Board, held a public inquiry at Wilslow respecting the urban district council's application for sanction to borrow £2,000 for the purchase of land belonging to Sir H. de Trafford, required for new public offices and street improvements. The council propose to remove old buildings near Swan-street, erect offices, and widen the Manchester and Alderney main road. These changes will involve the removal of a dangerous corner on Manchester-road.



# SKETCHES OF FURNITURE

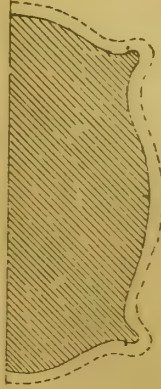
belonging to

THE LATE MR J. T. DELANEY.

Editor of THE BUILDING NEWS

Sold by Messrs ROBINSON and FISHER.

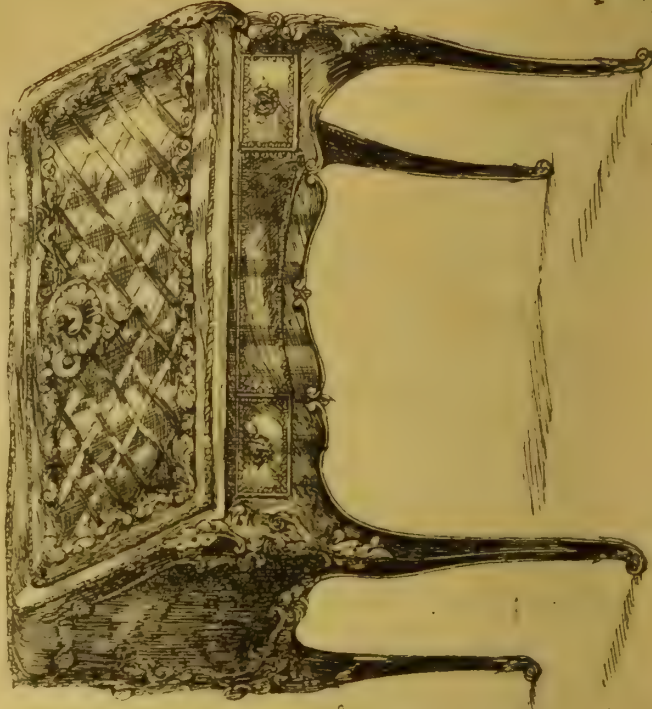
Plan of Commode.



Old English Commode

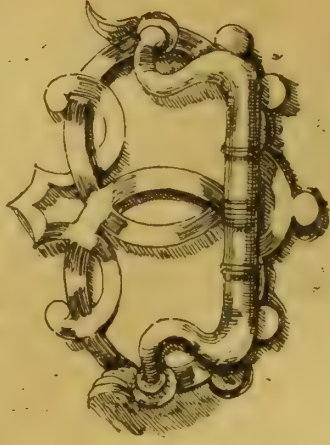


Louis XV  
Escrutoire



WATER-J. WILLS

Detail of Handle.



JACOBEEAN TABLE

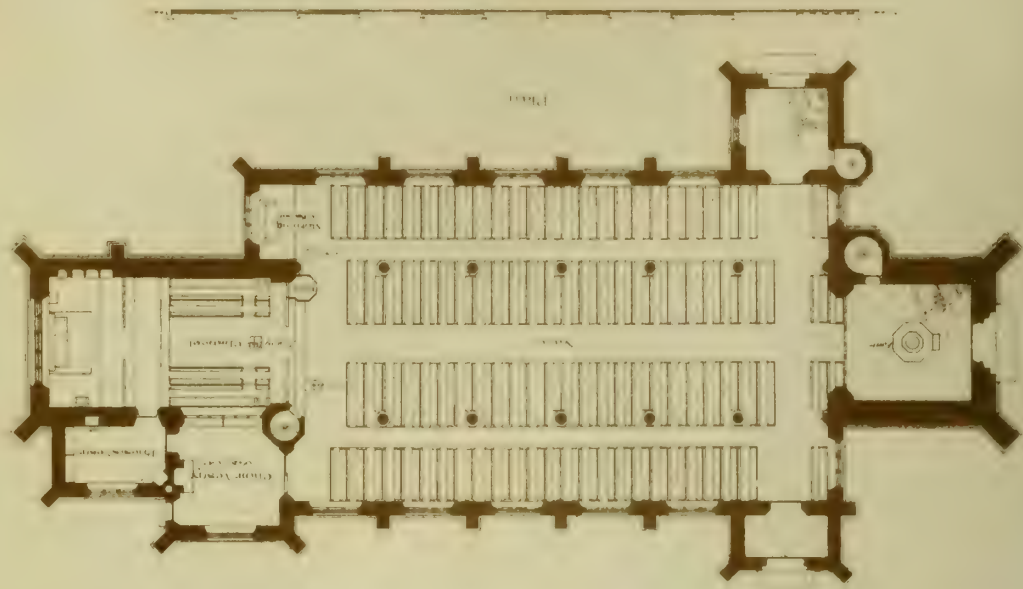
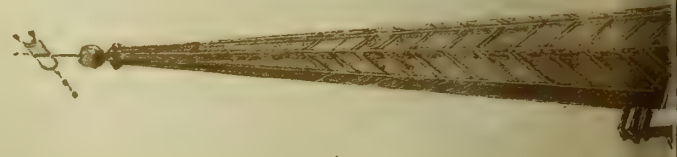








*Proposed New Church  
Mundesley, Norfolk.*



OLIVER. LEESON AND C. M. SILLEY ARCHTS.





PHOTO-TINT IN COLOR AND

1000  
1000  
1000













. Ranelagh Club, Barnes, S.W. . Co



Nov. 25, 1898.



Photo Lithographed & Printed by T. Agnew & Sons, London W.

den Front. — Mr Alfred Barr, F.R.S.A. Architect,

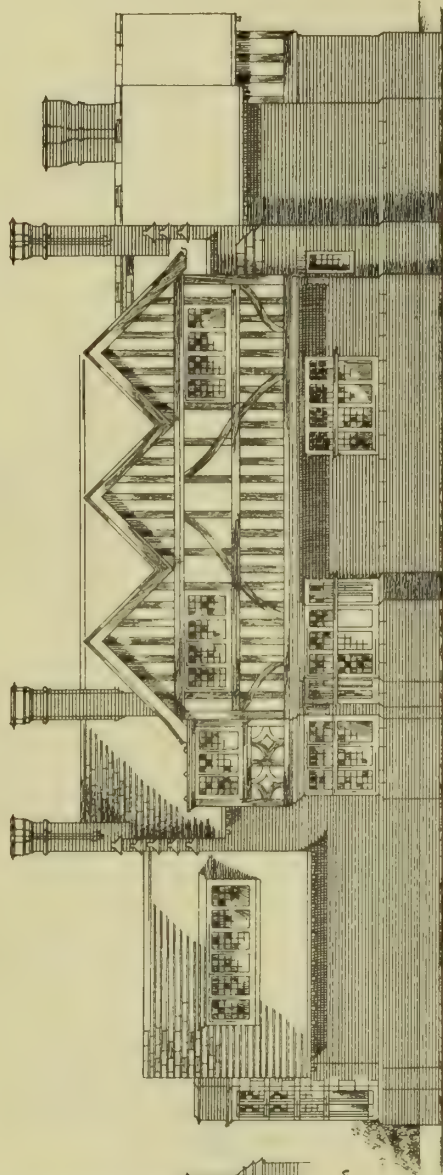
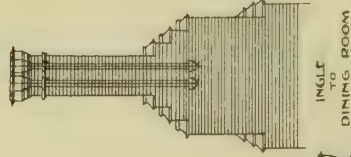
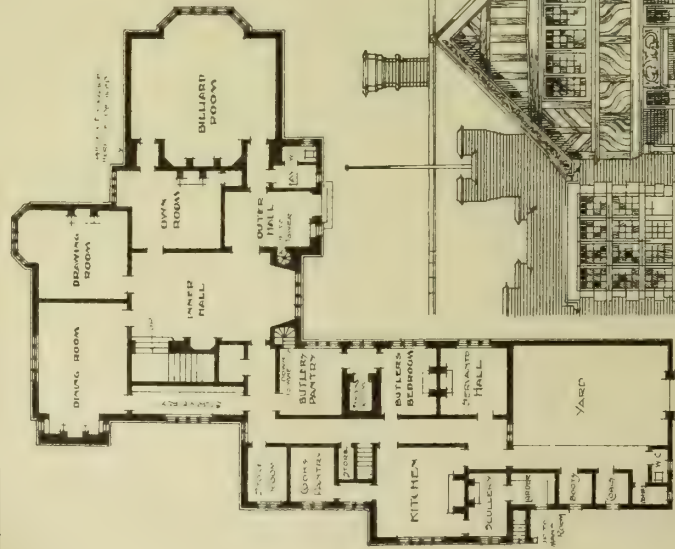












SOUTH WEST ELEVATION



PLACED FIRST

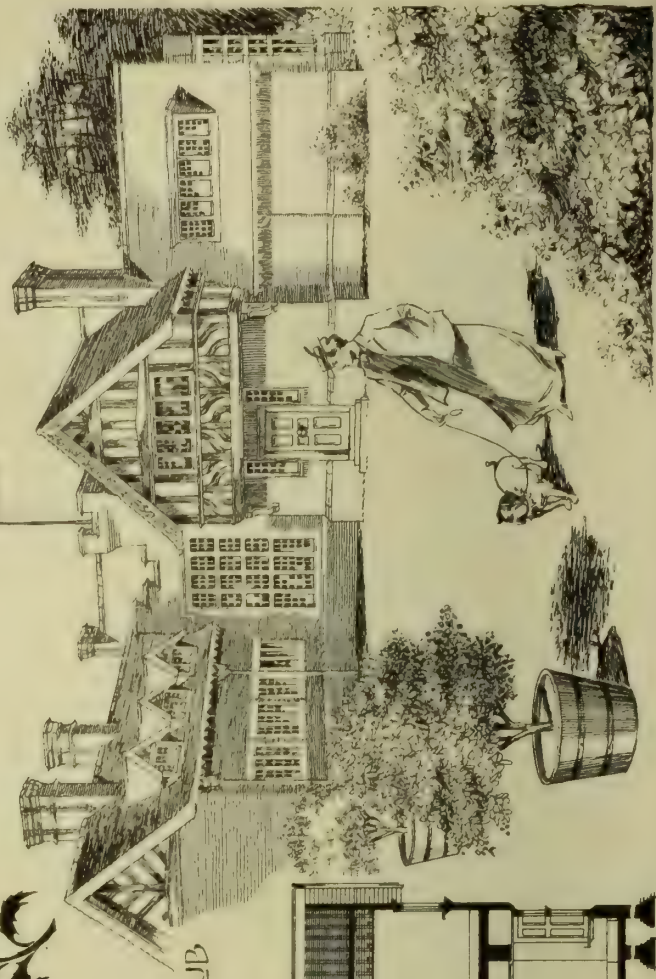
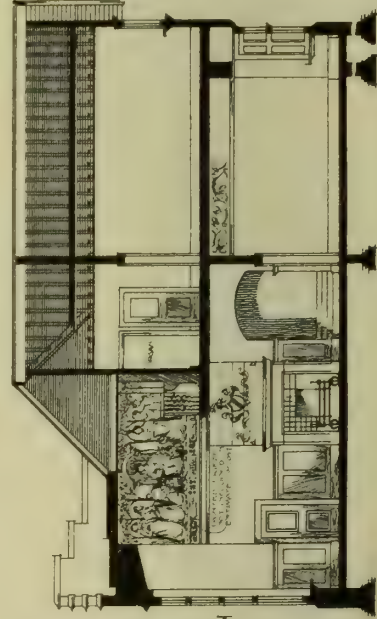
NORTH EAST ELEVATION

"BUILDING NEWS" DESIGNING CLUB  
A COUNTRY HOUSE



FIRST FLOOR PLAN

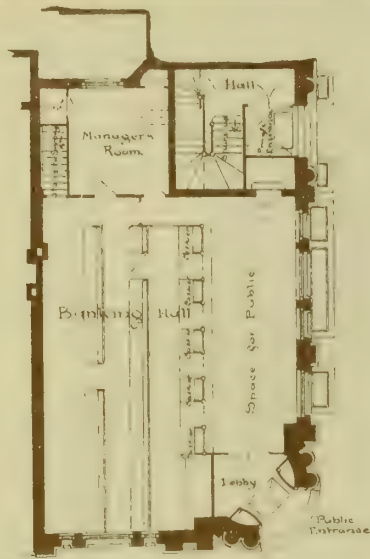
SECTION THIRD FLOOR











LONDON AND SOUTH WESTERN BANK. KILBURN BRANCH.





FAIEN  
in Istanbul - 1895



OWEN JONES TRAVELLING STUDENTSHIP.

FAIENCE DECORATION FROM STAMBUL.

DRAWN BY A. E. HENDERSON

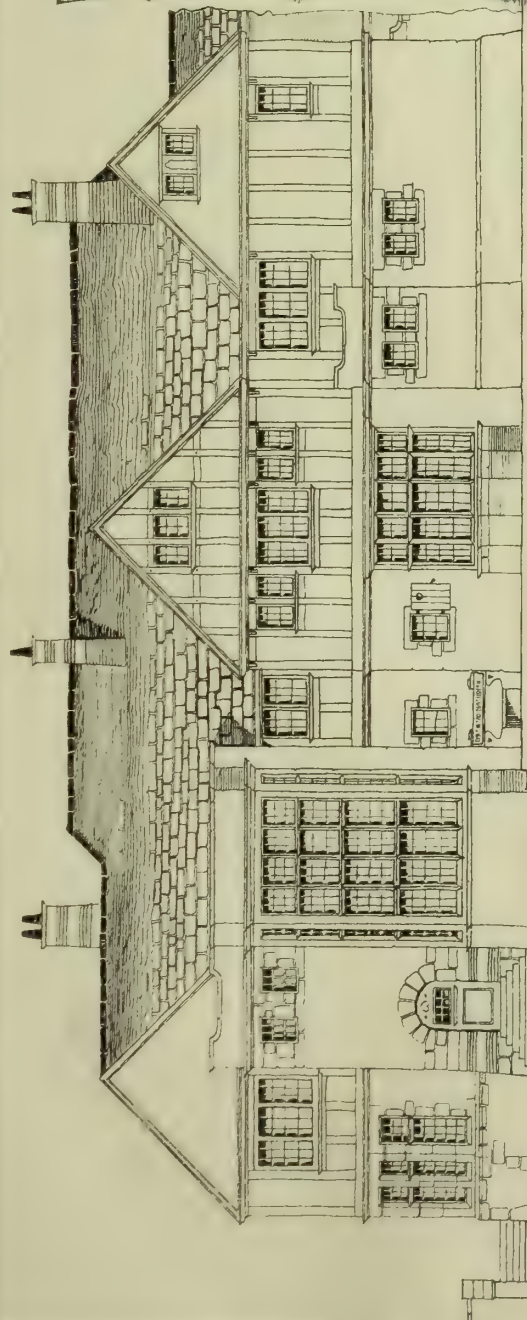




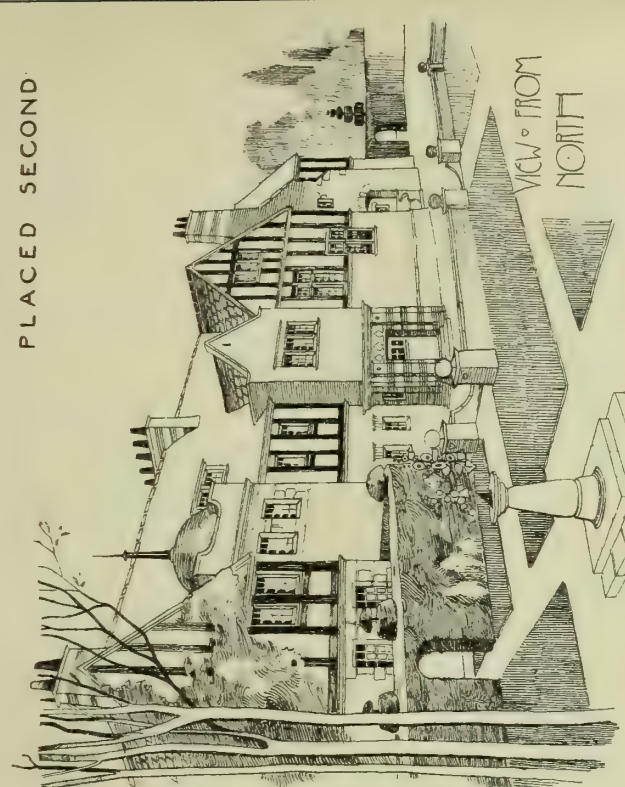




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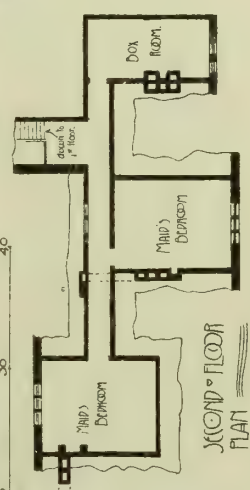
SOUTH ELEVATION - FACING GARDEN AND TERRACE



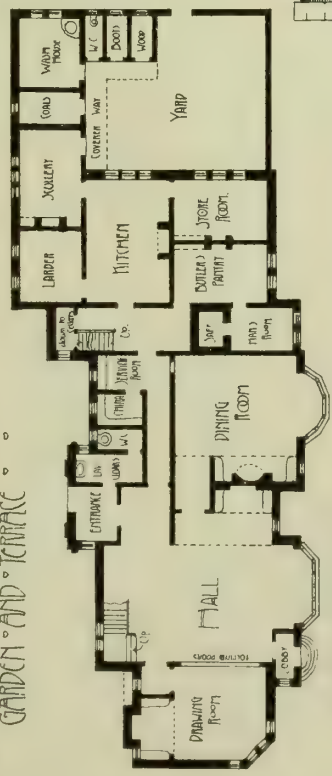
VIEW FROM NORTH

BADC MAIL COUNTRY HOUSE BY

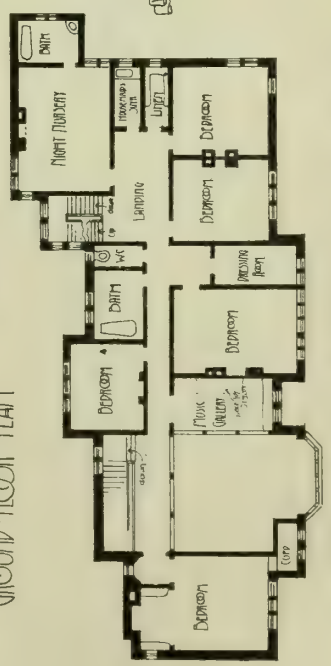
MR GILLIGAN



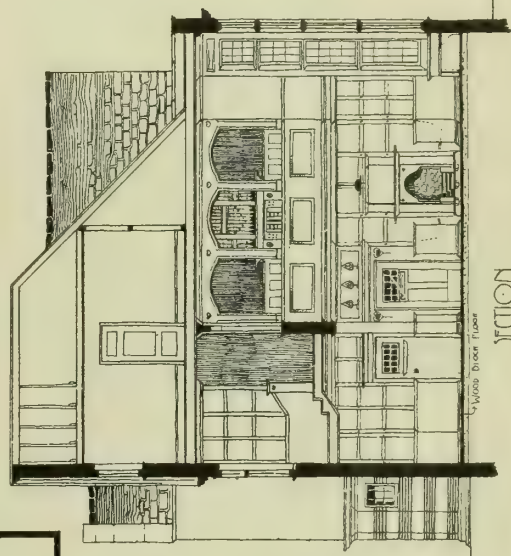
SECOND FLOOR PLAN



GROUND FLOOR PLAN



FIRST FLOOR PLAN



WEST ELEVATION

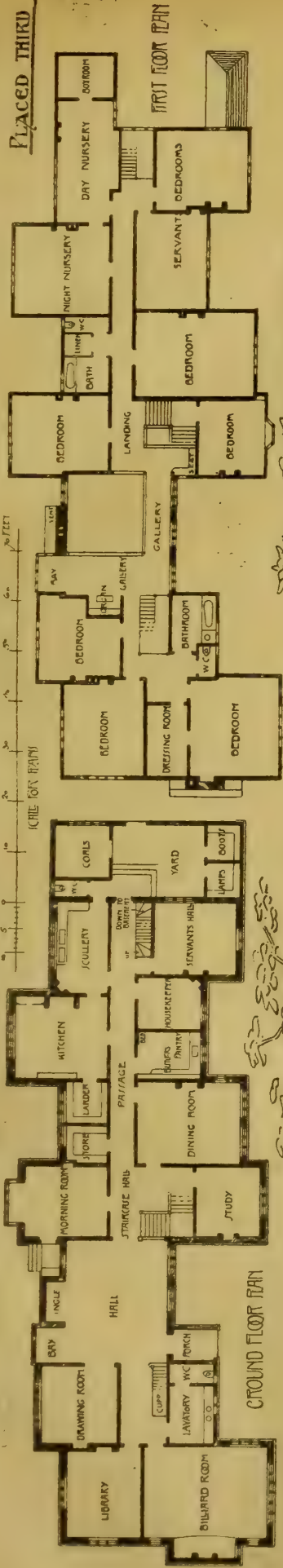
SECTION







PLACED THIRD



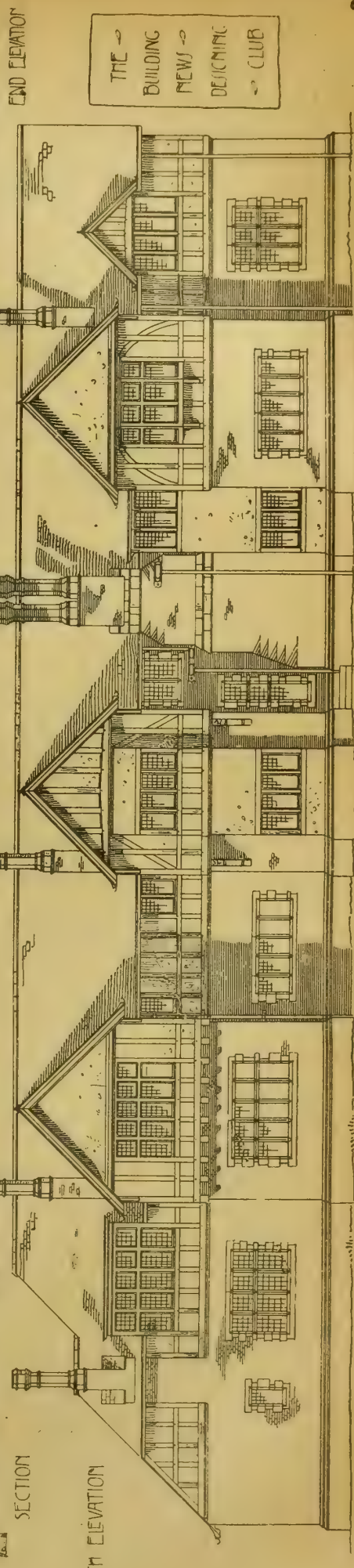
A COUNTRY HOUSE DESIGN BY TREPRIW

SECTIONS AND ELEVATIONS TO 1/8" SCALE



PERSPECTIVE VIEW

END ELEVATION



SECTION

SOUTH ELEVATION

THE BUILDING NEWS DESIGNING CLUB



## Correspondence.

### BURNLEY HIGHER GRADE SCHOOL COMPETITION.

To the Editor of the BUILDING NEWS.

SIR,—The Burnley School Board having advertised in the Burnley, Manchester, and building papers for architects practising within a radius of 60 miles to submit designs in competition for a new Higher Grade School, we found, after obtaining the conditions, the following very irregular clause was inserted:—

[COPY OF CLAUSE WE OBJECT TO.]

The Board reserves to itself full liberty to reject the approved design if, on its being submitted to tender, the buildings cannot be erected by the contractors approved by the Board within five per cent. of the sum named in the architect's estimate of the accepted design.

The author of the design rejected for this reason "will not have any claim on the Board beyond the provision of £50, and the plans, specifications, bills of quantities, and tenders will become the property of the Board, and the architect will not be employed to carry out the work; but it is intended that the architect whose plans may be accepted by the advice of the assessor shall be intrusted with the erection of the school at a remuneration of five per cent. on the cost of the work, on condition that the cost does not exceed the estimate furnished by the architect."

The remuneration will include payment for plans, specifications, bills of quantities, tenders, inspection, particulars of furniture, settlement of accounts, and the whole of the architect's and surveyor's work of every kind.

[Competition open to all architects practising within 60 miles from Burnley.—W. and W.]

Having written to the clerk pointing out that such stipulations precluded all architects who were members of the Institute, and loyal to same, from competing, we herewith beg leave to submit you copies of the correspondence that has taken place on the matter.

[COPY OF CORRESPONDENCE BETWEEN THE BURNLEY SCHOOL BOARD AND OURSELVES.]

#### Competition for New Higher Grade School.

100, King-street, Manchester, Oct. 31, 1898.

DEAR SIR,—We are extremely disappointed on perusing the conditions for the above to find that your Board are asking the profession to compete on terms considerably below the usual recognised charges.

We find that you will require the successful architect, not only to supply the competition and working drawings, details, and supervision for the usual 5 per cent. fee, but you include also for bills of quantities and obtaining tenders from same as well as squaring and measuring-up at the completion of the work.

The taking-out of the quantities and squaring-up on completion, your Board must surely be aware, are surveyor's work, altogether outside the architect's fee of 5 per cent., and paid for separately.

As Fellows of the Royal Institute of British Architects, we are precluded from competing on terms below the usual recognised fees—viz., 5 per cent. for architectural services and 1½ per cent. for surveyor's fees.

Trusting your Board will see their way to modify their conditions in this respect, and so allow many architects of repute to submit your their schemes, who are at present unable to do so.—We beg to remain, yours very truly,

(Signed) WOODHOUSE AND WILLOUGHBY.

E. Jones, Esq., Clerk, Burnley School Board.

[R. Higher Grade School.]

Town Hall, Burnley, Nov. 1, 1898.

GENTLEMEN,—I regret that the conditions of competition do not meet with your approval. I am afraid, however, that no modification can be made in the same, as the instructions have been formally approved by the Board.—Yours, faithfully,

E. JONES, Clerk.

Messrs. Woodhouse and Willoughby, 100, King-street, Manchester.

100, King-street, Manchester, Nov. 4, 1898.

DEAR SIR,—We have yours of the 1st inst., and carefully note contents of same.

Will you oblige us by placing our letter of Oct. 31 last before your Chairman at the earliest possible date? The matter is a very grave one for the profession generally.—Awaiting reply, we remain, dear sir, faithfully yours,

(Signed) WOODHOUSE AND WILLOUGHBY.

E. Jones, Esq., Clerk, Burnley.

Town Hall, Burnley, Nov. 5, 1898.

GENTLEMEN,—In reply to yours of the 4th inst., I shall be glad to place the letter before my Building Committee, as desired.—Yours, faithfully,

E. JONES, Clerk.

Messrs. Woodhouse and Willoughby, 100, King-street, Manchester.

100, King-street, Manchester, Nov. 16, 1898.

DEAR SIR,—We shall be glad to hear from you the result of your Building Committee's perusal of our letter respecting the above, as promised in yours of the 5th inst., and oblige,—Faithfully, yours,

(Signed) WOODHOUSE AND WILLOUGHBY.

E. Jones, Esq., Clerk to Board.

Town Hall, Burnley, Nov. 19, 1898.

GENTLEMEN,—I duly brought your letter before my Committee at a meeting held yesterday. The Committee, however, decided that they should not interfere with the arrangements already made.—Yours, faithfully,

E. JONES, Clerk.

Messrs. Woodhouse and Willoughby, Architects.

100, King-street, Manchester, Nov. 21, 1898.

DEAR SIR,—We exceedingly regret to learn that your Board intend to adhere to the conditions issued for the above project, which debar all honourable members of our profession who are associated with the Royal Institute of British Architects from competing.

Under these circumstances, we have no alternative but to return you the conditions, and ask for the return of our guinea deposit.—Dear Sir, yours faithfully,

(Signed) WOODHOUSE AND WILLOUGHBY.

E. Jones Esq., Town Hall, Burnley.

Such a grave and far-reaching attempt on behalf of a board like Burnley to dispossess architects of their usual recognised fees, especially after earning same through the keenness of a competition, requires, we consider, the utmost ventilation at your hands. The designs are to be submitted by January 14, 1899.—We are, &c.,

WOODHOUSE AND WILLOUGHBY.

100, King-street, Manchester, Nov. 11.

### RE GODALMING MUNICIPAL BUILDINGS COMPETITION.

SIR,—I forward herewith copy of letter in the above matter, which has been sent to the Town Clerk of Godalming, on behalf of the signatories.—I am, &c.,

J. WILLIAM STEVENS.

21, New Bridge-street, London, E.C., Nov. 23.

#### BOROUGH OF GODALMING: MUNICIPAL BUILDINGS COMPETITION.

To the Worshipful The Mayor and Corporation of the Borough of Godalming.

GENTLEMEN,—We, the undersigned, having submitted designs for the above-named competition, and having received copies of the Assessor's report, and information as to the design selected by the Town Council, respectfully beg to call your attention to the following facts in relation thereto:—

No. 1. A schedule of instructions was issued on behalf of the Council, to each competitor, setting forth the conditions under which the designs were to be prepared.

No. 2. The most important and absolute of these conditions was the following—viz.:—

"A passage is required along the south side of the public hall, as indicated on the block plan, to be 10ft. wide if the engine-house be placed at the back, and, if otherwise, 6ft. wide. The plan accompanying this condition show the 10ft. way required, and exact position of it by a coloured strip. There was also a question upon the point addressed to the Council, and numbered 9 in schedule as follows:—

"If fire-engine is placed on back part of site, may not the 15ft. road to the 'Buries' roadway be used as access for engine to public road instead of the passage through centre of site, as suggested.

The answer given was as follows:—

"The 10ft. passage into Bridge-street is regarded as essential, if the fire-engine house is placed on the back of site. With reference to the above point, we consider that nothing could be more clear than the intention of the Town Council, as expressed in the conditions, and as shown upon the plan supplied by them to the competitors, neither could anything be more definite than the answer given to the question that this condition was to be regarded as essential. It made no variation possible to those who intended to carry out the instructions. We would also point out that the nature of this condition was such, that it could not be regarded as of small moment, because it was of primary importance in the planning of the buildings, and completely controlled the whole disposition of the several parts of them.

Under these circumstances it is with great surprise that we learn that the design selected and adopted by your Council violates the one condition which was stated to be essential, and also the condition which more than any other influenced any arrangements of the plans. We are also at a loss to understand how the assessor can have recommended for the first place a design at variance with this condition unless he entirely overlooked the point.

We may safely conclude that he must have done so, as he could not have otherwise passed over such variations as that referred to without remark, and further stated that the designs were in accordance with the "conditions and instructions issued."

The plan selected does not provide a 10ft. way on the south side of the public hall as indicated on the block plan, but this space is built over, contrary to the instructions on the ground floor. It cannot be urged as an answer to this objection that the design selected provides some adequate alternative for the requirements laid down in the conditions, or that the alternative so provided is even an improvement upon what the conditions required.

We respectfully submit that, in awarding the premium, the only equitable course that could be followed was to disqualify any design that infringed a condition involving a radical change of plan, and make a selection from among those which most faithfully followed the conditions so clearly laid down.

Under these circumstances we regret that we feel compelled to strongly protest against the premium offered being awarded to a design (whatever its alleged merits), which is at variance with the conditions.

We are fully assured that this cannot be done without great injustice to us, and in support of this view we may refer to the emphatic statement made by the editor in the issue of the *Builder* of the 5th inst. Upon a matter of this description, no higher or more impartial authority could be quoted.

We cannot think that it is the desire or intention of the Town Council of Godalming to ignore conditions which they themselves laid down, or to act otherwise than fairly and in good faith with regard to them.

We therefore appeal to them with the more confidence to take such action as shall be equitable to those competitors who have carried out their instructions.

(Signed) ARDSON and DAWSON, 8, Delahay-street, Westminster.

CHARLES BELL, 3, Salters' Hall-court, E.C.

E. R. ROBBIN, F.S.A., 9, Bridge-street West, S.W.

J. WILLIAM STEVENS, A.R.I.B.A., 21, New Bridge-street, City, E.C.

SAMUEL WELMAN (Welman and Street), Guildford and Godalming.

### CLARIDGE'S HOTEL.

SIR,—In your last week's issue you say in your brief description that the red facings and glazed bricks were supplied by Messrs. Laurence and Sons. You have been misinformed, as the whole of the red facings were supplied from my works at Hedingham, the arch bricks being specially made to shape, thus saving a great amount of labour. Your kind mention of this in your next issue would greatly oblige.—I am, &c.,

FRANK GENTRY.

Sible Hedingham, Essex, Nov. 22.

## Intercommunication.

### QUESTIONS.

[12105].—**Burial Ground.**—I have a country burial ground to lay out. Can any reader kindly give me any advice on the matter—as to grave space, drainage, &c. I—RESURGAM.

[12106].—**Waterproofing Tile Roof.**—I want to reduce the extra weight which accrues to a red plain-tile roof when it becomes soaked with rain. What should I use, and how? Tar objected to. I want to make the exposed surfaces of the tiles as nearly as possible non-absorbent.—CLAYPOLE.

[12107].—**Measuring the Cube Stone in Window Sills.**—A bay window, canted sides, is to be measured for a stone sill of ordinary section. Will any measurer tell me how it should be taken? The sill is Sin. by Sin.—G. H.

[12108].—**Iron Ridge Cresting.**—I shall be obliged if any practical reader will tell me how I can fix a cast-iron cresting to the ridge of roof. Should there be a grooved ridge fixed, and what should this be, terra-cotta or cast-iron? Are screws necessary, and will red lead cement do for bedding?—IGNORANT.

[12109].—**Fire-Resisting Composition.**—So-called fireproof buildings have so frequently been destroyed by fires, that I should like to be informed what are the principles advocated by the best authorities? Is not the main safety to be found in dividing the building into comparatively small risks by floors and partitions of protected ironwork, and to avoid a large collection of inflammable materials? Most of the disastrous fires point to some kind of communication between stories by staircases and lifts, and also by faulty partitions, column connections, and pipes. There has been a great deal of talk, but few practical suggestions.—A READER.

[12110].—**Property in Materials.**—A builder sends bricks and joinery (not fixed) to the site of building, and afterwards becomes bankrupt. Can his creditors or assignees sue for value of materials and sash-frames on the ground? An answer will oblige.—F. A.

[12111].—**Radiators.**—How are these usually fixed, and what size should the connections be? They are for warming hall on ground floor in a large house.—ZERO.

### REPLIES.

[12099].—**Tile Roofs.**—Brosely tiles have nibs or stubs cast on their top edge which can be hung on battens or strong fir laths 1½ in. by ½ in. These battens can be nailed to rafters, or, if boarded, it is better to nail them to vertical battens spiked to boarding. The feather-edged system of boarding is sometimes used, the thickest edge of board is placed uppermost to receive the stubs of tiles.—G. H. G.

[12101].—**Liquid Indian Ink.**—I have experienced the same thickness in liquid ink I have used, and have met the difficulty by using a drop of ox-gall, or even a drop of common ammonia, either of which makes the ink flow from pen.—DRAUGHTSMAN.

[12102].—**Fixtures.**—Cupboards are generally the landlord's fixtures, unless they are provided by the tenant.—L. E.

[12102].—**Fixtures.**—All cupboards in a house belong to the landlord, as they are fixed to the freehold. Consult Tarbuck's "Handbook of Property," and Wheeler's "Appraisers' Guide" (Lockwood), which deal with the subject of fixtures. When once a tenant has attached the materials to the soil they cease to be his, and become the property of the landlord.—A. B. N.

[12103].—**Eaves Spout.**—If "B" can prove that the water which drips from "A's" house is detrimental to his property, he can find a legal remedy, as it then becomes a nuisance. Who does the piece of land between the property belong to?—L. E.

[12103].—**Eaves Spout.**—B. has no power to compel A. to put up an eaves spout, though he can try to get him to do so by friendly means. For his own security A. ought to see that an eaves gutter is necessary.—A READER.

[12104].—**Steel Joist.**—Steel being weaker in tension than compression, it is best to have the plate on the bottom of the girders. But one fixed on top and bottom has a still more strengthening effect.—LOUIS EAWOLD.



## LEGAL INTELLIGENCE.

**A SIDE LIGHT ON BUILDING CONTRACTS.**—At Greenwich County-court last week before Judge Addison, Q.C., Tomlin, estate agent, Stanstead-road, sued Horwood Bros., builders, of Dalmain-road, Forest Hill, to secure commission upon a building contract, which, as alleged, he had been instrumental in obtaining for them. The plaintiff's case was that he, having become aware that a Mr. Jewell was about to build upon some property in Stanstead-road, informed the defendants that he could use influence in securing them the contract. He got the plans from Mr. Jewell's architect, a Mr. Baker, of Catford. He had an interview with the younger defendant, when Mr. Baker, who was present, said that he had received a tender from another builder for £4,140, and that if the defendants could agree to do it for £4,100 they could consider the contract as practically theirs. Plaintiff was to have five per cent. on the amount of the contract. The younger defendant offered plaintiff and the architect £100 each; but they refused that, and stipulated for five per cent. to be divided between them. The elder defendant was at Brighton at the time of this interview. When the tenders were sent in he heard that the defendants' amounted to £4,250, and that they had excluded certain work. On May 27 he had an interview with Baker and the Horwoods at the house of the former, who brought up the question of commission. Horwoods said that they would give them £50 on the first "draw" and £50 on the second, the balance to be paid on completion, and that was agreed to. He was present when the contract was signed on June 8. He introduced Jewell to the defendants some time in May. A letter was produced from plaintiff to defendants, dated September 15, stating that he understood the second payment had been made upon the contract, and asking for the £50, and a letter in reply was read in which the defendants characterised the demand as "extraordinary," and warning him not "to make any further use of their name, or means would be taken to put a stop to it." His Honour remarked that the suggestion before him at present was not one which an honest man, let alone a judge, should encourage. Frederick Horwood, the elder defendant, said that he was introduced to Baker by the plaintiff, who asked them to compete for the work, but did not tell them his interest in the matter. They did compete, and their original tender was for £4,250, and afterwards they amended that and made it £4,500, in consequence of a rise in prices, and that was accepted by Jewell. The question of commission was never broached by either Tomlin or the architect. Alfred Horwood, the younger defendant, said that the first he heard of the arrangement to pay 5 per cent. commission was when he was sued for it. Alfred Charles Baker, the architect, was called, and said that he and the plaintiff were friends, and the plaintiff was introduced to Jewell by him. Witness never heard of the 5 per cent. commission being agreed to, but it was spoken of in a jocular way between Tomlin and himself, and he even thought he had written to Tomlin saying that he ought to get commission from the defendants. He remembered another letter in which he said to Tomlin that, if he got the commission, they would divide it; but he never heard the matter mentioned to the defendants. The witness was cross-examined upon letters sent by him to the plaintiff. In one he wrote "We must fix this deal with your man. Don't say anything; but Johnson and Aldridge's estimate, I have found out, is £4,140." Witness said that he did not intend Tomlin to give this information to anyone. In a letter to the plaintiff, dated May 6, he wrote that the defendants' offer was "all rot," and that "if they jibbed, it would pass them. We don't want this to occur after all our trouble." At the bottom of the letter were the words "Biz, my boy, biz. Put your shoulder to it." In another letter were the words "Get your note"; but the witness said that that referred to a commission note for letting from Jewell. Another extract from the correspondence was: "This is right, and going through, old man." In a letter from Baker to Tomlin, dated Sept. 5, which was read by defendants' counsel, in reply to one from Tomlin in regard to the commission, Baker expressed surprise, and denied that he had ever expected to receive half the commission. Jewell, the owner of the property, stated that he had employed Baker in the usual way to look after his interests at the usual charges. His Honour said that the evidence of Baker had, it was true, been "abundantly discredited," but he found for the defendants.

**IMPORTANT APPEAL UNDER THE WORKMEN'S COMPENSATION ACT, 1897.**—*BILLINGS V. HOLLOWAY.*—The Court of Appeal had on Friday an appeal by the plaintiff from the judgment of Judge Addison, Q.C., sitting at the Clerkenwell County-court. The plaintiff was a labourer in the employment of the defendant, a builder. The defendant was in July last erecting a building in the Clerkenwell-road under a contract with the building owner. The building was to take the place of one which the defendant had previously demolished, and when erected the new building would be a four-storied

building over 30ft. in height. The new building was being erected by means of scaffolding, and during the course of the building operations a brick fell upon the plaintiff's head and injured him. At the time when the accident happened no part of the building had reached the height of 30ft., the highest point of the building being 26ft. from the basement. The plaintiff having claimed compensation under the Act of 1897, the County-court Judge held that, as the building at the time of the accident was not more than 30ft. in height, the Act did not apply, and entered judgment for the defendant. By section 7, subsection 1, of the Workmen's Compensation Act, 1897, "This Act shall only apply to employment . . . on, in, or about any building which exceeds 30ft. in height, and is either being constructed or repaired by means of a scaffolding, or being demolished." Mr. Bassett Hopkins, for the plaintiff, contended that the Act applied if the building in course of erection was when finished to exceed 30ft. in height. Supposing a building exceeding 30ft. in height was being demolished, would the Act cease to apply the moment the building ceased to be more than 30ft. in height? The actual height of the building at the time of the accident was not the test. The test was what would be the height of the building when completed? Lord Justice Collins pointed out that the provision as to the building exceeding 30ft. in height might, perhaps, have been taken from section 23, subsection 2, of the Factory and Workshop Act, 1895. Mr. Ruegg, Q.C., and Mr. A. W. Groser, for the defendant, were not called upon. The Court dismissed the appeal. Lord Justice A. L. Smith said that the question was whether a workman who was working at a building which at the time did not exceed 30ft. in height, but which, when completed, would exceed that height, and who was injured, was entitled to claim compensation under the Act. He did not care to speculate whether the limit of height was taken from section 23 of the Factory and Workshop Act, 1895, or not. Section 1, subsection 1, of the Workmen's Compensation Act, 1897, provided that "if in any employment to which this Act applies personal injury by accident arising out of and in the course of the employment is caused to a workman," his employer shall be liable to pay compensation. To see what employments were covered by the Act it was necessary to turn to section 7. That section said that the Act should only apply to employment (*inter alia*) "on, in, or about any building which exceeds 30ft. in height, and is either being constructed or repaired by means of a scaffolding." Could any words be plainer? It was said that the Court ought to add the words "or which may hereafter exceed 30ft. in height." The Court could not add any such words. The appeal must, therefore, be dismissed. Lord Justice Rigby and Lord Justice Collins concurred. A question having been raised as to the costs of the appeal, Mr. Ruegg, Q.C., said that he did not ask for costs.

**A CLAIM FOR COMMISSION.**—*FITCH V. COHEN.*—Mr. Justice Lawrence and a special jury heard, on Wednesday, in the Queen's Bench Division, this action, in which the plaintiff claimed to recover £300, as commission at 2½ per cent. upon £10,000, the price for five houses in Took's-court, and five other houses in an adjoining street. The defendant denied his liability to pay the commission claimed. The case for the plaintiff was that he had obtained a purchaser for the property for £12,000, and had earned his commission, though the purchase was never completed. On the other hand, it was said that the commission was to become due only upon the plaintiff obtaining a contract of purchase, binding upon the intended purchaser, before December 31; that the plaintiff had not obtained such a contract before that date, and therefore the commission claimed had not become due. The jury, having heard a good deal of evidence, gave a verdict for the plaintiff for the amount claimed. Execution was stayed upon terms, with a view to an appeal.

**BUILDING CONTRACTS AND PARTY-WALL BY-LAWS.**—*MELLOW V. GRAIN.*—This action was heard by Mr. Justice Phillimore and a jury at the Manchester Assizes on Monday. The plaintiff was Mr. Alfred Mellor, builder and contractor, Openshaw, and the defendant was Mr. Edward Grain, locomotive engine-driver, Openshaw. The claim was for £116 8s. 4d., balance said to be due under a contract for the building of four houses in Sandwell-street, Openshaw. With regard to the main part of the claim, the defendant said that the plaintiff had not done the work in accordance with the specifications and the by-laws of the Manchester Corporation, and he counter-claimed for the expense he said he would be put to in making the work good. In 1895 the defendant called upon Mr. C. H. Mellor, the plaintiff's father, an architect in Manchester, and asked him to prepare plans for four houses. Plans were accordingly drawn, and they were passed by the corporation. In the following spring the defendant accepted the plaintiff's tender for the building. The work was completed in September, and the plaintiff, on the defendant's behalf, gave the necessary notices to the corporation of Manchester. The corpora-

tion's inspector then found that there were two items in which the buildings did not conform to the regulations. These matters were not included in the contract, but the plaintiff rectified one of the defects, and the other was also remedied. On Oct. 19 the corporation's certificate that the houses were fit for habitation was issued. The defendant had, after a lapse of two years, enumerated a large number of cases in which, he said, the specifications had not been fulfilled, and three in which the corporation by-laws had not been complied with; but even assuming that these allegations were well founded, the plaintiff contended that an expenditure of £15 would set everything right. Mr. Alfred Mellor, builder, Fairfield, the plaintiff, in the course of his evidence, said that the specifications and by-laws were carried out, except where he deviated from the plans at the defendant's request. Everything necessary could be done for £7 10s. In cross-examination, the plaintiff said the party-walls were not carried up to the slates, as they should have been. The bricklaying was sublet. Defendant's counsel said that an official who passed these buildings had been dismissed. Mr. C. H. Mellor, architect and surveyor, Manchester, a former clerk to the Openshaw Local Board and chairman of its Building Committee, said he drew up the specifications and the plans. They were approved of by the defendant and passed by the corporation. In cross-examination, the witness said the contractor's price would include the making of the 4½ in. party-wall into a 9 in. wall. The work could have been done at first for £10 or £12, but it would now have to remain a defect. The Manchester by-laws required a party-wall to be carried up to the roof. Mr. W. H. Aldred, architect and surveyor, formerly in the service of the Manchester Corporation as an inspector of property, said the work which was the subject of this dispute was generally satisfactory. Mr. Walter Fielding, builder, and Mr. C. Graham, a representative of Messrs. George Evans and Sons, Newton Heath, corroborated. On behalf of the defendant, a number of witnesses were called to show the cost to which defendant would be put in making the property what it ought to be. Mr. Hibbert, builder, Moss Side, estimated the amount at £129. Mr. McFarlane, another builder, considered that it would be impossible to make the houses all right. Mr. E. J. Thompson, architect and surveyor, Dickinson-street, Manchester, said the cost of the necessary alterations would be £122, and the property, the contract price for which was £792, exclusive of extras, would not bring more than £700. The Judge, in summing up, said the suggestion made on behalf of the plaintiff was to the effect that he undertook if he could to run this matter through without the corporation opposing—that if the corporation insisted the contractor would put up the required party-wall. This was a very discreditable story, if it was true, to both the Messrs. Mellor, and it was also discreditable that the corporation officers never detected it. It was put forward by the Mellors, in fact, that it was the duty of the corporation's inspectors to see that they put up a 9 in. wall, and that if the inspectors did not come down upon them they were entitled to avoid doing so. The plan was sent in with a 9 in. wall, and this seemed to show great carelessness on the part of the corporation and great blame on the part of the plaintiff. The jury returned a verdict for the plaintiff for £66 8s. 4d.—practically knocking off £50 in respect of the counter-claim.

**ILLUMINATED SIGNS AND THE BUILDING ACT.**—Mr. Henry Emanuel, proprietor of the Buttercup, in the Brompton-road, was summoned by the London County Council on Tuesday for unlawfully extending without permission a projection, an illuminated sign, beyond the general building line, contrary to Section 73 of the London Building Act of 1894. Mr. Thomas A. D. Chilvers prosecuted for the London County Council, and Mr. Duerdin Dutton defended. The structure complained of, a semicircular iron framework, filled in with ornamental glass, advertising the saloon bar and billiard-room, was erected at a height of 8ft. above the pavement. The projection, which extended more than 4ft. over the highway, contained 14 gas-jets for illumination. Mr. Dutton said that the lamp or illuminated framework only replaced an old, unsafe one which projected further. Mr. Marsham said the projection must be removed. He imposed a penalty of 40s. and costs.

**UNFOUNDED CHARGE AGAINST A BUILDER.**—At the Bath City Police-court on Friday, Edgar William Wooster, a member of the large firm of contractors known as Messrs. Hayward and Wooster, Welcot-street, was charged with committing perjury at the county-court holden at Bath on June 23, in the hearing of a case in which his firm were the plaintiffs and Mr. H. C. Wansbrough, accountant, of Bristol, was the defendant. The case was based on a statement made by Mr. Wooster during the hearing of proceedings to recover £26 for work done at the Sydney Gardens Estate, Bath, by Messrs. Hayward and Wooster, the defence being that Mr. Wansbrough was merely an agent acting for a principal, D. Jones. In cross-examination Mr. Wooster was asked about a previous payment



in 1894, in respect of work done at the estate, and he admitted having received a cheque. This, he swore, was drawn by Wansbrough, and bore his name only, as he could prove by a book in which were entered the signatories of all cheques the firm received. This was the perjury alleged, for the cheque was produced bearing the signatures of W. H. Brown and D. Jones. The prosecutor admitted that he did not take out a summons till the day before he was due to appear at the Bristol County-court to show cause why he should not be committed to prison in respect of the debt. The defence was that defendant based his statement on an entry in a book in which were entered the names of the drawers of all cheques the firm received. The cheque in question was entered by mistake in the name of Wansbrough. The magistrates were unanimous in their opinion that there was no corrupt motive on the part of Mr. Wooster whatever. They believed he made a mistake, but believed what he swore was true. The Mayor added that he believed those proceedings were taken not so much in the interests of justice as from some other motive. A similar summons against Mr. Wooster's head clerk was adjourned till December 1.

#### CHIPS.

Mr. Dryland, assistant surveyor for Division I. of the main roads under the Kent County Council, has been appointed county surveyor for Herefordshire.

At Birmingham, on Tuesday, the outlay involved in the scheme of the public works committee for the reconstruction of the sewerage of Edgbaston and Harborne—a sum amounting to no less than £155,000—was passed by a unanimous vote of the city council.

The Glasgow Electricity Committee opened on Tuesday the tenders for the new electric-power station to be erected for the south side of the river near Eglinton Toll. It is expected that, exclusive of plant, the buildings will cost £49,000. Mr. Chamen, the engineer, was instructed to report on the offers.

At a general meeting of the Society of Oil Painters, Piccadilly, held on Wednesday evening, Sir George Reid, P.R.S.A., and Mr. Ernest A. Waterlow, P.R.W.S., A.R.A., were elected honorary members, and Messrs. Byam Shaw, R.I., Cecil W. Rea, Mortimer Menpes, R.I., Chas. L'Anson, and Alfred Hartley were elected members.

Herbert Davis, described as a surgeon, who pleaded guilty at the Central Criminal Court to having obtained money from Colonel Shipway by false pretences, forging wills, and making false entries in parish registers in connection with the Shipway pedigree case, has been sentenced to three years' penal servitude. The penalty cannot be regarded as unduly severe.

The work of removing a block of insanitary houses in Candlemaker-row, Edinburgh, and erecting a handsome retaining wall to Greyfriars' Churchyard, has now been completed. A sum of rather more than a thousand pounds has been expended upon the work, which has been carried out by Mr. Morham, the city superintendent.

The chancel of the parish church of Bulmer, near Castle Howard, has recently been rebuilt and embellished from the designs of Messrs. Demaine and Brierley, architects, of York. The works comprise rebuilding the south and east walls, the insertion of new Decorated tracery windows, a new roof of oak covered with lead, new oak chancel seats, altar-rails and table, a simple painted reredos, and a stained-glass window.

The moorland church of Cropton, in the parish of Middleton, near Pickering, has recently been improved and beautified. The work consists of reglazing the windows, fixing a painted and panelled wood ceiling to the nave, painting the seats and wall-paneling, new oak altar-rails, providing a new heating apparatus and chimney, and generally repairing the walls, roof, and fittings of the fabric. The work has been executed from the designs, and under the supervision of, Messrs. Demaine and Brierley, architects, of York, by Mr. Barnes, of Malton, and Mr. Nicholson, of Barton-le-Willows.

At the last meeting of the City Court of Common Council, the Improvement and Finance Committee submitted a plan for making Lothbury 50ft. wide between Old Jewry and Princes street, at an estimated cost of £42,000, together with a letter from the London County Council agreeing to contribute one-third of the net cost of the said improvement, such contribution not to exceed £15,000. The committee's recommendations were adopted.

Mr. H. H. Low, a Local Government Board inspector, held an inquiry at Felixstowe Town Hall, on Tuesday week, relative to an application from the urban district council for Walton and Felixstowe for sanction to borrow £925 for the purpose of public walks and pleasure grounds. Mr. G. S. Horton, surveyor to the council, explained the plans.

#### WATER SUPPLY AND SANITARY MATTERS.

THE LONDON WATER COMMISSION.—At Tuesday's sitting of the Royal Commission Mr. Reginald E. Middleton, representing the water companies as joint engineer with Mr. Walter Hunter, for the Staines reservoirs, recalled, said he believed that the effect of the purchase of the companies' undertakings would be loss both to the consumer and to the ratepayer. He thought it was more fair to have differential rates than one rate for London, because it cost more to supply higher than lower districts. He did not think purchase would effect savings either in maintenance or management. He did not believe in the necessity of going to Wales for an additional supply. If there was such a necessity, there would be a deduction on that account from the cost of purchase. In his opinion it would be practicable for the county of London to purchase the whole existing supply, and give the outside districts their present supplies with a margin, but it would be inconvenient and expensive. He was opposed to severance between London and the outside counties, because he thought it undesirable that there should be division of authorities. The witness was still under examination when the Commission adjourned until Monday next.

BIRMINGHAM.—Underground lavatories, &c., have been constructed in Bull Ring and the Old Square, and the former one was opened on Monday. Two apartments have been constructed beneath a paved island just below the Nelson Statue. The space below the island is divided—one part being for women, the other section for men. Entrance to the women's lavatory is by a semicircular staircase, protected by an iron railing of neat design. There are eighteen steps of York stone, between walls of white glazed brick, the staircase leading to an open space 16ft. long by 4ft. wide, paved with black and white tiles. To the left of this space is the lavatory, with bowls and table of red marble, and six closets. The wall spaces are of white glazed brick, with a wainscoting of red marble. Light is derived from prismatic pavement lights. The men's department is entered by other stairs, and contains a number of radial pattern stalls of white glazed porcelain with red marble jambs and granite treads. There are seven closets, and the lavatory and dressing-room is an inclosure of woodwork and Muranese glass. The walls, fittings, and paving are similar to those in the women's department. The entire establishment has been constructed at a cost of £2,000 by Mr. Jennings, of Lambeth, from the designs of Mr. John Price, the city surveyor. £2,000 is also the estimated cost of the underground lavatory in the Old Square, which will not be finished for a few weeks.

DOUGLAS WATER SUPPLY.—The Douglas Corporation is applying for powers to borrow £50,000 for the construction of a new reservoir in West Baldwin Valley. The present water supply, the source of which is at Onchan, is sufficient for all the probable demands that will be made upon it for some years, but it is thought advisable to have two distinct watersheds. The two reservoirs now in use hold 73,000,000 gallons; the new reservoir is to have a capacity of 300,000,000.

DUNFERMLINE WATER SUPPLY.—A report has been prepared by Mr. A. W. Bell, C.E., the superintendent of Dunfermline Corporation waterworks, on the extent to which the flow of the 12in. main pipe from Glensherup to Glassieburns has decreased since 1878, when the supply was introduced, down to the present time. In November, 1878, Messrs. Leslie and Reid, civil engineers, Edinburgh, reported that they had tested the main, and had proved it to be running not less than 1,500,000 gallons per twenty-four hours, and that ten years later they found that the supply had decreased to 1,303,200 gallons per day. In September, this year, the ascertained delivery was only 1,097,000 gallons. Mr. Bell is satisfied that, whatever may be the cause of the diminution of the supply, it is not incrustation of the pipes, which are wonderfully well preserved, and he believes that there is some foreign material lying somewhere, and hindering the flow. He therefore recommends that a scraping tool be passed down the pipes, and he estimates the cost roughly at £250.

LEICESTER.—The town council adopted, on Tuesday, almost unanimously, the important proposals of its water committee, with reference to the projected scheme for obtaining a new water supply from the Upper Derwent and Ashop watersheds in North Derbyshire. The scheme involves the construction of five great reservoirs in the valleys of the two rivers, and the total cost was estimated at upwards of four millions; but, as a first instalment, it is proposed to spend a million and a half, in which outlay it is hoped the Derby Corporation, who have promoted a similar scheme, will join. Strong opposition is anticipated from Sheffield.

Mr. Dore Lyon, who died November 6 in West Chester, N.Y., was formerly one of the best-known builders in New York City.

#### Our Office Table.

THE proceedings for selecting a superintending architect to the London County Council, in succession to Mr. Thomas Blashill (who retires, it is now arranged, on December 31st) have advanced a further stage, for a sub-committee of the General Purposes Committee of the Council selected, on Friday, nine names from the thirty or forty applicants who presented themselves for the post. The selected candidates are: Messrs. Frank Thomas Baggallay, F.R.I.B.A. (Asphitol prizeman, 1877), Allan Ovenden Collard, A.R.I.B.A., formerly a pupil of Mr. Blashill, and his successor in his private practice; Arthur Crow, F.R.I.B.A., district surveyor for White-chapel and Spitalfields since 1891; Bernard John Dicksee, district surveyor for East Newington and St. George's, Southwark, since 1893; H. H. Fox, lately in official service in India; Frederic Hammond, F.R.I.B.A., district surveyor of East Hampstead and North-West Islington, appointed in 1880; Francis G. F. Hooper, F.R.I.B.A. (Pugin Student, 1882, and Godwin Bursar, 1888); Henry Lovegrove, A.R.I.B.A., district surveyor for South Islington and Shoreditch, appointed 1887; and Ellis Marsland, hon. secretary Society of Architects, and district surveyor for Camberwell, appointed 1885. These nine selected candidates were called before the sub-committee on Thursday morning, and on Monday next the list will be reduced to three. The final appointment by the Council will be made without delay, as it is desired that the official shall commence his duties on January 1st. No one of the candidates included in the short list at the last election on January 28, 1887, has now come forward—and, indeed, two of the six, Mr. Alexander Peebles and Mr. E. J. Tarver, have since died.

A DEPUTATION from the Society of Architects waited on the Lord Chancellor on Tuesday and presented a petition praying that a Parliamentary Committee might be appointed to inquire into the present law regarding "ancient lights," with a view to saving the large amount of money expended in determining the rights of owners in respect of such lights. The deputation, which was introduced by the Earl of Hardwicke, comprised the following:—Mr. Walter Emden (president of the society), Mr. Silvanus Trevail, F.R.I.B.A., and Lieutenant-Colonel F. Seymour Leslie, R.E. (the vice-presidents), Mr. Ellis Marsland (hon. secretary), and Mr. M. Morse Hewitt, of Messrs. Morse Hewitt and Edgar Farman (solicitors). The society desires the appointment of a Building Act tribunal of the London County Council to deal, before the commencement of building operations, with applications made by building owners to define the limits within which they are entitled to build, having regard to the adjacent properties, and of a similar tribunal for other parts of the country. Earl Halsbury, after discussing the subject, informed the deputation that he would give the matter his careful consideration.

PARLIAMENTARY notices have been given for the coming session by the London County Council for powers to construct the new central street from Holborn to the Strand. This is described as commencing in the parish of St. George, Bloomsbury, opposite the southern end of Southampton-row, and terminating in the parish of St. Clement Danes, at or near the northern corner of the site now occupied by the Olympic Theatre. The design includes a curved street in the parish of St. Mary-le-Strand and contiguous parishes, to connect the new central street with the Strand at two points. It will be proposed to widen the Strand between either end of the curved street, from the point on the west where Catherine-street now joins the Strand to a point on the east on the land which the Council are acquiring under statutory powers between Holywell-street and the Strand. There will be in connection with the said central and curved streets, subsidiary streets, or junctions with existing streets, including a new street on the site of part of Exeter-street. The proposed curved street will connect with the central street at the termination thereof at or about the site of the Olympic Theatre, and will have a junction with Catherine-street at or near the present site of the Gaiety Theatre. The same Bill will include powers for the widening of Southampton-row, on its eastern side and an adjoining portion of High Holborn, the widening of the Wands-



worth-road, and the widening of High-street, Kensington.

DR. G. V. POORE points out in a letter on building regulations in town and country that the model by-laws issued by the Local Government Board do nothing to prevent, and very much to encourage, overcrowding. The maximum obligatory curtilage for a house under these by-laws is a back-yard 25ft. deep, while the minimum may be as little as 10ft. deep. As soon as these by-laws are adopted by a local council, the speculative builder naturally, as Dr. Poore remarks, takes them for his model, with the result that the country is quickly covered with a gridiron-pattern of stuccoed slums, while gardens, in any proper sense, cease to exist. These so-called model by-laws hold out no encouragement to the man who is desirous of living at a decent distance from his neighbours. All harassing regulations are out of place when they are applied to isolated dwellings which are separated by a moderate interval (say a distance equal to the height) from other boundaries. The man who builds a detached cottage ought to be encouraged and not worried; and Dr. Poore suggests that rating for sanitary purposes should be proportionate to the cubic contents of the house, and should bear no relation to the size of the garden, which is a sanitary gain to the whole district.

At the present time, says a special correspondent of the *Daily Telegraph*, the Guinness Trust, founded just nine years ago, controls some 2,350 rooms and tenements in all parts of London, and at the end of last December had 7,320 persons sleeping under its roofs, though it has since opened more blocks. The insurmountable obstacle to the full utilisation of the fund lies in the almost impossibility of obtaining sites sufficiently large to make these blocks worth erecting. Nothing under half an acre is of any use at all, and more than that, up to two acres, is desirable; but such spaces are only rarely indeed to be got nowadays upon practicable terms, and if they are, it is usually through some such body as the Ecclesiastical Commissioners. It is only when worked upon an enormous scale that these buildings can be made to pay their way, and the Trust is now considering whether it may not be advisable to carry its future operations further out of London, into some of the more easily accessible suburbs.

In a second article the same writer shows what has been done by the London County Council, and quotes a report by their architect, Mr. Thomas Blashill, F.R.I.B.A., who considers that permanent remedies for the scarcity of accommodation must be looked for in improved means of transit to the suburbs, and in endeavouring to find means of increasing the incomes of those earning low wages by reducing the inefficiency of such workers. The writer shows that the London County Council has built, and controls, 1,263 tenements in different parts of London, of which fifty-eight consist of one; 593, two; 437, three; 168, four; 6, five; and one six rooms. In course of construction are 420 more, in about similar proportions. In Boundary-street, Shoreditch, the rent is a fraction over 3s. a room per week in the self-contained tenements of two to four rooms, these possessing their own sanitary appliances in sinks, sculleries, and other directions. In the Associated tenements, where some of the conveniences are in common to parts of the landings, the average rent of a room is a trifle over 2s. 9d. Taken all round, in London the Council's tenement rents vary from 4s. to 8s. for the two-roomed, and 5s. 6d. to 10s. 6d. for the three-roomed. But the regulations against overcrowding are extremely stringent. No more than two persons to a room are allowed, and even an infant in arms, after a very few weeks, counts as "a person."

LEEDS will shortly possess a patent American chemical fire-engine, with hose-carriage combined. During the past month the Fire Brigade Committee have been using a specimen of this engine, which has been taken out to sixteen fires during the four weeks on which Superintendent Baker and his men have had it on loan, and on fifteen occasions it has succeeded in extinguishing the flames without requiring any assistance from the street mains. The apparatus is provided with two large cylinders, each of which is filled with a patent chemical fluid, which, in proportion, has four or five times the power of water. When one cylinder is emptied the next one is switched on, and by the time that is exhausted

the first cylinder is ready again. The appliance is fitted with a patent tremolo foot gong, which can be heard several hundred yards away, and the Leeds Fire Brigade Committee have resolved to buy three more of these alarms to fit on to the three ordinary steamers.

In a paper read before the Society of Arts on Wednesday night, on the "Long-Distance Transmission of Electric Power," Professor George Forbes remarked that, though long-distance transmission had been much talked about, little had been done, and there were few people who realised what a vast field there was in that way for investment of capital on a sound commercial basis. He had found, when considering the utilisation of the Nile Cataracts, that the electric lighting of Cairo could be done more cheaply by power generated at the First Cataract—400 miles distant as the crow flies—than by steam-engines at Cairo, and if the gold mines in Rhodesia were really good, it would pay handsomely to transmit electric energy 500 miles from the Victoria Falls of the Zambesi. Many a gold mine, hitherto considered worthless because of the cost of power, would be found to be valuable if water-power were available within a few hundred miles. Most of the capital of a transmission company was required for the copper employed for conductors. On this, which might be removed if the enterprise failed, and was an absolute safe security, a mortgage might be raised, and thus, by a simple transaction, a great reduction might be made in the total capital required by the transmitters of energy, with consequent increase of interest earned. Professor Forbes explained some methods elaborated by himself for rapidly estimating the cost, on the ordinary lines of working, of any particular case of long-distance transmission of power by electricity. A discussion followed the reading of the paper.

DIFFICULTIES having arisen in connection with the administration of the by-laws in some of the local districts adjoining Birmingham, a sub-committee of the council of the Birmingham Architectural Association has been formed to consider complaints and approach the surveyors and district councils responsible for the framing and administration of by-laws with a view to securing more uniform and reasonable action. The existing by-laws for the city and surrounding districts reveal on examination many strange inconsistencies. A set of plans may be deposited and passed as in accordance with the by-laws of one district which would be returned as quite incompatible with the regulations of an adjoining district, where the conditions under which the work would be done are precisely similar. At a meeting of the committee, held on Friday last, the matter was freely discussed, and an intimation was read from Mr. John Price, the City surveyor, to the effect that when the proposed revision of the city by-laws was proceeded with the draft would be referred to the Architectural Association for their suggestions. Several letters were also read from the surveyors of local districts which evinced a desire to act in conjunction with the Architectural Association, and the committee decided to approach the Local Government Board on the subject.

In a letter to the *Birmingham Post*, Mr. William Henman, F.R.I.B.A., of that city, traverses the contention of Mr. Henry May, the medical officer of health for Birmingham, in favour of intercepting traps. He remarks that Mr. May has apparently not realised the vast improvements which have been effected in domestic sanitary appliances since intercepting traps were introduced, more than a quarter of a century ago, and that now there is no difficulty in preventing sewer-gas entering buildings by means of the necessary sanitary appliances. "Every house-drain," Mr. Henman points out, "is but a continuation of the sewer. Why, then, should the boundary of the site of a building be the arbitrary point at which to place an impediment to the flow of sewage and to the ventilation of the sewer? It is more often than not close up to the dwelling, particularly if of the smaller class in populous localities. It seems to be an admission on the part of local authorities that they are incapable of constructing sewers which can be regarded as safe, and an acknowledgment that house-drains may be so."

In the course of excavations necessary for the putting in of the foundations of a villa to be erected near Hammersmith Bridge, there has been found, some 9ft. below the surface, the paved floor of a Roman villa. The design of the

pavement consists of half-circles, circles, and triangles, bordered with what would appear to be geometrical patterns or figures. In the area of the circles are depicted leopards and sea-dragons pursuing dolphins; in the centre compartment are what appear to be dogs chasing foxes. In the spaces between the circles and the triangles are drawings representing the heads of Neptune, Venus, Jupiter, Mars, &c. Another design, in remarkable preservation, is believed to represent Actæon attacked by his hounds. There are also heads of Flora and of Ceres, Silenus mounted on an ass, a fine head of Medusa, and a vine-leaved Bacchus. These tiles are laid upon a bed of concrete supported upon brickwork, which again, in its turn, rests upon rammed-down clay.

THE Hampshire County Council at their last meeting received a report from the special asylum committee stating that the present institution at Fareham was full to overcrowding. The additions authorised in 1898 would shortly be commenced, and when completed would afford accommodation for 150 more, bringing the total number of beds up to about 1,200. The committee considered that the asylum would, on the completion of the present additions, be incapable of further extension, and they asked for powers to select a fresh site and obtain plans for a fresh asylum. After a long discussion it was resolved to instruct the committee to consider the manner in which the further accommodation for lunatics should be provided, to select a convenient site, and to prepare plan and estimate of the cost of both land and buildings.

Two recent papers, one read by Mr. A. A. Knudson before the American Institute of Electrical Engineers, and the other presented to the Municipal Improvement Association at Washington by Mr. H. P. Brown, give details of damage done by currents leaking from rail return-circuits. Mr. Knudson, in his paper, gave particulars of an "electrical survey" he had made. Differences of potential of from  $\frac{1}{2}$  to  $3\frac{1}{2}$  volts were detected between the rails, water-pipes, &c., and in some cases the rails were positive to the pipes, in others the reverse was the case. On inspection of the rails of one of the lines, it was found that a large amount of metal had been removed by electrolysis, and that the bottom sides of the rails had been "cut by the current down to knife-edges" for several feet back from the ends, the edges being irregular in shape and somewhat jagged in appearance. The tie-rods of this line, originally  $1\frac{1}{2}$ in. wide by  $\frac{3}{4}$ in. thick, had been nearly all so eaten away that the middle part was missing. Mr. Brown had found that in Dayton, Ohio, cast-iron pipes had been seriously injured by stray currents. Tests showed that the pipes in the business portion of the city,  $1\frac{1}{2}$  to 2 miles from the power house, were positive to the rails, the highest readings being  $4\frac{1}{2}$  volts. Near the power house, however, the pipes were as much as 9 volts positive to the rails. The corrosion of the pipes at Dayton Mr. Brown attributes to a reaction of the soil surrounding them, when a current passes through it. Chemical analysis of the soil showed that it contained carbonate and chloride of sodium.

"THE Old Houses at Stratford-on-Avon" was the subject of a lecture by Mr. W. Salt Braddington, Librarian of the Shakespeare Memorial, at the Birmingham and Midland Institute. Mr. Braddington said he was led to the choice of the subject by the fact that though there were yet many old houses in Stratford, the number was gradually diminishing. Each year brought about the destruction of a portion, if not the whole, of an ancient building, so that in the course of the next generation or two a great part of the town would present a modern appearance. It seemed to him to be a sacred duty to preserve the ancient characteristics of Stratford. Such a desire was not mere sentiment—in a great measure the commercial prosperity of the town depended upon the maintenance of its ancient appearance. The modern aspect of Stratford was to a certain extent temporary, many of the old houses having not actually been destroyed, but effaced by covers of brick and plaster. In some instances the plaster had been removed with most satisfactory results, as in the case of the grammar school and the Five Gables. Two points seemed to require attention from those who desired to see Stratford retain its ancient beauty: first, that nothing worth preservation be destroyed; and, secondly, that good features now hidden be brought to light.



## LIST OF COMPETITIONS OPEN.

Preston—Small-pox Hospital (30 beds) .....	Joint Hospital Committee .....	James Clarke, Clerk, Union Offices, Preston .....	Nov. 29
Aberavon—Market Extension (£5,000 limit) .....	20gns. .....	The Borough Surveyor, Aberavon .....	Dec. 1
Pewsey—Vagrant Wards to Workhouse .....	.....	S. B. Dixon, Clerk, Pewsey, Wilts .....	3
Morley—Schools, Victoria-road and Gildersome-road .....	.....	The Clerk, School Board Offices, Morley .....	12
Chertsey—Sewerage Schemes .....	£50, £30, and £20 .....	Arthur W. Smith, Surveyor U.D.C., Eastworth-road, Chertsey .....	23
Stockholm—New Stations, &c. ....	.....	Secretary, Royal Administration Swedish State Railways .....	31
Kingston-upon-Hull—Central Public Library, Albion-street (Sidney R. J. Smith, F.R.I.B.A., F.S.I., Assessor) .....	£50 (merged), £30, £20 .....	E. Laverack, Town Clerk, Town Hall, Hull .....	(1899) Jan. 1
Hull—Central Free Library (Sidney R. J. Smith, F.R.I.B.A., Assessor) .....	Corporation .....	Edwin Laverack, Town Clerk, Town Hall, Hull .....	1
Harrogate—New Royal Pump Room (£8,000 limit) .....	£50, £30, and £20 .....	Samuel Stead, Boro' Surveyor, Municipal Offices, Harrogate .....	2
Bradford—Central Fire Brigade Station .....	£100, £50, £30 .....	The City Surveyor's Office, Bradford .....	2
Harrogate—Alterations to Old Pump Room .....	£30, £20, and £10 .....	Samuel Stead, Boro' Surveyor, Municipal Offices, Harrogate .....	2
Burnley—Higher Grade School, &c., Ormerod-road (limited to Architects within 60 miles of Burnley) .....	.....	E. Jones, Clerk, Town Hall, Burnley .....	14
Bristol—Restoration of Colston Hall (Assessor) .....	£100, £50, £25 .....	Arthur E. Rieley, Secretary, 33, Corn Exchange, Bristol .....	—
Carnarvon—Cottage Hospital (12 beds—£2,000 to £2,500) .....	£10 10s. ....	Charles A. Jones, Carnarvon .....	—

## LIST OF TENDERS OPEN.

## BUILDINGS.

Middlesbrough—Internal Alterations to Summerfield House ..	Society of the Church of Christ .....	Alfred E. Hudson, 17, Park-street, Middlesbrough .....	Nov. 26
Warenford—Cottages, &c. ....	R. W. Maling .....	George Reavell, jun., A.S.I., Architect, Alnwick .....	26
Rishton—Conservative Club .....	.....	Sandbach and Parker, Architects, 15, Richmond-terrace, Blackburn .....	26
Bristol—Workshops, &c. ....	Peckett and Sons .....	Henry Williams, Architect, 24, Clare-street, Bristol .....	26
Wolverhampton—Repairing Schools .....	School Board .....	T. H. Fleeming, Architect, 102, Darlington-street, Wolverhampton .....	26
Scarborough—Rebuilding 82 and 83, Newborough-street .....	Baths Committee .....	J. Caleb Petch, Architect, Scarborough .....	26
Manchester—Joists and Concrete Flooring (Expanded Metal System) at the Mayfield Baths .....	Guardians .....	The City Surveyor, To vn Hall, Manchester .....	28
Castlecomer—Labourers' Cottages .....	William Auty and Son .....	Thomas Mahony, Clerk, Castlecomer .....	28
Leeds—Additions, Brunswick Ward Conservative Club .....	T. C. Fawcett .....	Thomas Winn, Architect, 92, Albion-street, Leeds .....	28
Batley—Hoffman's Kiln and Long Chimney at White Lee .....	Guardians .....	John H. Brearley, Architect, Hanover-street, Batley .....	28
Castleford—Malkin .....	Parkia Brick Company .....	Arthur Hartley, Architect, Carlton Chambers, Castleford .....	28
Cliffden—Extension of Workhouse Infirmary .....	Great Western Railway Company .....	James Perry, County Surveyor, Galway .....	28
Wakefield—Manager's Residence .....	W. D. Jackson .....	William Watson, Architect, Barstow-square, Wakefield .....	28
Carnarvon—Drying-Shed .....	Urban District Council .....	Rowland Lloyd Jones, Architect, 14, Market-street, Carnarvon .....	28
Mytholmes—Sixteen Houses .....	School Board .....	John Judson and Moore, Architects, Keighley .....	29
Newquay—Alterations to the Station Buildings .....	.....	G. K. Mills, Secretary, Paddington Station, London .....	29
Keighley—Two Blocks of Shops and Houses, Cavendish-street ..	James Gray, J.P. ....	John Judson and Moore, Architects, Keighley .....	29
Morecambe—Four Houses in Thornton-road .....	Guardians .....	Albert Gorton, Architect, 24, The Crescent, Morecambe .....	29
Alford—Addition to Manse .....	Croydon County Council .....	Jenkins and Marr, Architects, 16, Bridge-street, Aberdeen .....	29
Ystrad—Fever Hospital Laundry, &c. ....	Governors of Allen's Schools .....	W. D. Morgan, 23, St. Mary-street, Cardiff .....	29
North Berwick—Additions to High School .....	School Board .....	R. Wilson, 3, Queen-street, Edinburgh .....	29
Baldon—Country House, Stabling, &c. ....	.....	Isitt, Adkin, and Hill, Architects, Prudential Buildings, Bradford ..	30
Rhiwffwr—School, near Gwyn Station .....	.....	W. W. Williams, Archt., Island Chambers, 63, Wind-st., Swansea ..	30
Blackpool—Town Hall Extension .....	.....	Potts, Son, and Pickup Architects, 29, St. George's-road, Bolton ..	30
Whitby—Pair of Villas .....	.....	Edwin H. Smales, A.R.I.B.A., Architect, 5, Flowergate, Whitby ..	30
Cowling—Four Cottages .....	.....	James Hartley, Architect, Exchange Buildings, Skipton .....	30
Barnstable—Additions to Workhouse .....	.....	W. C. Oliver, Architect, Barnstable .....	30
Halifax—Villas, Savile Park .....	.....	M. Hall, Architect, 29, Northgate, Halifax .....	30
Rotherham—Bathrooms .....	.....	H. L. Tacon, Architect, 11, Westgate, Rotherham .....	30
Leeds—Ten Houses, Tunstall-road .....	.....	Fred. Mitchell, Architect, 71, Albion-street, Leeds .....	30
Warrington—Bailiff's House .....	.....	The Borough Engineer's Office, Town Hall, Croydon .....	30
Slains—Marine Hotel .....	.....	D. and J. B. McMillan, Architects, 214, Union-street, Aberdeen ..	30
Coldstream—Union Club Buildings .....	.....	W. A. Deas, Secretary, Coldstream .....	30
Dulwich, S.E.—Additions and Alterations to School Premises ..	.....	Arthur J. Gale, 4, Sergeant's-inn, Fleet-street, E.C. ....	Dec. 1
Washington—Two Houses .....	.....	Hughes Ritchie, Havelock Arms, Newbottle .....	1
Stoke-upon-Trent—Cooking Centre at Harfield .....	.....	R. Scrivener and Sons, Architects, Hanley .....	1
Felling—Alterations to Ninety-Two Houses .....	.....	Oliver and Leeson, Architects, Moseley-street, Newcastle .....	1
Dorking—Workhouse Infirmary .....	.....	H. Percy Adams, Archt., 28, Woburn-place, Russell-square, W.C. ..	1
Halifax—Pair of Semi-Detached Villas .....	.....	A. G. Dalzell, Architect and Surveyor, 15, Commercial-st., Halifax ..	2
Bradford—Engine-House at Midland Mills .....	.....	Samuel Jackson and Son, Architects, Tanfield Chambers, Bradford ..	2
Hastings—Coastguard Buildings .....	.....	Director of Works Dept., Admiralty, 21, Northumberland-av., W.C. ..	2
West Hartlepool—School Buildings (1,502 Children), Lister-st. ..	.....	E. F. Hinde, Architect, Liverpool .....	2
Coverack—Headland Hotel .....	.....	Sampson Hill, Architect, Green-lane, Redruth .....	2
St. Alban's—Four Shops .....	.....	J. E. Anstin, 23, York-place, Baker-street, London, W. ....	3
Falkirk—Manse .....	.....	Alexander Gould, Architect, Melville-street, Falkirk .....	3
Keighley—Fourteen Dwelling Houses, Bradford-road .....	.....	W. H. and A. Sugden, Architects, Keighley .....	3
Blackburn—Victoria Wing at Infirmary .....	.....	Simpson & Duckworth, Architects, Richmond Chambers, Blackburn ..	3
Sutton, Co. Dublin—Electric Power Station .....	.....	Company's Engineer-in-Chief, Amiens-street, Dublin .....	5
Halifax—Detached Villa .....	.....	Geo. Buckley and Son, Architects, Tower Chambers, Halifax .....	5
Greetland—Twenty-Five Through Houses .....	.....	S. Wilkinson, Architect, Sowerby Bridge .....	5
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# THE BUILDING NEWS

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### RIVAL LEADERSHIPS.

JUST now the profession is beset by a great many tendencies. There is the teaching of those who espouse the Arts and Crafts—who say in effect that the architect must go back to the evolution of the crafts—must begin to work as a mason or at a carpenter's bench; in fact, must learn the A B C of his art in the workshop; they tell us it is hopeless to evolve living art out of the dead systems of the past. It places architecture on a technical basis, and makes the architect co-operate with others. There are others who, in contradistinction, have set up quite a scholastic system—who advocate a course of academical instruction based on the historical periods or styles of art, upon general principles of construction, and modern scientific theories, and who attempt to form *a priori* principles applicable to all modern requirements. This is essentially a one-man view of learning the art: the architect takes all the credit. He must be the leader or head of the several trades which go to make up a building, and to this end the architect must be taught something of all the crafts, and of every science which concerns his work as a whole. Others there are who go in for eccentricities; it, too, is a one-man idea of architecture, in which one individual tries to go "one better" than his neighbour—an effort, as Mr. Jemmett says, to "exalt the artist above his art." We find this kind of art in particular crazes based on some sort of sentiment, good in itself, but magnified to such a degree as to be out of all proportion to other motives equally desirable. We had such eccentricities in the craze for Dutch architecture, Queen Anne white-painted window-frames, small panes, green woodwork, blank walls, and the revival of dull "hole in the wall" brickwork and 18th century bareness. Again, there are those who are essentially practical, who think the architect should confine his attention to matters of legal obligation, easements, light and air, building regulations and by-laws, sanitation, the problems of London streets, and so on. Through all these different views it is difficult for the young architect to pass. So long as the arts and crafts were in the hands of ancient guilds, influenced by the traditions and industrial pursuits of the time, and were under the control of masters versed in the crafts, they became the root of good contemporary architecture. But all is changed now. The trade unions have taken their place, and the question of wages and hours of labour have altered the whole situation. Each craft is now a thing of itself, worked quite independently of every other craft, and dependent more or less on mechanical means. So that before we talk of making an architect a craftsman we must understand what it means. Whether he is to be allowed the freedom of the old guildsman, or to be simply a machine?—whether he is to do his particular work as a free and responsible agent, or simply set to do somebody else's work? We can hardly expect a building to turn out a success if erected by a number of craftsmen trained under the modern system. It would only be a jumble of samples of each man's work. Their co-operation, however, would be perfectly reasonable if each was free to exercise his craft under the direction of an architect trained as a master of craftsmanship, yet aiding each worker to develop his faculties in a right direction, and not tied down to ordinary conditions of cost

and time. These are the factors which make it at present impossible to realise a craftsmanship ideal of architecture. Minimum rates of wages are quite repugnant to good art. The art craftsman would now get a bare living if he worked on his own risk; but give him again the opportunity to develop his powers, unhindered by restrictions, and he would soon prove that we have the material out of which such men as Giotto, Cellini, or the Florentine frescoists were made. The fact is, no workman is responsible. If we go into a large workshop we find it is no one man's business to take your order, or to execute what you want. One part of the work is done by one hand, another part by another. No one is responsible, or takes any individual interest in your work or design. Compare this with the trade or business of one man; he takes care to keep his customers, he can exercise a free hand in improving or suggesting modifications.

Every building is erected more or less by the co-operation of individuals. There is the builder who supplies the materials and labour, the foreman and clerk of works who superintend, but for opposite interests, the tradesman employed, the firm of engineers who does the constructional work, the heating and electrical engineers, and the decorative firm; but these are all commercially interested—contractors to carry out a one man's idea, instead of each contributing their quota towards the work. It is useless to talk of craftsmen co-operating just yet: if we allowed each trade to arrange the details of a building without the architect's control, the work would be made up, it is truly suggested, of pieces of craftsmanship having no relation with the whole.

The academical idea of architectural progress has this to be said for it: that it encourages the making of modern architects. It supplies a kind of royal road to the profession. We can hardly expect the young man who desires to enter a profession as easily as he can to care about "rubbing shoulders" with stonemasons, joiners, or blacksmiths. If he can pass an examination by a little cramming and become a member of the select circle, why should he trouble about learning the trades? To learn the art from books, to study its details by drawing or measuring actual buildings, to become proficient in construction by the study of treatises on statics and other subjects and attending classes, appeals to his ambition. However imperfect he is in details of workmanship, and conscious of his own ignorance of such things as cutting bevels for brickwork or masonry, or framing a piece of woodwork, he thinks he can easily surmount these obstacles as others have done before him—as architects like Barry, Scott, Street, and many more who never troubled about the crafts. He is quite satisfied if he can attain the general level of his profession, even if superficial;—it would be absurd for him to attempt to master the crafts, or even one. If architecture is the growth of the crafts, he is quite contented to take it up where the crafts left it, and to apply the results to modern wants. Of course, this is one way of looking at architecture; but it is not the one that appeals to the real artist who desires to think in the material and not only on paper; nor can it be seriously contended that it is the way the old architect worked and conceived. It is essentially modern—a compromise agreed to at the revival of the art. That the master mind, or architect, whatever we like to call him, was something distinct from the man who worked, there can be little doubt; but there was no strong line of division between the crafts and the designer of the building as we have to-day.

Eccentricity in modern work appears to be one of the natural outcomes of this

division. As long as the designer is in contact with his materials, he cannot indulge in any individual whim. The period of "crazes" in design, such as the "one-man" whim, Dutch or Japanese, came just at the time when men, surfeited with Classic and Gothic, turned to their own resources. They could never have happened if architects had been true to materials and national traditions of workmanship. There are no eccentricities in old work, sudden changes are scarcely ever noticed; all is gradual and transitional. Lastly, the practical man has a good deal to say. He talks of iron or concrete, and would quite ignore any claim of art. He thinks the architect ought to become an expert in Building Acts, Public Health Acts, Local Government Board regulations. Fireproof construction and ventilation, and the hundred other details of buildings, are of far greater importance than architecture or any artistic considerations. A man who cannot plan a system of drainage or a good stable or laundry, or specify the proper rotary washing machines or hydro-extractors, or warm and ventilate his building, has, according to this view of the case, no right to call himself an architect. All else he can do goes for nothing. This argument appeals to the public and to the average employer who simply wants something and demands it; it is hard and intensely utilitarian, but has not this view to be conceded as the very motive of building? The practical man has as much right to be considered as the craftsman. May we not consider these several views of the subject to be separate aspects of the whole question? Under our modern system of practice it becomes necessary to give the general directorship of buildings into the hands of men trained to plan and organise; the many kinds of building make this division of labour important. We could not leave to the crafts the duty of studying and classifying what is necessary for houses, churches, hospitals, schools, commercial buildings, and the like. It is a special qualification demanded in these days. The planning and detailed arrangement of special buildings has become a distinct part of architecture, a division of the work not contemplated by our ancestors. For good or evil, we must have advising and consulting architects, and those who can direct the trades so much more numerous than formerly. We lose, no doubt, a degree of relationship and harmony in the parts of a building by this system; on the other hand, we gain the experience and special knowledge of men who have made requirements a personal study.

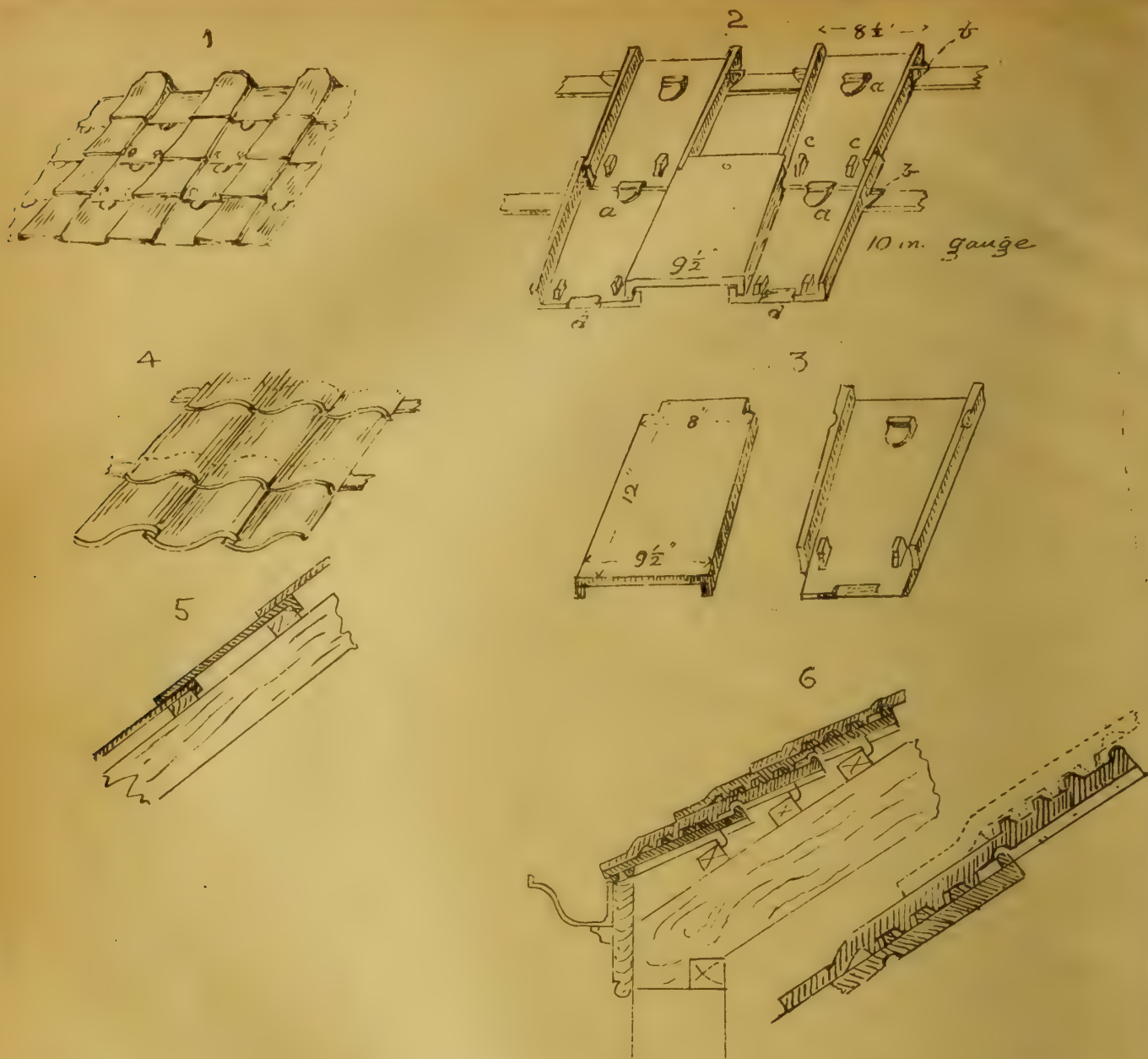
### MODEL SPECIFICATIONS.—XLI.

SPECIAL—MADE TILES—THE PLASTERER.

A VARIETY of ornamental and special or patented roofing tiles deserve the architect's attention. The ferro-metallic Staffordshire tiles in red, blue, and buff, and the Broseley brindled or brown tiles are much in request, and are hard and weatherproof. Of the many pressed roofing tiles, we may mention Edwards' (Ruabon), which are well burnt and impervious to moisture. Pantiles make a useful and pleasing covering to cottages, workshops, outbuildings, cattle-sheds, &c. They are made 14in. by 9in., with cogs on their upper edge, and are laid to a 10in. gauge. Their use is chiefly confined to roofs which require ventilation and have no ceiling below. Italian or ribbed tiles are ornamental, and for buildings of an Italian character are suitable; but they are not well adapted for our climate.

The Bridgewater double-roll tiles are of corrugated or curvilinear section, and resemble somewhat the pan or Flemish tile. Stubs are formed at the back to catch the laths, and they have a lap of 2in., and for





farm-buildings requiring ventilation they are well suited.

For roofs exposed to wind and heavy rains special patented tiles are made, in which the edges are turned up at sides, and stubs or cogs are cast on the underside to hang to the battens; in other kinds, stubs or cogs are cast on to prevent the upper tile from slipping, with cap or cover tiles to fit over the alternate vertical rows. Of such kinds we may name Taylor's. Many patent weather-proof tiles are made in various patterns—Italian, ribbed, corrugated, &c. These tiles interlock, and most of them make a weather-tight and ornamental roof. The "lock-jaw" tiles are fitted with single and double grips, by which each tile is locked on to its neighbour by means of rounded grooves or beads. In Major's "weather-proof" tiling, made in various channelled patterns, the tiles interlock by means of a number of horizontal ribs cast on the back and underside of each tile. Our sketches show Taylor's patent tiling, 1, 2, 3. The splays on edge of channel tile (Fig. 3) fits into undercut of shield *a* of lower tile (see Fig. 2), *cc* are cogs which rest on nail-heads *b*. This tiling is laid to a 10in. gauge on battens 2 1/2 in. by 1 in. Fig. 2 represents the laying, and shows one cover of capping tiles laid over two rows of channel tiles, which are fixed first. The shields *a* and the cogs *cc* and wedge-shaped nails *b* are shown. Fig. 1

shows the appearance of roof, 3 one of the tiles both sides. Sketches 4 and 5 are pantiles, and 6 is a section of Major's patent tiling.

15. *Pantiling*.—The pantiles for roof of offices or outbuildings to be well burnt and impervious, and of approved shape and colour, laid dry (or bedded in lime or hair, and pointed outside or inside) to a 10in. gauge, on stout fir laths, with hip, ridge, and valley tiles, neatly cut to splays, with T-nails, hip-hooks, and with all necessary cement filleting, and to leave same weather-tight. The hip and valley tiles to be set in cement, and fixed with T-nails dipped in melted hot pitch. The hip-hooks to be of wrought iron and dipped in hot pitch.

16. *Cement Filleting*.—The filleting to be of cement formed on a key of strong cast-iron nails driven into walls, parapets, and gables at intervals. Or—

Cover the roof with pantiles laid to a 3in. or 4in. lap upon 1 1/2 in. by 1 in. red fir laths spiked to rafters, bedded and jointed in hydraulic lime and hair mortar, with hip and valley tiles to design, neatly cut to splays, &c., cement filleting against walls and gable ends, and leave water-tight. Or, the hips and valleys to be plain convex and concave tiles to course properly, nailed to timbers, and bedded in cement.

17. *Interlocked or Patent Tiling*.—The roofs to be covered with approved interlocking tiles of true shape and even colour (Major's or Phillips'), laid to a 4 1/2 in. (or 3 1/2 in.) gauge, each tile to be bedded at the top in lime and hair, upon 1 1/2 in. by 1 in., or 1 1/2 in. by 1 in. strong sawn fir laths and battens, and cut closely to hips, valleys, ridges, and gables;

or laid and secured according to the instructions of the tile manufacturer or patentee (or under his directions). The gable ridges, hips, and valleys to have purpose-made tiles to course and bond with the tiling of roof. Or—

Cover the roofs with Taylor's patent tiling of true shape and even colour, laid to a 10in. gauge. The tiling to be laid under the direction of manufacturer. Or channel tiles to be first laid in rows from eaves to ridges, the narrow end of each tile being pushed into wide end of tile below until the played notch fits into undercut of shield and lower tile. Secure the tile by wedge-shaped nails fitted into notches at sides. The capping tiles to be put on after, to cover intervals between channel tiles. They are to be pushed down until the cogs rest upon the nails of lower tiles. Point the lower side of joints with cement mortar. Properly cut to hips and valleys, and cover same with purpose-made tiles, or as shall be directed.

18. *Special Tiling*.—Cover the roofs with weather-proof roofing tiles of interlocking (or approved) description to a 3 1/2 (or 4 in.) gauge, and, according to the instructions of the manufacturer, the horizontal and vertical joints to be straight, and cut and dressed to ridges, hips, valleys, and verges, and to be hung on 1 1/2 in. by 1 in. battens, of sawn red fir (or give detail drawings of tiling, specifying how laid and fitted together, according to the tile selected). Or—

Cover roofs with Major's patent weatherproof interlocking plain tiles (Broseley type, or ornamental or "corrugated" pattern), laid to a 4 1/2 in. gauge on 1 1/2 in. by 1 in. battens, according to directions of maker, with special ridges, hips, and valley tiles, and leave perfect and weathertight to the architect's satisfaction.



## PLASTERER.

We refer the reader to treatises on this trade for all technical details and descriptions of materials and processes, to Rivington's Notes, "Materials," and other textbooks.

The properties of limes, cements, and sand should be known by the architect, also the various special materials—chiefly cements, patented and otherwise—that are constantly used, such as Martin's, Keene's, Parian, Atkinson's, Selenitic, Robinson's. In these cements or plasters the object is to procure in most cases slow-setting, so that the plaster can be easily worked and painted immediately. Keene and Parian cements have a good reputation for internal use, and one is supposed to contain alum and the other borax. Both these and Martin's become very hard; Parian will take paint immediately; Robinson's patent cement is also intended for internal plastering, and gives a very hard and fine surface, and can be applied and finished in one coat, either on brick or lath, and its cost is about 15 per cent. above ordinary plastering. It has also fire-resisting properties. Several qualities of this plaster are made, "A" Paragon plaster is used for floating on walls, "B" a floating coat for lathwork, "C" a floating coat for cornices, "D" coarse for floating only, "E" for one-coat work, &c.

Selenitic cement combines cheapness with rapidity of setting and hardness, and is very largely used. The cement consists of a special preparation of lime, by which it is converted into a kind of cement. The process is applicable to most limestones, especially those of the lias formation. It can be applied to brick and concrete work, as well as plastering. See Col. Seddon's "Building Work." The instructions for making selenitic plaster are given by the Patent Selenitic Cement Company, Lambeth.

But the ordinary materials of the plasterer are limes, sands, plaster of Paris, Portland and Roman cements. Pure or "fat" limes are generally used for plastering; the hydraulic limes are apt to "blow" if not very well ground. The lime used in London is chiefly prepared from chalk found in Kent. Dorking lime is also used for stucco; lias lime, from the blue lias formation, is valuable, and mortar made from it has hydraulic properties. But the plasterer uses the fat limes, as being less liable to "blow." Little lumps of unslaked lime injure the work after the finishing coat is put on, and a blistered ceiling or wall is the result. Aberthaw lias lime is a lime of hydraulic value, and was used by Smeaton at the Eddystone Lighthouse. Lias lime, when slaked, ought to be kept for a week, at least, before use.

In specifying the Plasterer's work, describe the kind of lime, where procured, the proportions of lime, sand, hair, the laths, &c.; how long putty shall be run before using. Describe also the cement, its fineness, tensile strength, weight, &c. The commonest work is first described, such as "render and set" walls; next walls that are "rendered, floated, and set"; then "lath, plaster, float, and set" work. Then describe girths of cornices, &c., if net, taking the simplest cornices first. Specify pavings, skirtings, their height and thickness; dados; floated grounds for paving tiles; also any work in Keene's or Parian cement, such as finished work of walls, corridors, archways, reveals, and angles.

Specify if fibrous plaster slabs, such as G. Jackson and Sons', are to be used; the backings or grounds required; if Hayward Brothers and Eckstein's "Jhilmill" patent metal lathing or the Expanded Metal Co.'s lathing is to be employed, and describe size of mesh for ceilings and partitions.

Laxton says: One cubic yard of chalk lime, two yards of sand, and three bushels of hair will cover 75 yards of *render and set* on brick, 70 yards on lath, or 65 yards *plaster*, or

*render two coats and set* on brick, and 60 yards on lath. Floated work will require about the same as two coats and set.

It may be useful to define certain mixtures:—"Coarse stuff" is a rough mortar composed of one, to one and a half parts of sand to one of slaked lime by measure, with the addition of short ox-hair. It varies with the quantity of sand. The hair is added in the proportion of one pound to two cubic feet of stuff for superior work. The mixture should be left to "cool" for several weeks, until the lime is thoroughly slaked.

"Fine stuff" is composed of pure lime, slaked with a little water into a smooth paste, and afterwards saturated with more water until of the consistence of cream, then allowed to settle, and the superfluous water run off. It is then fit for use. "Putty," like the last, is a mixture of pure lime in water, and then running it through a hair-sieve, which makes it finer. No hair is used. "Gauged" stuff is putty and plaster, made of about three-quarter to four-fifths plasterers' putty, just described, and one-quarter of plaster of Paris, and is used as a finishing coat for cornices. The plaster makes it set quickly. Equal parts of putty and plaster are sometimes used.

"Common stucco" is composed of three or four parts of clean sharp sand, and one of hydraulic lime, gauged as above. For walls intended to be painted where a smooth face is required, "trowelled" stucco is employed; made of two-thirds fine stuff (without hair), and one-third of fine, clean sand. "Rough cast" is composed of sand, grit, or gravel with hydraulic lime and water, and is used for panels in half-timber houses.

Laths should be laid in bays to break joint, in widths of about 3ft. Zinc nails are used for ceilings and superior work, as they do not corrode or discolour.

One-coat work, or "lath and lay," consists of a layer of coarse stuff spread over laths with a smooth surface, and is the cheapest kind of plastering. "Two-coat" work, or "lath, plaster, and set," has the first coat as above, scratched to give a "key." The second or setting coat is a thin layer of fine stuff, or "putty" or "gauged" stuff, and should not be trowelled on till the first layer is stiff. "Three-coat work," or "lath, plaster, float, and set," consists of first "pricking-up" the first coat, as before, by scoring the surface with point of lath or crossed lines. The second coat is called "floating"; it is applied when the pricking-up is dry, and consists of fine stuff with a little hair, and is laid on with floats, for which purpose screeds of plaster are used at intervals to preserve a true surface by means of straightedges. The last or "setting" coat is made of fine stuff with a little hair, if the surface is to be papered, after the previous coat that is scratched over by a broom is dry; or if the surface is to be whitewashed or coloured, the third coat should be of plasterer's putty, mixed with a fine sand and white hair. Sometimes a little plaster of Paris is added to set quickly, about one-sixth to one-third. This work can be specified as "lath, plaster, float, and set with putty and plaster, or 'gauge' putty." These several kinds of plastering are applied in the above order to walls of different degrees of finish. One-coat work is only used behind skirtings, linings, and rough work; the "two-coat" work is used for cottages and small dwellings and for cupboards; the "three-coat" work for superior walls of reception rooms.

Here are a few clauses for ordinary kinds of plastering:—

1. *Generally*.—The cement, lime, hair, and sand to be of the best quality of their various kinds. The lime to be fresh, well-burnt chalk lime, to be run to putty at least one month before being used. The Portland cement to be of an approved manufacture, and to weigh 112lb. per bushel; the sand to be clean and sharp, free from all clay, saline

particles, and other impurities; the hair to be the best long hair, well beaten, and used as specified, and the laths to be of best Baltic wood, lath and half, free from sap, broken at joints, and to be butted at ends and nailed with wrought iron (or zinc nails). Or—

*Lime*.—The lime to be best white (or grey) chalk lime, well slaked and screened, and the sand to be clean sharp grit or inland river sand, free from impurities, washed and screened. The hair to be long bullock's hair, well beaten and free from grease.

*Laths*.—The laths to be lath and half laths out of the best red Baltic fir, and free from sap and knots, and to be straight and butt-jointed with broken joints, and fixed with galvanised wrought-iron nails.

*Plaster*.—The plaster for internal use to be composed of 2 (or 3) parts sand, 1 part lime, mixed with 1lb. hair to 1 bushel of lime. The setting coat to be of pure lime run into putty one month before using.

2. *Angles, &c.*—All angles and arrises to be run in neat Parian or Keene's cement on a backing of 1 of Portland cement and one of sand. Or—

All angles to be executed in Portland cement, and finished in Keene's cement, with a bold quirked head or quarter-round.

3. *Limewhite, &c.*—The whitewash to be of fast lime, Russian tallow, and water, and the colouring to be of the same ingredients with colouring pigments. Size, clearcole, and distemper walls of kitchen, scullery, larder, &c., and twice size and colour walls of areas.

4. *Render and Set*.—The brick walls of passages, work-shops, or kitchen offices to be rendered and set; or render, float, and set all the offices or work-shops, and twice whiten all ceilings and soffits.

5. *Lath, Lay, and Set*.—Lath, lay, and set the ceilings and partitions of second floor, and render, float, and set the brick walls of basement.

6. *Lath, Plaster, Float, and Set*.—The ceilings and partitions of ground, first, second, and third floors to be lathed, plastered, floated, and set, also the soffits of stairs and landings. Or—

7. *For Colouring*.—Lath, plaster, float, and set with putty and plaster all ceilings and partitions of all rooms to be coloured. Or—

8. *For Papering*.—Lath, plaster, float, and set with fine stuff all ceilings and walls to be papered.

9. *Rough Stucco*.—Lath, lay, float, and rough stucco the partitions and battened walls, and render, float, and rough stucco the brick walls of basement, stores, &c. Or—

10. *Trowelled Stucco*.—Lath, lay, float, and finish with trowelled stucco the partitions and battened walls of upper stories; and render, float, and finish with trowelled stucco the brick walls, the walls of reception-rooms, or offices.

## IRON CONSTRUCTION IN DRAINAGE WORK.—I.\*

By T. E. COLEMAN, F.S.I.

OF late years sanitary engineers have devoted considerable time and attention in endeavouring to secure the highest standard of permanent efficiency in the construction of drains and their appurtenances. Formerly, drains were laid in a more or less haphazard fashion—the joints were defective, and leaked to a very large extent; but as long as no stoppage occurred, and the sewage matters were removed from sight, such irregularities were considered to be of little or no importance.

It is now generally recognised by the most superficial observer that the continued percolation of putrescible sewage matters into the subsoil immediately adjacent to a domestic dwelling, and the consequent contamination of the air by the deleterious gases resulting from decomposition, must of necessity exert an injurious effect upon the physical well-being of the residents. Such surroundings are undoubtedly a fruitful cause of disease and general ill-health. Especially is this the case under the highly complex and artificial conditions which now obtain in civilised life: more particularly when it is considered that a great proportion of the people inhabit large towns and cities where the houses are crowded as close together as possible. Under these circumstances the supply of light and the free movement of air in and around an ordinary street dwelling is frequently impeded to a considerable extent, so that the ameliorating influences of such natural purifying agencies are in a great measure prevented.

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In all high-class modern sanitary work it has therefore become a *sine qua non* that the drains shall be perfectly air and watertight. It is not sufficient that the drains and fittings connected therewith are in themselves constructed of good and suitable materials, and free from flaws of every kind; but it is also necessary that when permanently fixed and joined together in their respective positions, they shall then be capable of affording a reasonable proof of thorough sanitary efficiency. The only satisfactory method which has yet been devised for this purpose is to subject the work to some physical test which shall adequately demonstrate the actual soundness and reliability of the parts as a whole.

The tests usually applied to drainage works are the "hydrostatic" and the "smoke" tests. Of these the first named provides a positive and thoroughly reliable test of soundness, and should be used in all new works before the drains are covered in, or passed as satisfactory by the engineer.

In the application of the "hydrostatic" or "water" test, the lower end of the drain is securely stopped, and the pipes filled with water in such a manner that the pressure of a column of head of water—varying from 5ft. to 10ft. in height—is brought to bear directly upon the joints and interior surfaces of the pipes, so that any leak or defect is at once noticed by the continued falling of the water level. A column of water 5ft. high exerts a pressure of 2.165lb. upon the pipes and joints under test, and the pressure increases by .433lb. for every additional foot in height of head of water.

Glazed stoneware or fireclay pipes are in general use for ordinary drainage works. Well burnt glazed stoneware has a smooth surface, is durable, and not easily affected by acids or gases; but great difficulty is experienced in making the joints between the pipes perfectly air and watertight, and insuring that they will remain permanently in that condition. The difficulty is rendered still more pronounced by the comparatively short lengths in which the pipes are made, and the numerous joints consequently required.

The reality of this drawback is apparent from the efforts which have been made to manufacture stoneware pipes in longer lengths, and in the numerous ingenious forms of joint and jointing material which have been devised from time to time to remedy the objection already mentioned.

Even when the greatest care has been taken in laying and jointing stoneware or fireclay drains, so that they have satisfactorily withstood the water test before being covered in, yet it is frequently found that they are not perfectly watertight when the hydrostatic test is applied some time afterwards. These defects may be due to many unforeseen causes, and a slight settlement or disturbance of the ground will result in fractured pipes and broken joints.

To assist in increasing the permanent efficiency of stoneware or fireclay drain-pipes, they are now generally laid on a concrete foundation from 4in. to 6in. thick, and after the pipes have successfully passed the water test, they are haunched up at the sides with concrete, as shown in Fig. 1, or else entirely surrounded with about 6in. of cement concrete, as in Fig. 2.

Cast-iron pipes are now being increasingly used in this country for drainage work of the best class, especially for town and city buildings.

Amongst the advantages which are obtained by the use of cast-iron drain-pipes may be mentioned the following, viz.:—

1. *Air and Water-tight Joints can be Insured.* Heavy cast-iron pipes put together with caulked lead joints may readily be made to withstand a pressure of 200ft. head of water if necessary. After the lapse of years the joints, if properly made, will be found perfectly sound and tight.

2. *Increased Length of Pipes.* Ordinary cast-iron drain-pipes are made in 9ft. lengths. The number of joints in any given length of drain is, therefore, considerably less than in the case of earthenware pipes, and the possibility of leaky or defective joints occurring is correspondingly reduced.

3. *Greater Initial Strength of Iron over Earthenware.* The risk of fracture from settlement, excessive weight of the superincumbent earth, or from the passage of heavy loads over iron pipes is proportionately less than in the case of stoneware or earthenware pipes.

It will thus be seen that cast-iron drain-pipes possess several important advantages over stoneware, and at the same time the cost is not greatly

in excess of stoneware pipes when incased in cement concrete. Cast-iron pipes are very extensively used in the United States for underground house drainage, whilst if the drains are altogether exposed to view as in basements, vaults, &c., steel or wrought-iron pipes put together with screwed joints are largely adopted. Wrought-iron pipes can be obtained up to 28in. in diameter and 20ft. in length. They are readily put together, and the number of joints is reduced to a minimum.

Cast-iron drain-pipes should be of good, tough iron, run from the second melting, and cast in a vertical position, free from air and sand-holes, cinder, or other defects, perfectly straight, cylindrical in section, and of uniform thickness

FIG. 1.

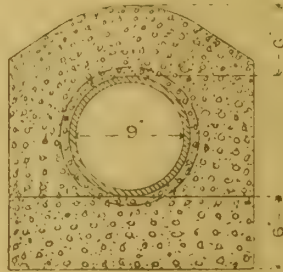
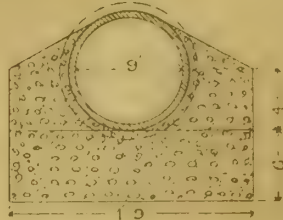


FIG. 2.

throughout. They should be capable of withstanding a hydrostatic pressure of 200lb. per square inch. The sockets should be strong and sufficiently deep to admit of their being well caulked with lead. The internal diameter of the socket should be  $\frac{1}{4}$ in. larger than the external diameter of the pipe so as to allow a space of about  $\frac{1}{8}$ in. all round for securely packing and caulking the joint. The socket should also be at least  $\frac{1}{4}$ in. thicker than the body of the pipe to allow for the additional strain caused by caulking the joint. A small bead should be cast on the end of each spigot.

The average weights of medium and heavy cast-iron drain-pipes are given in the following table, viz.:—

WEIGHT AND THICKNESS OF CAST-IRON DRAIN-PIPES.

Diameter of Pipe.	Length (exclusive of socket).	Thickness of Metal.	Depth of Socket.	Average weight per pipe.	Approximate weight per foot run.
in.	ft.	in.	in.	cwt. qr. lb.	cwt. qr. lb.
4	9	$\frac{11}{16}$	$\frac{3}{4}$	1 1 12	0 0 17
4	9	$\frac{3}{8}$	$\frac{3}{4}$	1 1 20	0 0 18
4	9	$\frac{3}{8}$	$\frac{3}{4}$	1 2 14	0 0 20
5	9	$\frac{3}{8}$	$\frac{3}{4}$	1 3 0	0 0 22
5	9	$\frac{13}{16}$	$\frac{3}{4}$	2 0 0	0 0 25
5	9	$\frac{13}{16}$	$\frac{3}{4}$	2 1 0	0 1 0
6	9	$\frac{7}{16}$	$\frac{3}{4}$	2 2 0	0 1 3
6	9	$\frac{1}{2}$	$\frac{3}{4}$	2 7 7	0 1 7
7	9	$\frac{7}{16}$	$\frac{3}{4}$	2 14	0 1 8
7	9	$\frac{1}{2}$	$\frac{3}{4}$	3 1 11	0 1 12
8	9	$\frac{7}{16}$	$\frac{3}{4}$	3 1 0	0 1 12
8	9	$\frac{1}{2}$	$\frac{3}{4}$	3 2 24	0 1 18
9	9	$\frac{1}{2}$	$\frac{3}{4}$	4 0 7	0 1 23
9	9	$\frac{17}{32}$	$\frac{3}{4}$	4 2 0	0 2 0
10	9	$\frac{17}{32}$	$\frac{3}{4}$	4 2 0	0 2 0
10	9	$\frac{17}{32}$	$\frac{3}{4}$	5 2 24	0 2 6
10	9	$\frac{17}{32}$	$\frac{3}{4}$	5 0 0	0 2 15
10	9	$\frac{17}{32}$	$\frac{3}{4}$	5 2 24	0 2 19
12	9	$\frac{17}{32}$	$\frac{3}{4}$	6 2 14	0 2 26
12	12	$\frac{17}{32}$	$\frac{3}{4}$	7 2 7	0 2 14
12	12	$\frac{9}{16}$	$\frac{3}{4}$	7 3 14	0 2 18
12	12	$\frac{5}{8}$	$\frac{3}{4}$	8 2 14	0 2 25

Mr. John Galt, of Toronto, has been elected city engineer of Ottawa, Ont., to succeed Mr. Robert Surtees.

## THE ARCHITECTURAL ASSOCIATION.

The fortnightly meeting of the Association was held on Friday evening, the President, Mr. G. H. Fellowes Prynne, F.R.I.B.A., in the chair. Several donations to the library were announced, and were acknowledged with thanks, and Messrs. L. Blanc and R. Woodroffe were elected as members.

### ORIEL AND BAY WINDOWS.

A paper on this subject, illustrated by sketches and large photographs, was read by Mr. PAUL WATERHOUSE, M.A., F.R.I.B.A. The lecturer humorously remarked that the method adopted by the committee of the Association of suggesting a subject when asking a member to read a paper was a humane one. The system saves, he said, a world of trouble, and is the means of introducing a large number of middle-aged practitioners to subjects of which they had previously no knowledge whatever. For the writer who is faced by an unresponsive title goes to his "Parker's Glossary," and his "Architectural Dictionary," drinks eagerly if not deeply at these fountains of knowledge, and comes smiling to his audience, refreshed with the sense of having put himself at least abreast of common knowledge in the subject which he has so lately made his own. Alas! for the student of oriel and bay windows; the dictionaries give him but cold comfort under either heading. You will find there, to be sure, a wonderful turmoil over

### DEFINITIONS AND DERIVATIONS.

You will learn there that some consider the word oriel to be originally and properly applied to the projecting windows of mediæval dining-halls, or to that part of the refectory occupied by the monks who were slightly indisposed, while others hold that it originally connotes a recess for an altar or for prayer, whether a window or not, and that it certainly cannot properly be applied to the bay window of a banquet hall. *Orare*, to pray, is, say some, the foundation of the word, making it, apparently, synonymous with "oratory," while others see it in the Saxon for an "eye-hole," though why they should overlook the fact that orielle (a 17th-century spelling of the word) means an *ear* and not an *eye*, nor why again the oriel window should be considered more of an eye-hole than any other kind of window is more than I can say. Another derivation connects it with *areola*, a diminutive of *area* which in certain senses is the equivalent of the "halo," of Greek origin—and, indeed, the similarity of the term aureole (undoubtedly based on a *reola*) favours this source, which is probable enough when one considers that circularity is the essence of the "halo." Plunge, if you desire it, into the controversy on this topic in the IVth Series of "Notes and Queries," and you will learn at least enough to induce you to drop the use of the word altogether. Probably you will conclude with me that the ancients used the term a good deal more loosely than even we are tempted to do; and that an oriel, like a "yorker" and a "gentleman," is one of those things which can be better understood than defined, also that it makes no great matter, for example, whether you restrict the term to bay windows which are corbelled out, or extend it to those whose form continues down to the ground. Busybodies have been at work, too, even with the innocent term bay window, which most people can understand by the light of nature as meaning a window whose bulging form, whether polygonal, semi-circular, or segmental, produces on plan a bay-like addition to the room it affects. But some wiseacre has produced a glossary of terminology to qualify the word. We are taught, for instance, of the "square bay" and the "cant bay," of the "compass bay" and the "square and compass bay," of the "bow bay" and the "square and bow bay," and, lastly, of an elliptical horror entitled the "cabinet window"! A modern tradition often enforced upon young gentlemen under articles of pupillage confines the term "bow" to the circular forms, and "bay" to the rectangular or polygonal, while yet another refinement of etymology would banish the word "bow" altogether. Let it suffice to say that the ancients called them all bays, whether they had or had not angles in their composition, and there are many examples to which we cannot deny ourselves the luxury of applying the gracious and expressive term "bow." Thinking the matter over, it has seemed to me that we may well avoid in this evening's discussion both the etymological question and the



archæological. An historical treatment seems undesirable, and even the constructive aspect may well be laid aside in favour of the attractive subject which I may call, for want of better title,

#### "THE MORALITY OF THE BAY"

—I mean its properties and its proprieties, and the rights and wrongs of its uses and significations. Bays are bound to be either the glory or the shame of the building to which they are applied. A bay window is, in the literal sense of the word, an extravagance, by which one means, not merely the escape of money from somebody's pocket, but a deliberate variation on the part of a building from the normal boundary lines of common construction. Now, it is in the nature of extravagances of all sorts that they must either be successes or failures, and the rule applies to bows and bays. They challenge attention both from within and from without, and if the attention they attract amounts to unfavourable criticism, they bring shipwreck on the building they encumber. Let us think of the objects for which these excrescences exist. They are few, and consist of (1) the desire to increase either the size or the amenity of a room; (2) the desire to enable the occupants to look out obliquely or even sideways without putting their heads out of window; (3) the desire to attract oblique sunshine to a room; or, finally, (4) a desire which is at once the most attractive and sometimes the most fatal of all—pure ambition of a worthy or unworthy kind. Ambition is as happy in its literal application as was the word extravagance. Meaning as it does a certain "going round," it touches in its primary and literal no less than in its secondary senses the essence of the ambient bow. It may seem absurd to some of you to go thus intimately into the rationalities of an architectural feature; but I suspect that we architects can lose nothing by any attempt to study the true significance of any of the items out of which we compile our compositions. There is one special reason for thought in dealing with such a matter as this—namely, that if we find ourselves dealing in bay windows merely for looks, it is of vast importance to be sure of their excellence and of their propriety. I am not arguing that utilitarian reasons only are the proper grounds for their application, but wish emphatically to mark the necessity of insuring appropriateness in the bay which is merely a luxury.

#### THE COMMON OR VILLA BAY.

We are all familiar with the commonest of all examples of inappropriate bays—the almost invariable excrescence which decks the speculative villa. But let us be sure, in condemning it, that we condemn it on the right grounds. Ambitious as these features appear, there is generally an economic reason for their existence. Sometimes they are one story high, sometimes two, and, in either case, the use of this unlovely addition is generally dictated by one of Architecture's fundamental laws—the economy of space—which is the economy of material. The one-story bay tells the passer-by, not merely that the speculative builder wished to give a spurious gentility to his drawing-room at the expense of his garden, but that, desiring to put on the ground floor a room of larger capacity than that of the floor above, he hit upon the bay as the best expedient. Even where the bay is two floors high, thus belying the reason just given, another cause may be at work. Without the bay, there would have been the need of making the wall of the large front room line with the wall containing the front door; in other words, the room would have had to be cramped, or the entrance lobby unduly lengthened. In fact, the common villa bay, so far from being an ambitious luxury only, is generally born of the desire to keep down the cubic contents. So much for its shape, its plan, and its capacity; as for its decoration, that is another matter. That it is generally stop-chamfered on every stop-chamferable surface, that it has what they call a patera in the middle of every lintel, and that it boasts of columns of the fern-leaved order of Gothic—all these things are to its shame, but they do not disqualify its original title for existence. Some one should write an article or even a book on the cost of ugliness. The pathetic squalor of middle-class homes is greatly due, not to the absence of unattainable embellishments, but to the addition of the undesirable. I know a town in a good stone country inhabited by persons of comparative wealth (for it is the country home of a neighbouring business centre) the architectural appear-

ance of which has been hopelessly ruined by sins not of omission but of commission. I suppose that if, on an average, £10 less had been spent on every one of the houses in that place, it might have been comely; whereas to-day it is loathsome. It bristles with bay windows, and they have nearly all got stone dressings; but there is scarcely a square arrie to be found in the town, and not a chamfer but is mutilated with fancy stops. If all these chamfers had been run out to their legitimate terminations, or, better still, if half of them had never been at all; if all that square sunk foliage had never been square sunk; if all those pateræ (their creators call them "paterasses") had never been cut, the builders might have been richer, the rents might have been lower, and the town itself might have been natural and beautiful, instead of looking like the purgatorial region which lies between the Angel and the Seven Sisters-road. Alas, for the villa bay, its existence is justified; but its usual development is one of the darkest sins of architectural wantonness. I have mentioned, as one of the legitimate causes of the bay window, the desire to obtain an oblique view from the room. To this cause is due the well-known and often gracious feature which one may call

#### "THE SEASIDE BAY."

With this we are all familiar, and happily we are able, among the bays of this class, to distinguish a successful as well as a disgraceful variety. The Englishman's cultivation of the seaside dates practically from the last century, and probably the desire on the part of the landladies to claim a sea-view as an excuse for additional rental is coeval with the birth of watering-places. It is to this excusable rivalry in the possession of a glimpse of salt water that we owe, in most marine towns, the amicable bellied fronts of the streets which run at right angles to the coast-line. Without the use of bay windows a sea-view in such streets would be impossible; with their employment comes the possibility of such a view—a little strained, perhaps, in the further buildings, but still appreciable; just worth having, and, moreover, just worth paying for. It is, in fact, the existence of a row of smiling, sunlit houses planted along one side of a broad street only, and, above all, the prevalence of bay windows, and especially of bay windows in certain transverse streets that cultivates the illusion—one falls irresistibly into the trap. Oh, these seaside bows—how well we know them! The modern varieties are tall and pert, not circular, but octagonal, and bastard octagons at that, with one gaunt oak grained sash in the centre light and two thin and equally tall ones in the side lights. And then the brickwork all covered with pale stucco, and the weak lead roof that lets the wet through! The old ones, how different and how insidiously attractive! I think of one which, on plan, is about a third of a circle. It is divided into three sashes of equal size, all made circular of course, and between them comes no brickwork, but just the sash boxing, so that, in fact, the entire construction is of wood; on the floor above the running of the front room over the entrance passage made the bay unnecessary for space; but, unwilling to give up the lines of the bay, whose delicate curve means so much to the expression of the house, the designer continued the treatment, and added to its emphasis by a light metal roof of similar form, covering a curved balcony, with a balustrade of ironwork. A great deal of the charm lies simply in the shallow curve and in the appreciation, however latent, of the slight extravagance of the circular joinery. The cheap building of last century or of the early 19th century seems never to have denied itself circular joinery; but to-day—probably owing to the prevalence of machine-made mouldings—circular work is apparently the first thing one has to give up in the attempt to save money. In the circular sashes one's satisfaction rests not merely in the delicate form of the sweeping segment, but also mentally—and perhaps unconsciously—in a sense of the added labour, in which there is a gleam of Ruskin's "lamp of sacrifice." Can it be a fact that every age of building finds at last some corresponding period of admiration, and will it ever be the lot of some degraded generation to cherish a cult of to-day's abominations? Will there some day be talk among the as yet unborn of the good old days of our great-grandfathers and their cathedral-tinted door panels, their delicately-tiled halls, their winsome stop-chamfers, and their charming bay windows, the angle-piers of which were

formed sometimes of quaint wire-cut bricks, covered with grey cement rendering, and sometimes with dainty cast-iron columns, with neck mouldings four times the true Palladian size, and branching capitals cast in the similitude of the common polypody? Such a day I hope can never come; or rather, when the time does come for our great-grandchildren to pass judgment on what is left of the bricks and mortar of to-day, they will have before them such a vision as we cannot have in any of our retrospects. There is in the work of to-day a visible contrast between the good and the bad such as is not to be found by any searcher of our time in the recesses of our past. The contrast-line, unhappily, does not lie between architects' buildings and builders' buildings, for, to our shame be it spoken, there are things bred on the drawing-board of men with brass plates which have to find themselves classed on the wrong side of the line. But that the contrast exists there can be no doubt, nor can there, happily, be a doubt that there are many beautiful things—bay-windows among them—which will do as happy resting-places for the eyes of our antiquarian descendants. But we are getting away from the bays. In those of the circular form it is important to remember, as a designer, that the plan form, whichever is adopted, is the most important thing about them; that it must be cherished and led up to, and that finally it will accomplish more of its mere self than a person of moderate experience would expect. There is a special reason for emphasising the observation. In the actual process of designing we deal necessarily with orthographic elevations as a means to our end. A similar bay window put on to an elevation is a comparatively dull thing. You, as architects, realise its circularity on your own or other men's drawings, especially on your own, by the toil of drawing in the mullions in oblique elevation. But the drawing does not tell its full tale of effect, and you may be tempted to attach an (apparently lacking) interest to the member by some addition to the simplicity of its lines—some crowning feature, for example, or an addition to the centre of the cornice, if there is one. In this there is danger of error. The circular or segmental plan once adopted, you cannot serve its end better than by the accentuation of the horizontal lines which partake of the circularity. Herein lies the difference, or one of the many differences, between those old bays that we admire (be they stone and Tudor or wood and Georgian), and the modern horrors in which hang the "apartment" labels. The modern bay makes for height in its apertures; it avoids bars, specially horizontal bars, in its glazing; transoms are probably altogether absent, and the piers are made thick and heavy, so as to break even the moderate continuity of the sashes' meeting rails and of the head and sills. With the older types this is different. Copious window bars (or in stone-work well-defined transoms) perform the double office of breaking-up undue verticality and of emphasising the plan form of the bay, while the small piers, mullions, or sash-boxes only produce as much intermission as the eye (that unconscious arbiter of stability) demands as a guarantee of sound construction and as a preventive of the worst of all faults—the over-bowing lintel. If you do not know what I mean by this last, ride down Oxford-street on a 'bus-top and look at the excrescence, which is the sole feature of the Frascati restaurant. To design a bay of this description, you take a centre on the frontage line of the building (or a little outside it if you prefer to increase the effect), and turn a wall circle, the inner radius of which is only about three times the length of the thickness of the wall. Here you have produced on plan a semicircular bay which you proceed to embellish by the insertion of one mullion. To be sure the omission of mullions altogether would have made the thing more startling; but the one mullion gives the public enough to reflect about with some sadness. As they pass the building they naturally and generally view it obliquely; the eye glancing across the curve which looked so fair on plan, and at least respectable on elevations, takes a straight line from the edge of the single mullion to the jamb, and above it they see transom and head vaunting their unsupported circularity. This sad example leads to what one may call

#### AN AXIOM OF ALL GOOD CIRCULAR WORK.

that the vertical supports must always be sufficiently close together to prevent the appearance



of the horizontal members being unsupported. This rule is, in one sense, the counterbalance of what I mentioned before—the need of emphasising the horizontal members; but it is surprising how little, how slender, the vertical supports may be, and yet satisfy the eye in this matter. In the old inn windows of many a coaching hostel the slimmest glazing bars between the glass panes are enough to prevent the eye being troubled by any optical instability. In the splendid segmental or semicircular bays, which are the glory of some of the country houses of our English Renaissance, the mullions are always so placed that there is no chance of offence in this respect. It should be borne in mind that the relative closeness of these vertical supports is necessitated and regulated, not by the measurement of the length of segment, but by the length of its radius. The flatter the bay, in other words, the less need for the frequent support. The greatest importance attaches to the way in which a bay is covered in. Obviously a bay, like other structures, can be roofed in either of two ways—either with a flat roof or a sloping one. If your bay extends upwards to the whole height of the building its roof may possibly form a part of the general roofing of the house. This, which is often a successful treatment, needs handling with great caution, especially if the bay be large and the building comparatively small. In a very large structure the roof of the bay, whether polygonal or circular, can appropriately be formed as a member growing out of the rest of the roofing; or it may even, if the plan of the bay be part of a regular polygon, or of a circle, take form as a turret, and rise above the apex of the normal roofing. It is, however, very often the lot of a bay window to be the largest feature, or one of the largest features, of a comparatively small house, and in such a case the use of a high-pitched roof of such wide span, with eaves at the level of the general eave, will often result in the production of a feature whose size will swamp not only the building, but with it the bay itself. It may easily happen that the architect finds himself driven to the use of a flat invisible roof, for his bay for this very reason: that any form of sloping roof would work itself out into something too gigantic for the scale of his building.

#### GABLED BAYS.

There is one treatment, popular some few years ago, which we may unhesitatingly condemn as inappropriate in nearly all cases. It abounds in the neighbourhood of Fitzjohns-avenue, and consists in the cheerful expedient of clapping a gable of the full width of the bay on to the unfortunate erection, which is placed in the difficulty of reconciling its own polygonal form with the square structure which surmounts it. The problem is usually resolved by one of two expedients. Either the canted angles of the bay are treated as gigantic chambers, and brought to the square by the usual latter-day expedient of a vast stop or corbelling, or the gable, which is at times half-timbered, gets its triangular soffits supported by a bracket. These expedients, particularly the bracket business, are unhappy at best, for they cast a shadow on to the splayed windows, besides offering gratuitous harbourage to sparrows and their nests. If a bay must be surmounted by a gable, there are ways of getting over the difficulty. One may make the bay itself square, and so produce one of the most beautiful features that can be devised. Indeed, so successful is the appearance of the square bay under a gable, that where this form is used one can tolerate a greater width in the gable, and a resultant soffit on either side, though the triangular soffit left by the polygonal bay is so far from tolerable. All good rules have their exceptions, I suppose, and there are buildings of bygone days which successfully carry through even the problem of the square gable on the canted bay. You may see an example in the Talbot Inn at Oundle. The homely satisfaction of this building goes to prove that our forefathers could sometimes succeed where their descendants generally fail. On the whole, one of the most beautiful treatments—though a very unusual treatment—of a gabled bay of polygonal form is that of which one finds an example at Weston, an old house between Leeds and Ilkley. In this case the front or flat wall of the bay runs up to form the gable face, and the splayed sides are surmounted by parapeted wings with finials. The wings, having horizontal copings, do not exactly follow the line of the roof. A gable formed on a canted plan is often very successful, as those will

agree who know the gabled apse of St. Michael's Church at Folkestone, where the gable is, like this at Weston, so to speak, three-sided. In cases where the bay we are dealing with has walls which are lower than the main walls of the building the roofing difficulty is often nearly as great—at least, where pitched roofing is attempted; and the difficulties in this case are caused by the intersection of the bay roof with the vertical face of the main wall behind. It is obvious that the roof of a segmental bay, if projected at an oblique angle on to the main wall, produces nothing more or less than one of those eccentric outlines which the geometers know as conic sections. With a polygon—if it be (as it generally is not) the exact half of a regular figure—there is no great difficulty, as the centre of the figure will line on the wall line, and the roof can be brought up to a true apex with regular mitres on the hips. When the figure formed by the plan of the bay is something less than the half of a regular polygon a little cooking is sometimes indulged in with results which are elegant on the elevations but disastrous in the eyes of ordinary spectators, who cannot be induced to see things as they would appear on a drawing-board. Generally speaking,

#### CANTED BAYS

are not parts of regular octagons, but have their canted sides less than the front. In such a case there may be a small piece of straight return between the cant and the wall. It then becomes necessary to regulate matters so that the hips of the canted sides shall exactly meet on the wall-line, otherwise a roof is produced which nothing but cooking can save, and which the said cooking will generally shipwreck. In this connection it is well to observe that many of the best old examples, particularly in Tudor and Renaissance work, have no square returns at all, and, further, that the angle of the cant is frequently flatter than 45°. There is an objection to the practice of allowing a very flat cant to die into a wall face without the intervention of a square return—namely, that the mouldings of the bay become unduly developed in their incidence upon the wall. This difficulty has to be met either by extreme modesty on the part of the mouldings, which have, in fact, to moderate their projection, or by continuing the same mouldings, on the wall face as strings or cornices. On the whole, there is a good deal to be said against pitched roofs for bays of the lower description, unless it be in the case of those with roofs of weathered masonry. In these, it need hardly be pointed out, the planning must be done in strict regard to the form which will be brought about by the intersection of the roof slope with the back wall. There is one simple consideration which often altogether upsets the possibility of applying a sloping roof to a bay—namely, the height which such a slope occupies upon the wall space. If your bay projects 3 ft. it is obvious that, with a slope of anything over 45°, a pitched roof with its flashings will make a window for the room above almost an impossibility unless its sill be at an unusual height from the floor. The

#### CORBELLED WINDOWS

to which we generally and perhaps incorrectly apply the term "oriel" are frequently covered with high-pitched roofs of masonry; but, with this exception, the bays of Mediaeval, Renaissance, and Georgian architecture—in fact, all the best bays of our ancient periods—are covered with flat roofs, or with roofs so flat as to be invisible behind their parapets. The roof in these cases being of no account architecturally, it remains to be considered how the parapet is dealt with. Some of the best examples in this, as in other departments of architecture, are the quietest.

#### PARAPETS

in all ages have been things to play with, and the bay being the luxury-point on a house's front is not the feature to forego all license. Our old friend, the battlement, used even by the ancients, as much for ornament as for the defensive objects which its warlike name implies, is a frequent infester of the tops of bay windows. He is not inadmissible, but he should be used with care. Too big, he becomes gigantesque and ludicrous; too small, he is lilliputian and again ludicrous. Even when the proportions are sound, he may break up indecently the horizontal continuity which I have spoken of earlier as one of the secrets of success in a bay. Open work of most kinds in the parapet involves piers, and these again, though very valuable in the canted bay as implying strength

at the angles, may introduce an ill-placed verticality. Our modern trick of the festooned or swooping outline is sometimes happy, but is better employed on the straight-sided bays than in the circular, and the same may be said of finials (whether balls or other forms) unless they occur with such frequency as shall cause an effect of series so as rather to carry the eye along the line we are emphasising than to interrupt that emphasis. Where indulgence is taken in open-work parapets or in finials, or other means of breaking the outline, it is still possible to maintain the emphasis of plan form by a cornice of some vigour. There is, especially in the circular kinds of bay, a marvellous charm in the simple bending of a moulding, however unelaborate, to the selected form. Even a plain unmoulded band—say, of stone—among brickwork has its value, and in cases where the bay is not mullioned, but pierced with large sash openings, it is difficult to overestimate the importance of all the horizontal bands in giving continuity to the form. A base will often help—even a simple plinth with the smallest possible projection; just enough to catch the light and continue the message of circularity. It is time to say something of those bays whose form is not continued downwards to the ground level. The simplest way of treating such a feature is obviously to cut it off flat, and, strange as it may seem, there are many examples of such bays on a small and homely scale, and in wooden construction, which are singularly successful and happy in effect. The bare idea is contrary to all one's notions of propriety, and the bald simplicity is helped in many cases by a slender wooden corbel or cantilever, which makes no pretence of really doing the work; but the fact remains that in many old villages, such as those which happily still surround London, there are small bays of this description with absolutely plain soffits which are not by any means unpleasing in their appearance. The corbelled-out bay, to which some authorities restrict the name of "oriel," is a more favourite feature in foreign architecture than in our own. If you look through the pages of those two monumental works on the Renaissance, the "Denkmäler Deutscher Renaissance" and Mr. Gotch's book on our English buildings of the same period—you will be struck by the fact that, whereas bay windows abound in both, the German examples are very largely of the corbelled-out variety, while the English ones are almost invariably of the simple, solid, down-to-the-ground type. Where the Englishman broke loose was in his timber-work; his bays in woodwork are sometimes marvels of projection; but in stone the Briton was ever more modest than his foreign rivals. It may be said to the credit of the English, that they have never been very over-reaching in the matter of corbels. Visible stability, even in the wildest days of the Early Renaissance, has always been as much revered in English architecture as it was ignored elsewhere. There are nations whose natural impetus has led them in architecture to the production of portents. It has been their aim to make stone look like a lace pocket-handkerchief, or to run it fine with corbels in real buildings as a child sports with gravitation in his box of bricks. These tricks have not been English tricks, and where they grow on English soil they are of foreign planting. We may be known by our bays and bows as by other things, and our solidity is something of a virtue. At the same time, one must allow a certain beauty to even the extravagant German frolics. Those bays in particular which grow out of the angles of a building are sometimes of singular grace, and when they are of the square type are often so arranged as to do no violence to the sense of stability.

#### CONSTRUCTIONAL DETAILS.

I had promised not to go into the construction question; but there are one or two points of appearance so closely allied to construction that I cannot conclude without a reference to them. First, as to bays at the angle of buildings. In villa architecture it is a common fault, and a perfectly avoidable one, so to place a bay at the corner of a room that the carrying of a wall angle above it becomes to inquiring spectators a matter of conscious or unconscious anxiety. Of course, one knows there is some jugglery of rolled steel joists going on out of sight, but there is no reason why the unconscious faculty which asks building construction questions on its own account should have been worried at all. It is perfectly easy to so plan a bay, circular, square, or polygonal, that the normal wall angle shall be



either upon or slightly outside the line of the bay. This gives no detriment to the effect within, and is a great relief to the spectator outside. To have anything so cardinal as the angle of a building apparently descending into the untrustworthy embrace of the lead flat over a drawing-room bay is, to well-ordered minds, a sin. There is also sometimes a sin in the popular collegiate device of a corbelled bay over an entrance-archway. It may be all right in appearance, as well as in construction, particularly if the corbelling is not pressed too hard on to the arch. If well arranged, the corbel and its burden seem only to be paying a compliment to the stability of the arch; but if once you get anything approaching to a collision between the arch moulds and the corbel the result is miserably weak—at least in looks. If close quarters are essential some form of keystone treatment is the only possible expedient. One may make a Classic or semi-Classic keystone the base of a corbel, where it would be impossible, on grounds of appearance, to let a corbel take liberties of trespass with a Gothic arch. These bays of which we have been speaking grow more in the house than in the palace; indeed, the monumental styles of architecture find less opportunities for their use than the more strictly domestic. The bay has no place in the Palladian method, and although one may find here and there a Classic clubhouse whose smoking-room has an excrecent window claiming the name of bay, you will discover it to be disguised outwardly by some tortured colonnade whose insulted entablature seems to be only waiting for the time when it may go back to the straight again. Gothic architecture and the freer Renaissance styles gave the opportunity of using bays even in buildings of size and dignity, but the bay as we have ordinarily to deal with it, is the appendage of a house—of a home. Its importance as part of a design can hardly be exaggerated. It is like the nose on a face. Add 10 per cent. to its size, or take a degree from its flexure and you may ruin the countenance—I should say the elevation—to which it belongs. A young architect not infrequently opens practice by “throwing out a bow” for a relation. The simple manoeuvre is thought to be a safe task to intrust to an unrisen genius. Confiding friends! They little know the risks they run. To be sure, the money-hazard is less than that of the cost of a house, but they little understand the test to which they put their aspiring architect. You know Tennyson’s poem of the flower in the crannied wall—

If I could understand,  
What you are, root and all, and all in all,  
I should know what man and God is.

The knowledge of the little is a test, a proof, of the knowledge of the great—of all. So with your bit of a bay window. It isn’t any fool’s job. There is a task for eye and hand, a task for the senses of proportion and propriety, a task, in fact, for all the powers that go to make an architect even in the least of these trifles. Bays and oriels are not to be despised. If a man can design them, it is, perhaps, a sign that he can design most things. “Throw out your bays” by all means, and if you can do them worthily, you are probably capable also of throwing up your town halls and your palaces.

Mr. LEONARD STOKES, past-President, in proposing a vote of thanks to the lecturer, observed that he was rather amused to hear Mr. Paul Waterhouse justify the jerry-builder’s bay on the ground that it afforded an economical extension of floor space in the small villa. He feared, however, that if detailed quantities were taken out, the bay would be found to be an expensive item, judged by the average rate per foot of the cubic contents of the house. The effect in a long suburban street of a series of exactly similar bays on either side, all fitted with green Venetian blinds and all smothered with so-called art curtains, was very depressing. The effect of the square bay was objectionable. He would go so far as to say, Never adopt the angle of 45° in setting out a bay; it was unfortunate and common-looking in appearance, especially where it was so arranged as to make the centre part of bay twice the length of the side-pieces. The bay was a most difficult feature to treat with success, and they would all agree with the lecturer that simplicity and good proportion were essential elements in the solution of the problem: no amount of ornament slobbered over an ill-proportioned bay would make it presentable.

Mr. F. T. BAGGALAY, past-President, in

seconding the vote of thanks, said it was a service to one’s vocabulary to give a definite meaning to words, and whatever might be the derivation or former meaning, it was well to define as an oriel a bay that was not carried down to the ground. He differed from Mr. Stokes, and thought that a long series of bays in a street, especially if well designed, had a dignified effect. The old builders very rarely carried a bay above one story, and adopted a quiet and dignified treatment. To carry the roof of a bay above the general level of walls was a most dangerous treatment to attempt, and rarely resulted in a success, for the roof of a small feature, if carried above the general level, attracted attention, and tended to dwarf the whole composition.

Mr. H. H. STATHAM remarked that the aim of the builder in introducing a bay window was not to economically add to the floor, but to induce the occupier of the house to think he had secured a larger and more commodious room. The proper nomenclature had always been to regard as an oriel a bay that did not come down to the ground level. As to the question of the beauty of angular v. segmental bays, the occasional introduction of another form gave piquancy to the general effect. Thus at Eastbourne, among a long series of angular bays on the east front, a single segmental bay gave a charm and a distinctness to the older house of which it formed the new feature. In an office building in Walbrook, E.C., a Liverpool architect had employed three very flat segmental bays with happy effect, giving variety to a frontage in a very narrow lane, without seeming to encroach on the limited open space. In angular bays it was often much better to bring the cant snugly down into the wall without producing a return.

Mr. ALEXANDER PAYNE said one reason why the bay window was so largely used in suburban London was because of the restrictions of the London Building Acts, which compelled a building owner to set back his house to the frontage line adopted by those who had already built, but allowed him to extend a bay to a certain distance. Many of the circular bays built at the beginning of the century, charming as was their effect, had proved insecure, and, to prevent them from falling outwards, columns had had to be put up in the centre of the curve.

Mr. T. BLASHILL, past-President, said in the London Building Act of 1894 the bay window, which before had been allowed as a special favour by the authority, was recognised. Its object seemed to be to provide a recess in the front room in which could be placed a little table to carry the inevitable family Bible, globe of fish, or flower-pot, thus leaving a square room for other purposes. Mr. Stokes had insisted on the advantages of simplicity and proportion; but he remembered an able lecture delivered some three years ago before the Association, in which the author sought to show that there was no such thing as proportion in architecture;—which version of the story were they to believe? He confessed he was very much in favour of the bay window; it was capable of being made a very interesting feature. It was largely used even in Palladian or Classic treatments in modern German work, being usually kept square and carried up two or three stories, the windows being well set back.

Mr. A. S. FLOWER, F.S.A., and Mr. H. A. SATCHELL having spoken, the PRESIDENT summed up the discussion, and put the vote of thanks, which was carried by acclamation, and was acknowledged by Mr. WATERHOUSE.

The PRESIDENT announced that the order of the next two lectures had been transposed since the syllabus was published, and that at the meeting to be held on Friday, December 9, Mr. Edwin T. Hall would read a paper on “The Position of Architecture Among the Arts.”

#### WALTHAMSTOW PUBLIC BATHS.

THE Walthamstow Urban District Council having applied to the Local Government Board for sanction to borrow £36,490 for purposes of public walks and pleasure grounds, and £3,108 for works of private street improvement, Colonel A. J. Hepper, D.S.O., R.E., an inspector of the Local Government Board, on Wednesday week attended at the Walthamstow Town Hall, to inquire into the several applications.

As to the proposed loan for baths, the clerk stated that the proposal was to provide a swimming-bath 130ft. by 35ft., 37 slipper-baths,

and offices. The accepted tender was for £14,847, and the architects’ and quantity surveyor’s commission and other incidental charges brought the total to £16,000.

Mr. Cross (of Messrs. Spalding and Cross) gave details of the proposed structure. Many questions as to the estimated cost of the plans were asked by Messrs. Neville and Ogilvie, the latter, a member of the council and a master builder, explaining to the inspector in detail the manner in which Messrs. Spalding and Cross were appointed architects. Mr. Rowland Plumbe, Mr. J. Williams Dunford, and Messrs. Spalding and Cross were, he said, invited to send in designs for baths to cost a sum not exceeding £7,000. Mr. Plumbe did not compete, but competitive designs were sent in by Mr. Dunford and Messrs. Spalding and Cross, and Mr. Plumbe was appointed assessor. Mr. Plumbe gave Mr. Dunford the first place on account of economy. Messrs. Spalding and Cross said, in their report accompanying the competitive drawings, that they saw no reason why they should not be carried out for £7,000, and at the request of the council they brought down a practical London builder, who said the plans could be carried out for £7,000 plus 15 per cent. This same practical builder tendered for the work, and his tender was for £16,300, and £1,200 had been cut out of the specification.—The Inspector: The same man?—Mr. Ogilvie: Yes. From my experience as a builder I knew the work could not be done for the sum named by the selected architects. Mr. Ogilvie added, in reply to the inspector’s question, that in the competition Mr. Dunford’s plan was approved and his appointment was sealed; but his appointment was afterwards rescinded, and the appointment given to Messrs. Spalding and Cross, and Mr. Dunford had been paid £80. Mr. Ogilvie then proceeded to say that a sub-committee was appointed to go into the matter, and they ordered reductions in the plans of Messrs. Spalding and Cross to the tune of £1,200.

The Inspector intimated that he could not go into details, which were for the local authority to decide upon.

Mr. Anderson, another member of the council, said all the reports were at the disposal of every member of the council, and every information Mr. Ogilvie required he could get. He admitted that the instructions were to prepare plans for £7,000 or £8,000, but Mr. Ogilvie had not said that his party kept back from the then minority a certain report sent in by Mr. Dunford with his design, and they knew nothing about it until they became the majority. He then criticised the hurried manner in which Mr. Dunford’s appointment was sealed, just before the other party went out of power. It was only on the ground of economy that Mr. Dunford gained the award of the assessor, as Messrs. Spalding and Cross’s plans were held to be far the best. Mr. Williamson, another member of the council, and Mr. Barrett, a ratepayer, having taken exception to details in the plans, the Inspector closed the inquiry.

\* A memorial tablet has been put up on the south chancel wall of Highfield Church, Southampton, in memory of the Rev. F. E. Wigram, by his widow and family. It bears an inscription in raised polished lacquered letters on a dark bronze background, and has been executed by Messrs. Hart, Son, Peard, and Co., of Drury-lane, W.C.

The Liverpool Corporation has adopted a detailed report and suggestions submitted by the city engineer for the reconstruction of old and the construction of new tram lines at an estimated cost of £143,060. It was recommended that certain lines should be constructed to the extent of 8½ miles, including Aigburth-road 2½ miles, Croxteth-road ½ mile, and Smithdown-road 5½ miles; and that the existing routes along West Derby-road, Stanley-road, Kensington, and Walton-road, a total mileage of 18½, be reconstructed.

The new sanatorium erected for the Brighton Corporation, from plans by Mr. F. J. C. May, the borough engineer, has just been opened. It stands on a slope of the South Downs, 326ft. above sea-level, and consists of several pavilions built of red bricks, with Portland stone dressings, Broseley tiles being used for roofing, except for the administrative block, which is covered with slates. Internally, glazed brickwork and tiles have been largely adopted, and the floors, except in the ward pavilions, are laid with wood-block flooring above the fireproof floor. Shorland’s Manchester stoves are used for heating the wards, and the rooms are heated by open fireplaces. The whole of the sanitary fittings throughout the establishment have been supplied by Mr. Jennings, of London.



## SOME SANITARY SPECIALITIES.

WE have received a new illustrated catalogue of sanitary specialties manufactured and brought out by J. Duckett and Son, Ltd., Burnley, Lancashire, that we recommend to all sanitary engineers, architects, builders, and others. The "automatic sloop-water closet," patented by J. Duckett and Son, is well known, and a very important improvement in closets, and it possesses many advantages over the ordinary water-closet, amongst them being that the closet is not liable to be frozen up like the clean-water closets; that it saves water, the closet and drains are better flushed, while for out-door uses the sloop-water system is far better than any other. The testimonials appended speak decisively on the merits of Duckett and Son's "sloop and trough closets." In one case the tipper is at a distance from the closet, and the motion of the water thoroughly cleanses the pan. This arrangement A of Duckett's automatic sloop-water closet is illustrated by a large scale section. A dishstone with grating in the yard receives the sloop water of sink through the waste. Just below the dishstone is a pivoted tipper self-acting, of three gallons capacity, fitted with brass axles, copper covers, and a rubber buffer, and this tipper, when full, discharges its contents into the drain. At the closet end, which may be a few feet or yards distant, the drain enters into a patent annular basin below the seat, and immediately beneath the basin is a siphon trap which can be turned in direction to suit inlet drain. A powerful flush is secured by this arrangement. The apparatus is of salt-glazed ware, and is simple and effective, as the tipper flushes the house-drain and closets, and the yard gully is superseded. Where the distance from dishstone to closet is great, arrangement B is recommended, in which the sloop-water is collected near the closet, the tipper being placed at the side of the annular basin, thus acting directly on the outlet, and flushing the pan thoroughly. The complete apparatus is only £1 10s. Various improvements have been made to both these alternative arrangements: the basin below closet-seat can be turned to any direction of inlet drain; the closet can be fitted up with a pedestal and hinged seat or with plain vertical pipes. The A 1 arrangement is designed for reduced depth of drain and for easy access.

Duckett's "automatic multiple closets" are on the same principle. One arrangement given shows how it can be used for flushing two, three, or more closets with a five-gallon tipper; another illustrates how nine closets can be flushed with two such tippers, each tipper being supplied with sloop-water from four houses—an arrangement suitable for a row of houses. Other arrangements are illustrated for closets adjoining the buildings, and for mills and workshops where ranges of closets are used. Fresh water can be fed into the tipper, regulated by a tap under the seat, and a mere dribble is all that is necessary to secure the flushing. Duckett's trough closets, siphonic and non-siphonic, possess several advantages over others. The flush is automatic and powerful, cleansing the trough completely; there is no splashing; there is a deep-water seal. The troughs, semicircular in section, have a hardwood capping or rail, and are emptied by siphonage in one case, and recharged with clean water from a special made stoneware or galvanised-iron cistern. The troughs are put together with socket-joints, and have a flushing rim. The patent latrines (p. 22) are well adapted for schools, mills, or where there are ranges of closets. They are flushed by Duckett's patent flushing tank to hold five or ten gallons. Duckett's isolated closets in ranges; their patent self-cleansing channel gullies; street gullies of improved form, yard traps and siphons, sloopstone, pipe protectors; Duckett's air-bricks, sinks, enamelled channelling, and other specialties are worth attention. The catalogue is well illustrated and printed.

Another step has been taken in the restoration of the Norman church of SS. Helen and Giles, Rainham, Essex, in the completion of a new porch and new arch and doors. These were dedicated at the same time as three stained-glass windows, on Wednesday week, by Archdeacon Stevens. A small window in the south aisle represents St. Nicholas, and another, the same size, represents St. Christopher, and is placed in the north aisle. The third, in the south aisle, is a double light representing the Annunciation. The windows were the work of Messrs. Bacon.

## BOOKS RECEIVED.

THE *Engineering Magazine* for November (London: 222, Strand).—The current number contains a few articles of interest. Mr. Thomas Cargill's paper on "The Great Railway Stations of England" refers to special developments of ground plan and roof design, and gives views of the Great Western Railway Station at Bristol, used also by the Midland; an interior view of that station showing the roof on a curve, plans and views of the Liverpool-street Station. The author treats mainly of the roof principals, and the elementary forms of roof-trusses employed for railway stations. The French form of truss is largely used, and to it the author gives the preference for economy. The arched-tie forms are also common, such as the polygonal, bowstring, and arched rib. The St. Pancras roof is chiefly referred to as one of the arched class, and is used at Glasgow and Manchester. The tie at St. Pancras and other large roofs of this kind are often below the level of the floor. The article is worth reading. "The Latest Improvements in the French Lighthouse System," by M. Jacques Boyer, and an interesting paper on "Sanitary Principles in the Construction of Isolation Hospitals," by G. A. T. Middleton (illustrated) are among other articles. —The *History and Antiquities of the Collegiate Church of St. Saviour, Southwark*, by Rev. Canon Thompson, M.A., D.D. (London: Ash and Co., Ltd.) is a welcome epitome of the history and antiquities of this fine church. It has been thoroughly revised and brought up to date, and is well illustrated by thirty-two well shown views by Brewer, including photo-process block of the interior. Canon Thompson gives a summary of the history of the edifice and its restoration, and describes every interesting part of the church: its monuments, epitaphs, and stained-glass windows. A good plan accompanies the text, and a plan and table showing the architectural styles found in the building. —*Alphabets: Old and New*, by Lewis F. Day (London: B. T. Batsford), is a very useful book of alphabets, in which Mr. Lewis Day shows the artistic development of letter forms. Many ancient forms and characters are given taken from original sources and MSS. The illustrations include Greek, Coptic of 10th to 14th century, Roman, Byzantine, English inscriptions, Franco-Gallic capitals, Saxon, Anglo-Saxon, German, Gothic, Irish, Italian-Gothic, and every description of letter forms. The artist and practical workman will find this book of value for its very complete illustration. The 15th and 16th-century capitals from brasses and manuscripts, and some of the Italian and German penwork letters are very good examples, and suitable for reproduction. The printing and illustrations are excellent. —*The Conduct of Building Work and the Duties of a Clerk of Works*. By J. LEANING, F.S.I., author of "Quantity Surveying, &c." (London: B. T. Batsford).—This is a handy little book that will be found of value to all architects and clerks of works. No one is better able to write such a book than Mr. Leaning. This book came out some time ago under the title of "The Duties of a Clerk of Works." It is now much extended, and will form a useful summary of suggestions and hints for all architects engaged in superintending buildings. Mr. Leaning rightly says examination ought to be extended to clerks of works, and he thinks the Clerks of Works' Association should be "an examining body, if the Government departments insist on examination for the appointment of building officials. In the appendix some useful examination papers are given. Architects will also find the hints of service in superintending buildings, and in drawing up specifications. —*Rowson's Iron Merchants' Tables and Memoranda* (London: F. and F. N. Spon, Ltd., Strand) will be found of everyday use by all engineers, iron merchants, architects, surveyors, and others. The tables give the weight of flat bar, square bar, round iron, steel angles and tees, bolts, rivets, sheet and hoop iron gauge, and other useful data, and the notes will be found of value. The book is well printed, and bound in limp morocco, gilt, and is convenient for the pocket.

The second list of subscriptions to the Archbishop Benson Memorial Truro Cathedral Building Fund shows that since the first list was published the total has been raised from £3,111 to £12,270, the principal contribution being £1,000 from "A Cornishman."

## OBITUARY.

WE regret to hear of the bereavement sustained by Mr. George Souden Bridgman, C.O., of Courtland, Paignton, Devon, late vice-president of the Society of Architects, by the death, on Sunday, of his wife. Mrs. Bridgman, who had been in delicate health for years, accidentally fell over a dog a few months ago, and sustained some injury to the knee, which was regarded as trifling, but which has led to her decease.

THE death has occurred of Mr. THOMAS CLARIDGE, for eight years surveyor to the Swinton Local Board, for twenty years surveyor to the Stockport and District Highway Board, and up to his decease surveyor to the Disley District Council. He was formerly engaged upon engineering works in Brussels and other Continental cities. He was fifty-eight years of age, and was well known throughout Cheshire and Lancashire.

## CHIPS.

Princess Christian will perform the ceremony of laying the foundation-stone of the new Christ Church, Brixton-road, on Thursday, 15th inst. The church is to be reconstructed from plans by Mr. Beresford Pite.

The Grand Theatre, Luton, which has been erected for Mr. Reginald F. Turner from the designs of Mr. Charles Herbert Shoppes, F.R.I.B.A., will be opened on Saturday in next week.

Mr. T. Brock, R.A., has now completed the life-size marble statue of the late Judge Thomas Hughes, which is to be erected by old Rugbeians at Rugby. The unveiling ceremony will take place as early as possible next year, after a suitable site has been selected.

A number of cottages are being built in Green-lane, Avonmouth, for Messrs. Elder, Dempster, and Co., the architect being Mr. E. Bligh Bond, of Bristol.

The corporations of Leicester, Sheffield, and Derby are now actively preparing for their great battle royal in the committee-room at Westminster during the coming session. Each has completed its Parliamentary Bill with the same great object of adding the waters of the Upper Derwent and the Ashop to their municipal supplies.

At a largely-attended public meeting held at Douglas, Isle of Man, on Thursday in last week, a resolution was passed calling upon the Tynwald Court committee to adopt a scheme of gravitation for the drainage of the town.

At a contested by-election held at Foleshill, Mr. J. F. Tickner, architect and surveyor, has been returned a member of the Foleshill Rural District Council.

In the case of Thomas Simpson, Borough High-street, Southwark, S.E., and Tilbury Villa, Ravenscroft-road, Beckenham, S.E., builder and contractor, the order of discharge has been suspended for three weeks, ended November 15, 1898. (Public examination concluded February 25, 1899.)

Mr. J. H. Hele, assistant borough surveyor of Stoke-on-Trent, has been elected surveyor to the Spalding Urban District Council.

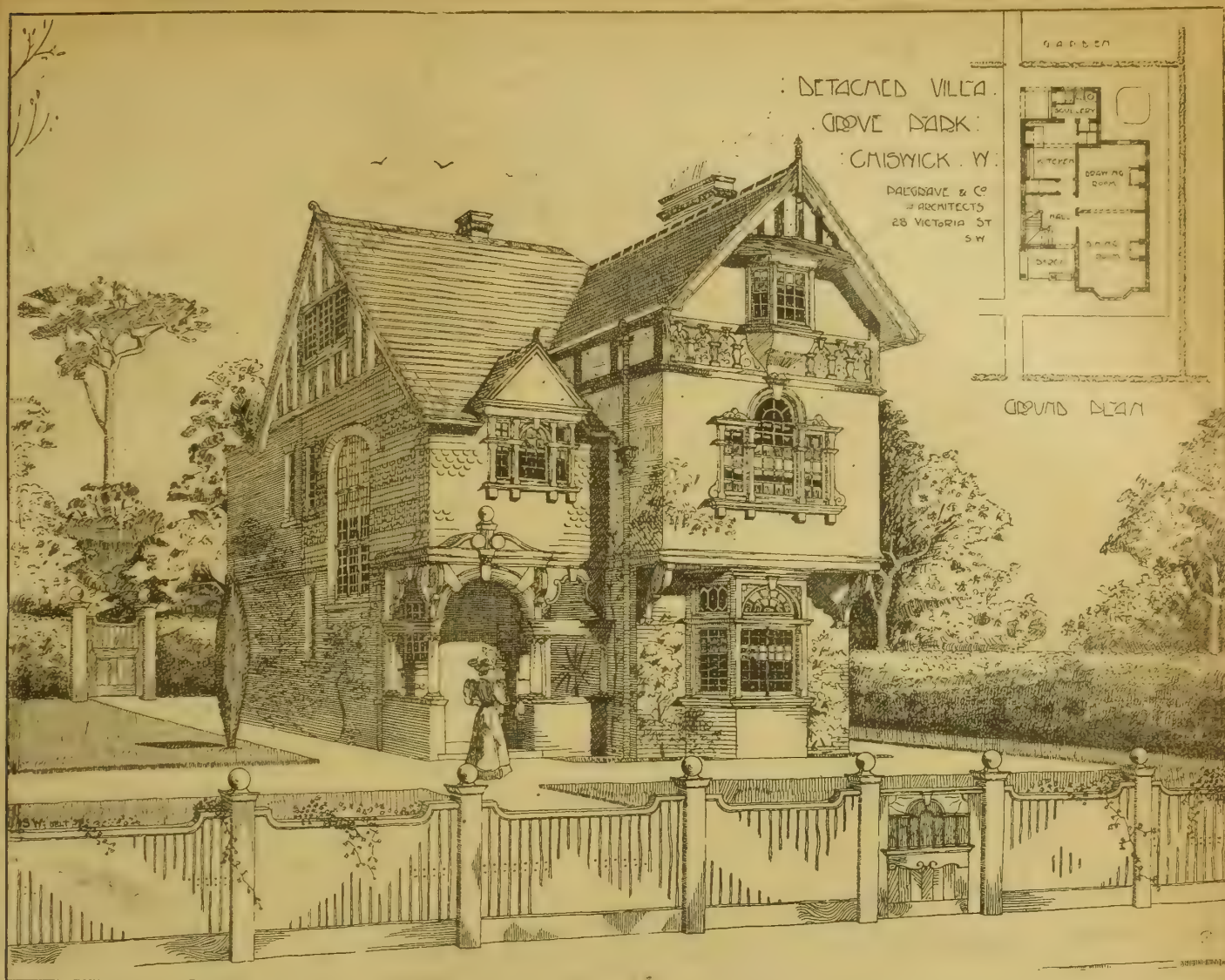
A remarkable interest has been taken in the five days' dispersal, at Messrs. Sotheby's, of the second and concluding portion of the fine collection of engravings and drawings on London and its notabilities gathered together by the late Mr. Holbert Wilson. The 860 lots sold last week brought something like £4,300, and this, with the £4,323 realised for the first portion, makes an aggregate of some £8,625.

By direction of the Local Government Board, Mr. Walter A. Ducat, inspector, opened a public inquiry at Muthorpe, on Friday, in relation to a new system promoted by the rural district council of South Westmoreland, who have applied to the Local Government Board for sanction to borrow £1,250 in order to carry out the project. At present the village is without either an efficient sewerage system or water supply.

The opening services took place on Thursday in last week at the new Wesleyan School Chapel erected in Heneage-street, in the Weelsby district of Grimsby. The building has cost about £1,280.

On Saturday the valuable collection of curios belonging to the late Mr. Thomas Kendrick, which is one of the finest collections of fossils, shells, &c., in the Principality, was removed from Great Orme Side to the Free Library at Llandudno to form a nucleus of a public museum. Steps are being taken by the new museum committee to enlarge the existing building by having another story added to it—the additional floor to be utilised by the Gwynedd Ladies' Art Society and as a public museum, and the committee have instructed Mr. G. A. Humphreys, architect, to prepare plans of the proposed additions.





#### VILLA RESIDENCES, GROVE PARK, CHISWICK, W.

**T**HIS design is one of a series of eight detached residences about to be erected on the estate of the Duke of Devonshire, Spencer-road, Grove Park, N. The fronts are to be executed in red brick and pale yellow rough-cast. The half-timber work will be stained with Stockholm tar. The roof will be covered with red Broseley tiles. Messrs. Palgrave and Co., Victoria-street, S.W., are the architects for the work.

Mr. H. H. Law, a Local Government Board inspector, has held an inquiry at the town-hall, Fulham, into an application by the Fulham Vestry for sanction to borrow £10,250 for the purchase of a site at Melmoth-place, Walham Green, on which it is proposed to erect public baths and washhouses.

In the Court of Appeal, on Saturday, before Lord Justices A. L. Smith, Rigby, and Collins, an appeal was heard from a decision of the Liverpool County-court judge awarding £243 to the widow of a carter employed by Messrs. Brown and Backhouse, builders and contractors, of Liverpool, who was killed by the tilting of a piece of timber on his cart while it was standing outside the defendants' premises. The ground of appeal was that the deceased was not employed "in or about a factory" within the meaning of the Act; but their Lordships held a different view, and dismissed the appeal.

Mr. W. J. Phillips died suddenly at his residence at New Barnet, N., on the 18th inst., aged 65. He had been a clerk of works for the last 30 years, and had been employed on many important works under well-known architects. Among the principal of these were the Congregational Church at Broughton Park, Manchester, under the late Mr. S. W. Dankes; the Convalescent Home, Southport; and laying out of southern cemetery, Manchester, under Messrs. Paul and Bonella, architects; a large mansion at Maidstone for Mr. R. J. Balston, the architect of which was Mr. A. Waterhouse, R.A., and several other large works, both in London and the provinces.

#### THE EDINBURGH SCHOOL OF APPLIED ART.

**A**N exhibition—free to the public—was opened on Monday in the galleries of the Royal Scottish Academy, Edinburgh, of the work done during the past year by the students in the Edinburgh School of Applied Art, of which Dr. Rowand Anderson is hon. director. The school is managed by a joint committee of the board of manufacturers and outside subscribers, and for several years a contribution of £1,000 was given to it out of the grant-in-aid by the Edinburgh Town Council. This year that sum, in the exceptional circumstances of the city finances, was reduced to £750; but it is hoped it may be increased again, as the school is doing an excellent work in the equipment of young architects, and designers in all branches of art industry for the work that is before them. The attendance last year at the school was between 60 and 70 students. Part of one of the octagons is set apart for the drawings of three students, who, having completed the school curriculum, were awarded travelling scholarships of £60, £40, and £40 respectively for four months. It is a condition that they must proceed to some art centre, and make drawings for their own improvement of architectural or other work. The first prizeman, Mr. J. Douglas Trail, being a furniture draughtsman, many of his designs are of pieces of furniture of English and French design, sketched at South Kensington Museum and elsewhere. The other two bursars were J. Hervey Rutherford and J. Forbes Smith, architects. They show designs for metal and stained-glass work. There are scholarships likewise given of £52 per annum in connection with a national survey of Scotland. Those taking part in this interesting work this year were J. Hervey Rutherford, J. Edwin Forbes, and W. Beattie Brown, jun. This scheme embraces measured drawings, features in the castles, mansion houses, and cathedrals of Scotland. The sketches are

being catalogued and preserved, and may eventually be published in a series of volumes. Specimens of work done by the students on Saturday afternoon excursions, in the school by the pupils of various grades, and in modelling in clay; in drawing the figure, and in colour, are also shown.

#### CHIPS.

It always seems a printer's ambition to correct an error by the perpetration of a worse one! In Mr. Mark Gentry's letter last week referring to Claridge's Hotel, he was made to say "glazed" instead of "gauged" bricks, and his name was given as "Frank," instead of "Mark" Gentry.

In the case of Alfred Patrick Joseph Roland (trading as Greenhill and Joseph), Hinds-road, Harrow, and Priory-road, Kilburn, N.W., builder, the discharge from bankruptcy has been granted conditionally.

Last week was a busy one at the Auction Mart, Tokenhouse-yard, and the excellent total of £141,046 was achieved, which compares well with the £133,948 returned for the corresponding week last year.

Messrs. W. T. Glover and Company, electric cable manufacturers, have commenced the erection of new workshops and offices covering two acres of land in Trafford Park, near the Manchester Ship Canal. Mr. Nuttall is the contractor for the foundations, and Messrs. Southem and Sons for the superstructure. The architect is Mr. Charles Heathcote, Manchester.

The Okehampton Board of Guardians discussed, on Monday, the alternatives of building a new workhouse at an estimated cost of £8,000, or proceeding with the erection of an infirmary to cost £3,000 and alterations to the house, at a further outlay of £1,000. It was eventually decided to adopt the larger scheme, and a sum of 75 guineas was voted to Mr. Harry Geen, architect, as compensation for having prepared, under instructions, plans for the infirmary and alterations, which will not now be carried out.



## Building Intelligence.

**BRYNMAWR.**—The county intermediate schools were opened on Wednesday week by the Marquis and Marchioness of Worcester. The school is a dual one, designed to accommodate 44 boys and 27 girls, and is arranged so as to be capable of enlargement for an additional 60 scholars. The buildings are of blue Pennant stone, with Ebbw Vale buff brick dressings. The central block contains the classrooms, surmounted by a ventilator turret. Right and left are cloakrooms, private rooms for master and mistress, &c., while at each extremity are receding wings containing laboratory, cookery-room, and the laundry. The girls' side, besides the usual classrooms, contains a cookery-room and scullery, laundry, music-room, cloakroom, &c. The boys' side is a counterpart; but, instead of a cookery room, contains the chemical laboratory. The contract for the work, amounting to £1,883, was carried out by Mr. John Jenkins, Brynmawr (whose tender was the lowest of eleven received), from the designs of Messrs. J. H. Phillips, M.S.A., Cardiff, and F. Baldwin, M.S.A., Brecon, who are also joint architects for the county schools at Ebbw Vale.

**BOROUGH POLYTECHNIC.**—Since the opening of the Borough Polytechnic rather more than six years ago, the work of the Institute, which occupies the buildings of the old British and Foreign Training College, remodelled from Mr. Rowland Plumbé's plans at a cost of £12,000, has been attended with so much success that twice the premises have had to be extended. The alterations carried out in 1894 under Mr. Plumbé's direction involved the expenditure of some £4,400, and now further enlargements and improvements have been effected at a cost of about £12,000, this latter sum not including the amount required for the furniture and fittings of the various buildings comprised in this second scheme of extension. The new buildings, which are to be formally opened on Thursday in next week, consist of a gymnasium, 80ft. by 40ft., four workshops for wheelwrights, boot and shoemakers, printers and bookbinders respectively, a school of cookery, a physics laboratory and lecture theatre, a men's club and refreshment-rooms, &c. These extensions have enabled the governing body to remodel the equipment of the whole of the buildings.

**ERDINGTON.**—The Benedictine monastery built in 1879 from plans by Dom Hildebrand de Hemptinne, now Abbot Primate of the Order, has been enlarged at a cost of £7,000, the architect being Mr. Haigh, of Leicester. The style is Decorated Gothic, and the buildings are executed in pink sandstone, from Kenilworth and Codsall. They include a tower, carried to a height of 70ft., and containing the apartments and a private chapel of the abbot, a novitiate, and other rooms. The cloister, of moulded brick arches, has been extended along the whole length of the new building at the rear. From the cloister open rooms allotted to the fathers for various purposes, and the refectory. The basement contains the stores, cellars, and workshops. A staircase leads to the library, to the cells of the monks, and to the guest-chambers, and the other apartments in the tower. The triptych reredos in the prior's chapel has been constructed from designs by Mr. G. F. Bodley, A.R.A.

**FELIXSTOWE.**—It has been determined to enlarge the church of St. John the Baptist. When the extension work is complete, the chancel will be, internally, 35ft. 6in. by 25ft. 6in. On the south side there will be a morning chapel 30ft. 6in. by 15ft. 6in., partly divided from the chancel by an arcade. Two vestries for the choir and clergy, 20ft. by 16ft. 6in. and 20ft. by 13ft. 9in. respectively, are placed on the north side of the chancel, and will be divided by a movable partition. The style adopted is Early Decorated. The contractor is Mr. Fred. Thurman, of Felixstowe, and the architects (who also planned the nave and aisles) are Sir Arthur Blomfield, A.R.A., and Sons.

**LUTON.**—The Grand Theatre in Waller-street will be opened on Monday week, the 12th inst. It is a two-tier house, constructed on the cantilever system, and there are only two columns upon the pit level and upper circle level. The whole of the floors are of concrete. There is seating accommodation for about 1,000 persons, and standing room for about 350 persons in addition.

The proscenium opening is 24ft. by 24ft., and the stage has a total depth of 30ft., and an extreme width of 46ft., with an additional area of 5ft. by 15ft. on the prompt side. The prevailing colours throughout the auditorium are white and gold. Provision has been made for ten dressing-rooms, a bandroom, three refreshment-bars, and cloakroom and lavatory accommodation. Upon the pit level there are thirteen entrances and exits, including two to the dressing-rooms in case of fire. The main entrance will be paved with marble mosaic. The exterior is faced with grey Luton bricks, relieved with quoins and dressings of red bricks, and St. Aldhelm Box Ground stone for cornice strings, bands, &c., the gable being carried out entirely in stone. The work has been designed and carried out under the superintendence of Mr. Charles Herbert Shoppee, F.R.I.B.A. The builder is Mr. W. Dunham, of Luton.

**NOTTING HILL GATE.**—The Coronet Theatre was opened on Monday night. It holds 2,500 persons, and while it possesses a fireproof curtain, it has also hydrants and fire-plugs in all parts of the house. Provision has been made for heating it throughout with low-pressure hot water. The house is a two-tier one. On the ground floor there will be stalls, pit stalls, and pit. The first tier contains the dress circle, with a balcony behind, and raised slightly above the circle, and on the second or upper tier, are the amphitheatre and gallery. No columns have been used in the interior of the building. The interior decorations are in the style of the period of Louis XVI., and they have been executed by Messrs. Waring and Gillow, of Oxford-street, by whom also the furnishings have been provided. The theatre is lighted both by the electric light and by gas. The pendants hang from a large oval stuccoed decoration, the sides of which are painted with emblematical female figures representing the Four Seasons. The stage is 40ft. deep, and 70ft. wide; the auditorium is 56ft. wide, and 60ft. from the curtain to the back wall. The front exterior elevation is in the style of the Italian Renaissance. The architect is Mr. W. G. R. Sprague, of Arundel-street, Strand.

The Light Railway Commissioners are to be applied to by the Economic Light Railway Company for an order empowering the construction of a light railway from Land's End to Marazion, with branches to Newlyn and St. Just. It is proposed to have a junction with the Great Western Railway at Marazion.

The works connected with the extension of the City and South London Railway to Moorgate-street are making rapid progress, and now both tunnels are complete so far as their actual construction is concerned. It is anticipated that in about six months from now the company will be able to hand over once again to the parish the church of St. Mary Woolnoth.

The corporation of St. Alban's have received a report from Mr. W. J. Dibdin and Mr. George Ford, the city surveyor, recommending the construction of bacteria beds at the filters of the sewage disposal works. The report has been adopted, and Messrs. Dibden and Ford have been instructed to prepare two experimental filter-beds.

Discovery of a large quantity of green sand water has been made in the caves of the Colley Hill overlooking Reigate. The spring comes from the hill above, which is 550ft. high. Taking the thickness of the green sand (60ft.) and the height of the water, there appears to be sufficient to supply 500,000 gallons a day of water that is softer than chalk-water and of exceptional purity.

St. John's Church, Smallwood, Cheshire, is being furnished with a new reredos of oak from designs prepared by Mr. R. B. Preston, architect, Manchester. The reredos will be a memorial of the 37 years' connection with the parish of the late Rev. Edleston B. Williams, during the last 35 of which he was the vicar of Smallwood.

Mr. J. Adams-Acton, sculptor, of Brodick, Arran, and Sunnyside, St. John's Wood, has received a commission to execute a colossal statue of Mr. Gladstone for the town of Blackburn. The statue will be of marble, 10ft. high, and will be placed on a pedestal of Peterhead granite. Mr. Adams-Acton is the sculptor of the statue of Mr. Gladstone in St. George's Hall, Liverpool, which was executed in 1865.

Mr. H. Percy Boulnois, Local Government Board inspector, held an inquiry on Friday at Camborne re the proposal of the Camborne Urban District Council to borrow £300 to erect a grand stand in the recreation-ground. No opposition to the scheme was offered.

## Engineering Notes.

**NEWCASTLE-ON-TYNE.**—An important project, for which Parliamentary powers are being sought, is that for the erection of a second high-level bridge over the Tyne at Gateshead by the North-Eastern Railway Company. It will be situated considerably west of the present one, and 750ft. east of the Redheugh Suspension Bridge. It will form part of a railway which from the Central Station to the junction with the Team Valley line will be about 3,000ft. long, including the bridge proper, which will be about 675ft. in length. It will be 48ft. 6in. wide from parapet to parapet, and will carry four lines of rails. The height from high-water mark to the girders is 83ft., and to the rails about 110ft. From the Forth the line will be carried on arches throughout to the Team Valley. The two central spans over the river are each of 300ft., supported by a central pier, which with the two main abutments will be of granite, whilst the remainder of the piers and arches will be of stone. The cost will be at least half a million sterling, and the time required for construction will be three years.

### OBITUARY.

The Duke of Norfolk opened, on Tuesday, the new buildings of the Throat and Ear Hospital in Church-street, Brighton, erected at a cost of £5,800.

Lord Roberts will lay the foundation-stone of the Soldiers' Victoria Hall and Institute at Dover on Thursday in next week.

On the 17th ult., a new church mission-room was opened near the railway-station at West Runton, between Cromer and Sheringham. The building, which is of red brick, with Cossey ware dressings, consists of two rooms. The larger one has an inside measurement of 30ft. by 20ft., and the other of 16ft. by 50ft. Mr. G. A. Lines, of East Runton, was the builder.

The Bowser Schools, Norton Malton, are being warmed and ventilated by means of Shorland's patent Manchester grates, the same being supplied by Messrs. E. H. Shorland and Brother, of Manchester.

The opening meeting of the Civil and Mechanical Engineers' Society for the session 1898-99 took place last (Thursday) evening in the Dublin room at the Hotel Victoria, Northumberland-avenue, S.W., when the president, Mr. B. Baines Dudley, delivered his opening address.

The Queensland Government has received through the Agent-General a report by Mr. Pennycuik, an English engineer, on a scheme for the prevention of floods in the Brisbane River. The report recommends the construction of a canal and the formation of a large reservoir at the junction of the Bremer and Brisbane rivers, the dredging of the river channel from Brisbane downwards to a depth of 26ft. at low tides, and the construction of training-walls, which will reclaim 1,300 acres. The scheme is to cost £2,047,000.

A new theatre, the Alhambra, is about to be built opposite the Victoria Courts at Birmingham, from plans by Mr. Frank Matcham. The site has frontages of 225ft., 113ft., and 285ft. respectively to Corporation, Ryder, and Dutton-streets. The stage will be 70ft. wide and 45ft. deep, and the total cost of the house will be between £70,000 and £80,000.

A Wesleyan chapel in Albany-road, Cardiff, was opened on Wednesday last. It is Late Decorated in style, is built of Newbridge stone, with Bath stone dressings, and has on one side of front a square, pinnacled tower. Messrs. Jones, Richards, and Budgen are the architects, and Messrs. E. Turner and Sons the builders.

Considerable improvements are about to be carried out in the Congregational chapel at Guildford, including structural alterations, heating, and lighting. Mr. E. L. Lunn, of Guildford, is the architect.

The Government House at Calcutta, which will be the official residence of Lord Curzon, was planned by the same architect who designed Kiddleston Hall, and is practically a fac-simile of his lordship's Derbyshire home.

On Saturday, the Duchess of Albany visited the Welsh Girls' School, at Ashford, Middlesex, at the opening of the new chapel, and unveiled a tablet commemorating its gift to the school by Mr. Alfred H. Bevan. The chapel will accommodate 150 persons, and is built of stone. Internally it is 66ft. long, 26ft. wide, and 30ft. high to the crown of the roof. The style adopted is Perpendicular. The special features include organ tribune and arches, oak dado, oak benches, marble and oak flooring. The building works were executed by Messrs. J. Dorey and Co.



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## ILLUSTRATIONS.

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NOTTINGHAM.—THIRD PREMIATED DESIGN FOR THE  
SOUTHERN HOSPITAL, CARSHALTON.—DETACHED VILLA,  
GROVE PARK, CHISWICK.

## Our Illustrations.

NEW TAVERN, KENNINGTON OVAL.

A VERY extensive group of buildings has been erected during the past year at Kennington Oval, comprising a new cricket pavilion and a tavern connected with the grounds. The cost has been between thirty and forty thousand pounds. Messrs. Muirhead and Baldwin, of Manchester, are the architects. We illustrate to-day the new tavern from a photograph by Messrs. James Mudd and Son, and supplied us by the architects. We shall at an early date give an illustration of the pavilion, when we hope to print some further particulars of this important and interesting undertaking.

HISTORIC ORNAMENT: NATIONAL SILVER MEDAL DRAWINGS.

ONE reason why modern sculptors so often fail in the matter of mouldings and the structural forms of those parts of their designs which may be considered, in a sense, as subsidiary to their figure-work, is because they study historic examples so partially and have so little knowledge and sympathy with architecture. An intimate acquaintance with specimens of historic ornament is essential to a matured taste, and in order to evolve original conceptions in which appropriate fitness is not to be violated, the designer must have an educated mind as well as a dextrous hand or an artistic eye. Without the skill of a craftsman and the taste of an intuitive artist, no living art is possible; but the reason why failure is so often associated with otherwise meritorious work is that a true study of the treasures of the past is not realised—it is only so half-hearted and unreal. A mere chronological knowledge, useful enough to the antiquary as it is, will not afford this needful cultivation of the artist's taste; his study must primarily be directed towards the motive and the ethics of design, so well illustrated by the past masters of applied ornament and composition. The old drawings of the authors of the works we admire are far to be preferred to new sketches by others of the objects themselves; but, failing an access to these manuscript draughts, to be seen in the art libraries of our National Collections or among the treasures of private collectors, it must be useful to have really accurate delineations of historic examples of work for ready reference and study. The sheet, therefore, of sketches which we give to-day is of more than a passing value. These studies are skillfully executed, and are well chosen. Each subject has a description attached to it, and Mr. John J. Brownword has earned the thanks of our readers as well as the National Silver Medal awarded him for the series, of which these drawings only form a part. We gave another sheet from his pencil on March 4, 1895.

## HOUSE, CHILWELL.

THIS house I have just built for myself at Chilwell, about five miles from Nottingham. The plan and illustration will explain themselves. The house is built of Ruabon bricks, and the rooms on the ground floor are wainscoted in oak and walnut. Doulton's have supplied some of the grates and mantels, and Lowe's oak and teak flooring upon Stuart's granolithic have been used. A little electric plant supplies the light. Mr. Barlow, of Nottingham, built the house.

ARTHUR MARSHALL.

## HOUSE, LENTON PARK, NOTTINGHAM.

THIS house has just been completed for Mr. W. G. Player. It is built of Ruabon bricks and Corsehills stone. The interior has much elaborate woodwork. The work has been well carried out by Messrs. T. Fish and Son, of Nottingham, from plans and under the supervision of Mr. Arthur Marshall, A.R.I.B.A., architect, of Nottingham.

## SOUTHERN FEVER HOSPITAL, CARSHALTON.

TO-DAY we illustrate the third premiated plan for this great hospital. Messrs. Newman and Newman are the authors of this design. On November 18 last the second premiated plans appeared in our pages. With reference to the accompanying drawings, lent us by the Metropolitan Asylums Board, it will be seen that Messrs. Newman and Newman have placed their administrative buildings in a central position, and they are of easy entrance without penetrating into the hospital area. The isolation buildings are to the extreme east of the site, well separated, as they should be, and the laundry buildings are as far away with reference to the direction of the prevailing winds as could be contrived. The general scheme is governed by an endeavour to secure the best aspects and the greatest amount of sunshine for the cottage wards and staff quarters. All these buildings are isolated. The medical superintendent's house is located so as to be accessible to all parts, and insure a comprehensive survey of all that is going on. No building occupied by infected persons is placed less than 100ft. from the boundary of the estate. In the administration block the officials are placed in the front. In the centre, behind the entrance-hall, is the dispensary, accessible both from the male and female sides of the buildings, and the same necessary provision of access is observed in the planning of the kitchen to the rear. The sergeries at the back open into a covered yard, in which motor-vans for the distribution of the food to all parts of the hospital would be worked. The messrooms for the staff are well placed, and the servants are admirably provided for in this plan. The difficulty in lighting long corridors in the centre of a large building not infrequently is met by borrowed lights. Upon the first floor are the bedroom cubicles and bathrooms for the staff and officers. The cottages are one floor only, and each double cottage contains the necessary accommodation for 24 beds. A separation-room is connected with each block, and is available from either of the two cottages. In each single cottage is provided the house-mother's bedroom, from which she can readily overlook and supervise the contiguous dayroom and dormitory, scullery, safe, linen cupboard, as well as the bath and ablution room. The three w.c.'s and slop-sink, which are common to both cottages are also provided. Verandahs are shown outside the dayrooms, from which the airing courts, sheltered from the north and east are accessible. Adjacent to each group of five double cottages is a staff building for sub-matron and staff. The architectural treatment is as plain as possible on account of exposure. Stock bricks are intended to be used with red brick bands and dressings, and plinths of blue Staffordshire bricks. Bangor slating was proposed for the roofs. The estimate, with the cottages on one floor, was calculated on the basis of 7d. per foot cube, exclusive of drainage and engineering, on 6,089,628ft. at £177,814. For the drainage, soil, and rainwater £11,500 is allowed; £5,000 for yard pavings, giving a total of £194,314.

The promises made by Devonport to St. Budeaux include the construction of a pier at Saltham Passage. Plans have been prepared, and the pier will be built just below the Royal Albert Bridge. The proposed pier will be 230ft. long and 20ft. wide, with archways at the west end. The estimated cost is from £6,000 to £7,000.

## COMPETITIONS.

YARDLEY RURAL DISTRICT COUNCIL.—In the limited competition for new public offices, depot, fire-station, and mortuary to be erected in Stratford-road, Sparkhill, Birmingham, the assessor, Mr. W. Martin, has awarded the first premium to Mr. A. Harrison, 88, Colmore-row, Birmingham, the second and third premiums being equally divided between Mr. J. R. Nicholls, M.S.A., 59 and 61, Colmore-row, Birmingham, and Messrs. Ingall and Son, 3, Temple-row, Birmingham.

## CHIPS.

The new Grand Theatre at Southampton, built from designs by Messrs. W. Hops and J. C. Maxwell, was opened on Monday night. Messrs. Jenkin and Sons, of Southampton, were the builders.

A new Wesleyan chapel in Bolton New-road, Atherton, was opened on Monday. The cost of the building and site is £3,600, and sitting accommodation is provided for 375 persons.

Mr. John Lamont Brodie, first president of the Manchester Academy of Fine Arts, died on Nov. 23 at his residence in Denmark-avenue, Wimbledon, aged 75 years.

The Lord Lieutenant paid a State visit to Londonderry on Thursday in last week, the occasion being the unveiling of a statue erected in the Guildhall as a memorial of the Queen's Diamond Jubilee. The statue is by Mr. J. Williamson, of Esher, the private sculptor to her Majesty. It is of the finest Sicilian marble, and represents the Queen-Empress in her State robes, wearing the famous Honiton lace.

The Board of Trade have recently confirmed an order authorising the construction of a light railway in the county of Perth, between Strathord Railway Station and Bankfoot.

A new cotton mill is about to be built in Buckley-lane, Hamer, near Rochdale, for the Eclipse Company. It will contain 100,000 mule spindles, and the architect is Mr. Sydney Stott, of Oldham.

Mr. Ralph Dodds, builder and contractor, died at his residence, Edmund-street West, Rochdale, suddenly on Tuesday week. Mr. Dodds, who was 62 years of age, came to Rochdale from Wigtownshire when a young man as clerk of works. Subsequently for about a dozen years he was in partnership with Alderman Cheetham, carrying on business in the neighbourhood of Spotland-road, and since that partnership was dissolved about 24 years ago he had continued the business on his own account in Clover-street in that town.

At Aldeby, Suffolk, a new parish schoolroom has been built at the vicar's expense. It is of brick, 45ft. by 20ft., and has stone dressings. Mr. Pells, of Beccles, was the architect, and Mr. Dunn the builder.

The Board of Guardians for Chorlton, Lancs, who have a constituency living in 60,000 houses, averaging a ground rent of £3 per annum per house, have unanimously passed a resolution to the Local Government Board urging the necessity for the taxation of ground values. In this they are following the lead of the Cardiff Board of Guardians.

The parish church of Palling-on-Sea is about to be restored, re-roofed, and reseated from plans by Mr. Herbert Green, of Norwich.

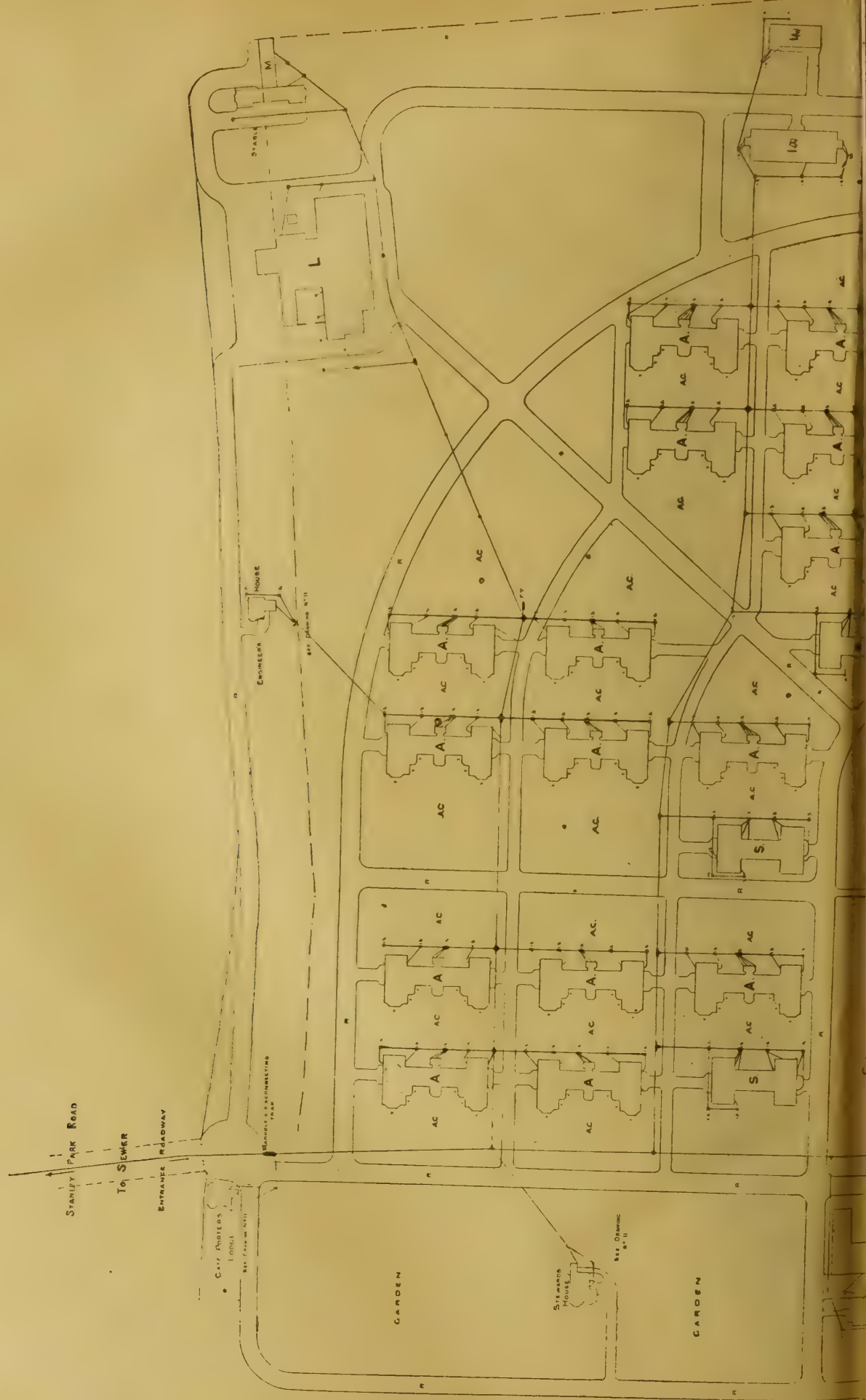
In furtherance of their efforts to improve and encourage architectural education in their district, the Bristol Society of Architects offer for competition among their student-members prizes, value six, three, and two guineas, for the best sets of measured drawings of specified examples from English buildings, ancient or modern.

A new fire-brigade station is in course of erection in the High-street, Lewisham, on part of the site of Lewisham House. It is of red brick, four stories in height, and has a look-out tower with steep pitched tile roof, rising to a total height of 84ft. The style is Georgian. The work is being carried out under Mr. Thomas Blashill, superintending architect to the London County Council, Mr. R. Pearsall, assistant architect, being in charge of it. The contractors are Messrs. Holloway Bros., of Queen's-road, Battersea. Mr. Schneider is the clerk of works.

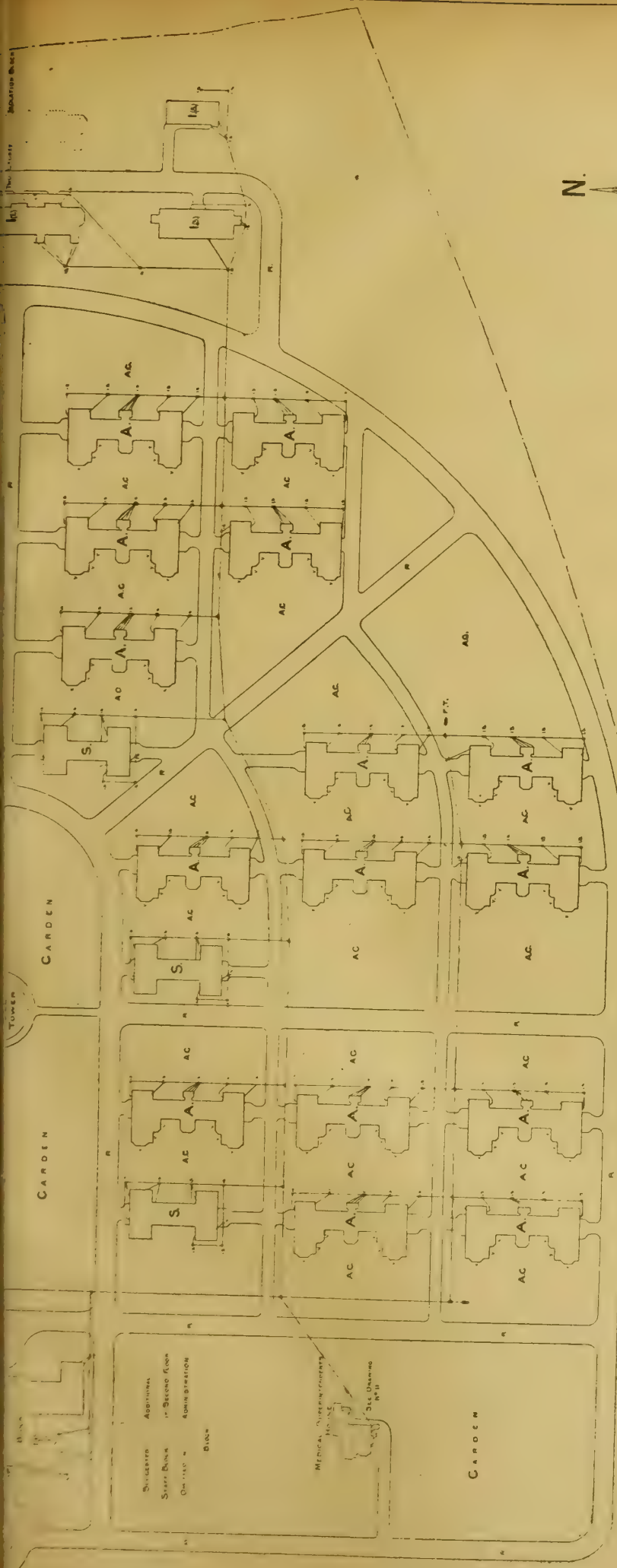
Mr. H. P. Boulnois, M.Inst.C.E., held an inquiry at St. Agnes, Cornwall, on Friday, on behalf of the Local Government Board, on an application by Truro Rural District Council for sanction to borrow £5,000 for works of water supply for the parish of St. Agnes. Mr. R. H. Worth, C.E., explained the plans, to which considerable opposition was raised by landowners.

The scheme of the Falmouth Corporation for the municipalisation of the Falmouth Gas and Waterworks, estimated to cost £120,000, has been rejected by the ratepayers by 1,233 votes against 773.









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I.S.	Flushing Tanks.	" " 12
A.C.	Inspection Shafts.	" " 12
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R.	Mortuary.	" " 6
	100 Feet Zone.	" " 1
	Verandahs.	" " 6
	Inspection Shafts & Disconnecting	" " 12
	Traps Combined	" " 1
	Roads.	" " 1

METROPOLITAN ASYLUMS BOARD SOUTHERN HOSPITAL, CARSHALTON.~THIRD PREMIATED DESIGN.

NEWMAN AND NEWMAN, Architects.



## PROFESSIONAL AND TRADE SOCIETIES.

**GLASGOW ARCHITECTURAL ASSOCIATION.**—At a meeting of this association, held on Thursday in last week in the rooms, 187, Pitt-street, Mr. George S. Hill in the chair, a paper was read by Mr. Hunter Crawford, Edinburgh, intitled "Domestic Steam Heating and Hot Water Supply." Mr. Crawford discussed the difference between heating by steam and heating by hot water. The extreme dryness of air caused by steam heating rendered it unhealthy except where a good circulation of air could be obtained, as in a hall or staircase. The rapidity with which the heat in a room could be raised by the steam was certainly one of the advantages possessed by the steam system over the hot-water system. The fact that water could be heated by steam to near boiling point rendered this system of great use for domestic purposes in the kitchen and in the washing-house, &c. Mr. Crawford illustrated his paper by a finely-executed model, glass tubes being used in the place of iron piping, so that by means of coloured water the flow in the pipes was clearly indicated. Mr. Crawford, by means of the model, showed the several points which had to be borne in mind when putting in such an installation as was shown by the model, which showed a section of a house with radiators fitted into the different rooms, washing-house, boiler, &c., connected to a steam generator in the basement. Mr. McGibbon moved a vote of thanks to the lecturer.

**NATIONAL REGISTRATION OF PLUMBERS.**—The Edinburgh and East of Scotland District of the National Registration of Plumbers opened their session on Monday night in Dowell's Rooms, George-street, Edinburgh, Professor Crum Brown presiding, when the inaugural lecture was delivered by Professor Hunter Stewart, D.Sc., M.B., Professor of Public Health in Edinburgh University, who took for his subject "The Relation of Plumbers' Work to Sanitation." Professor Stewart drew attention to the danger to public health caused by the insanitary arrangements which prevailed in many houses. The dangers arising from defective plumbing work were so very obscure that they did not attract the same attention as other perils which were more conspicuous. The chief province of the plumbing trade was to see that the water is delivered to the community as pure as when it left the main. The lecturer also referred to the question of sewerage, comparing the water system of carriage which prevailed to-day with the more antiquated methods. He then proceeded to deal with the various micro-organisms which exist in the air and water. The air in Edinburgh, for instance, contained in wet weather 20 microbes per cubic foot; in dry weather, 120 per cubic foot. After wet weather the air had been washed, and they had fewer microbes. The air of London contained 118 microbes per cubic foot; the air in the London sewers 110 microbes per cubic foot. This was a little surprising, and might seem paradoxical; but he quoted the case of Paris, where fewer microbes were invariably found in sewer air than in the air outside. In 15 drops of Edinburgh water there were 60 of these microbes; but the same quantity of Edinburgh sewage contained 2,200,000. In clay taken from the High-street at a depth of 6ft. no microbes were found; but in soil taken from near a leaking sewer, 15 grains contained 888,000 of the organisms. Professor Stewart, in concluding, drew attention to the importance of the plumbing trade and the confidence reposed in it by the community. He was not going to lecture them on fittings, but he strongly advocated the abolition of certain insanitary appliances in common use at present.

**PLUMBERS' CONFERENCE IN YORK.**—The National Association of Master Plumbers met in the Old Council Chamber, York, on Friday, for their half-yearly conference. The President (Mr. John Bean, of Newland, Hull), was in the chair, and there were also present the vice-presidents, Mr. J. Skirrow (Leeds), Mr. R. W. Cooke (Newcastle), Mr. W. Jaffrey (Manchester), and Mr. W. H. Mallender (Derby). There was a fair attendance of delegates. Mr. J. H. Shonksmith, president of the York association, attended, and welcomed the delegates, and Messrs. Birch and Hopkins, of York, acted as stewards. Mr. W. H. Smith, hon. secretary, read the half-yearly report, which stated that the association continued to make steady progress, and that, if they were not increasing very rapidly in numbers, they were being recognised more

generally by other societies and associations. Mr. A. E. Brigg (Leicester) submitted a report of his work during the half-year. Mr. A. B. Dyson (Halifax), hon. treasurer, reported that the balance handed to him on his appointment was £44 9s. 3d. The total income for the half-year had been £165 3s. 9d., and the balance in hand was £37 15s. 10½d. These reports and brief statements by the vice-presidents were accepted.

**SOCIETY FOR THE ENCOURAGEMENT OF THE FINE ARTS.**—The fortieth annual general meeting of this society was held in the Conduit Galleries, Conduit-street, on Thursday in last week. Dr. J. S. Phené, F.S.A., F.R.I.B.A., chairman of the council, presided, and stated that they met under the shadow of a great loss, in the death of their president, the Earl of Lathom, whom he had hoped to ask again to fill the position for the ensuing year. Under the circumstances, it was agreed to allow the election of president to remain over the present. Mr. P. H. Newman, hon. secretary and treasurer, presented the report and balance-sheet. The meetings of the past season had been very successful, and an interesting and attractive programme of lectures on various branches of the fine arts had been arranged for the coming season. The council had to deplore several serious personal losses to the society during the present year, including their president and two of their colleagues—Lieutenant-Colonel Hartley and Mr. J. Edmeston, F.R.I.B.A., both old members of the society. Mr. Newman was unanimously re-elected hon. secretary and treasurer.

## CHIPS.

The foundation-stone of the Leominster Cottage Hospital was laid on Thursday week. The building is intrusted to Mr. John Watkins, builder, of Leominster, and is being carried out from the plans and under the superintendence of Mr. Ernest G. Davies, M.S.A., architect and surveyor of Hereford.

At the town-hall, Newcastle-on-Tyne, on the 24th inst., an inquiry ordered by the Local Government Board, was held before Mr. W. O. E. Meade King, M.I.C.E., into an application by the council for sanction to borrow £750 for street improvement purposes, and £7,000 for market purposes. Mr. W. G. Laws, the borough surveyor, produced and explained the plans.

A deputation from the Master Builders' Association of Plymouth, Devonport, and Stonehouse, consisting of Messrs. W. G. Laphorn, chairman; John Wakeham, vice-chairman; C. S. Tozer, treasurer; A. N. Coles, Albert Lethbridge, and the secretary, Mr. Gabriel, waited upon the Mayor of Plymouth, Alderman J. Pethick, J.P., and on Monday presented an address congratulating him on his election to the mayoral chair, referring also to the congress of the National Association of Master Builders to be held in Plymouth next year.

The House of Lords heard on Friday an appeal raising the question whether the county council of Kent was liable for portion of the expenses incurred by the highway authority for the district of Sandgate in building a new sea-wall and repairing ravages by the sea to the esplanade beside the main road running from Folkestone to Hythe. A Divisional Court held that the Kent County Council were liable. The Appeal Court reversed that decision, being of opinion that neither the sea-wall nor the esplanade was part of the main road. The House of Lords now gave judgment, restoring the decision of the Divisional Court.

A massive carved oak cabinet has been presented to Sleaford parish church by a local solicitor, as a receptacle for the chained Bibles and Prayer-books, of which that church possesses one of the best collections in the county.

The Lieutenant-Governor of the Isle of Man, Lord Henniker, has opened a new village hall, which has been erected in the thriving village of Onchan, near Douglas. The hall has been built by Mr. W. M'Adam from designs by Mr. M. H. Scott.

A new Roman Catholic church in Maitland-street, Dundee, was opened on Nov. 20. It is built of bull-nosed rubble from Borwingmuirhead, with dressings of red Dumfries stone, and is Early Tudor in style. Mr. T. Martin Cappon, of Dundee, is the architect, and the chief contractors were Mr. William Bennet for masonry, and Mr. T. C. Stocks (both of Dundee) for joinery.

The period allowed by the Parliamentary Standing Orders for the deposit of Private Bills and Provisional Orders intended to be promoted next session, which require to be accompanied by engineering plans and other documents, expired on Wednesday night. At the Private Bill Office there were deposited 363 Bills and Orders, as against 335 last year—an increase of 28.

## WATER SUPPLY AND SANITARY MATTERS.

**THE LONDON WATER SUPPLY.**—At the sitting on Monday of the Royal Commission on this subject, Mr. Reginald E. Middleton, civil engineer, was further examined on behalf of the water companies. He was of opinion that to get water from Wales would be more costly than to obtain an equal supply from the Thames. His estimate of the existing sources of supply—the Thames, the Lea, and wells—was 834,000,000 gallons per day. He had visited the sites of the proposed Welsh supply, and did not think them as good as some other districts. His view was that it was unnecessary to go to Wales for water; that the present sources of supply were more than sufficient for the probable requirements; that thirty years hence would be time enough to determine that question; and that the cost of obtaining a supply from Wales would be much greater than enlarging the present means of supply from existing sources. He suggested that the water drawn from the sources of supply should be managed by an amalgamated or joint board. Future Parliamentary powers should be granted, not to any one company, but to the whole eight companies in such proportions as the board should determine. Mr. Middleton was further examined on Tuesday. He said the Welsh supply scheme would be unprofitable for a very long period. He estimated its cost at five times as much as the Staines scheme. The witness will be cross-examined on behalf of the London County Council next Monday.

**SEWER EXPLOSION OWING TO PETROLEUM VAPOURS.**—The Main Drainage Committee of the London County Council have reported with regard to an explosion which took place a fortnight ago in the filth-hoist over the northern low-level sewer at the Council's Abbey Mills pumping station. The filth-hoist was wrecked, the roof was blown off, and the force of the concussion also broke a large number of plate-glass windows in the main engine-house. A strong smell of paraffin had been noticed during the early morning, and the explosion was, no doubt, due to the ignition of a mixture of petroleum vapour and atmospheric air. It is thought that the petroleum vapour proceeded from refuse from stills used in the process of redistilling petroleum spirit, and the committee find that several other explosions of varying intensity have taken place in the past in the neighbouring districts. Some difficulty is experienced in definitely ascertaining where these inflammable substances are discharged into the sewers; but in view of the great danger to life and property arising from such discharges, the committee consider that notices should be served at once upon all persons carrying on the process of distilling or redistilling petroleum, calling upon them to cease discharging such refuse into the sewers. They also think that intercepting chambers should be constructed on their premises in such a manner as to render the discharges more difficult, and that this matter might with advantage be taken into consideration in connection with the granting of licenses under the Petroleum Acts. They accordingly recommend the Council to make an order under their General Powers Act, 1894, prohibiting the discharge into sewers of dangerous substances where the process of distilling or redistilling petroleum is carried on, and that copies of the order should be served on any persons carrying on the process. The report was adopted by the County Council on Tuesday.

A new workhouse is being erected at Doncaster, and special consideration has been given to the ventilation, which will be carried out on the Boyle system.

A large clock has been erected in Wilshamstead Church, Bedford, by John Smith and Sons, Midland Clock Works, Derby. It has a 5ft. dial, facing eastwards, and strikes the hours.

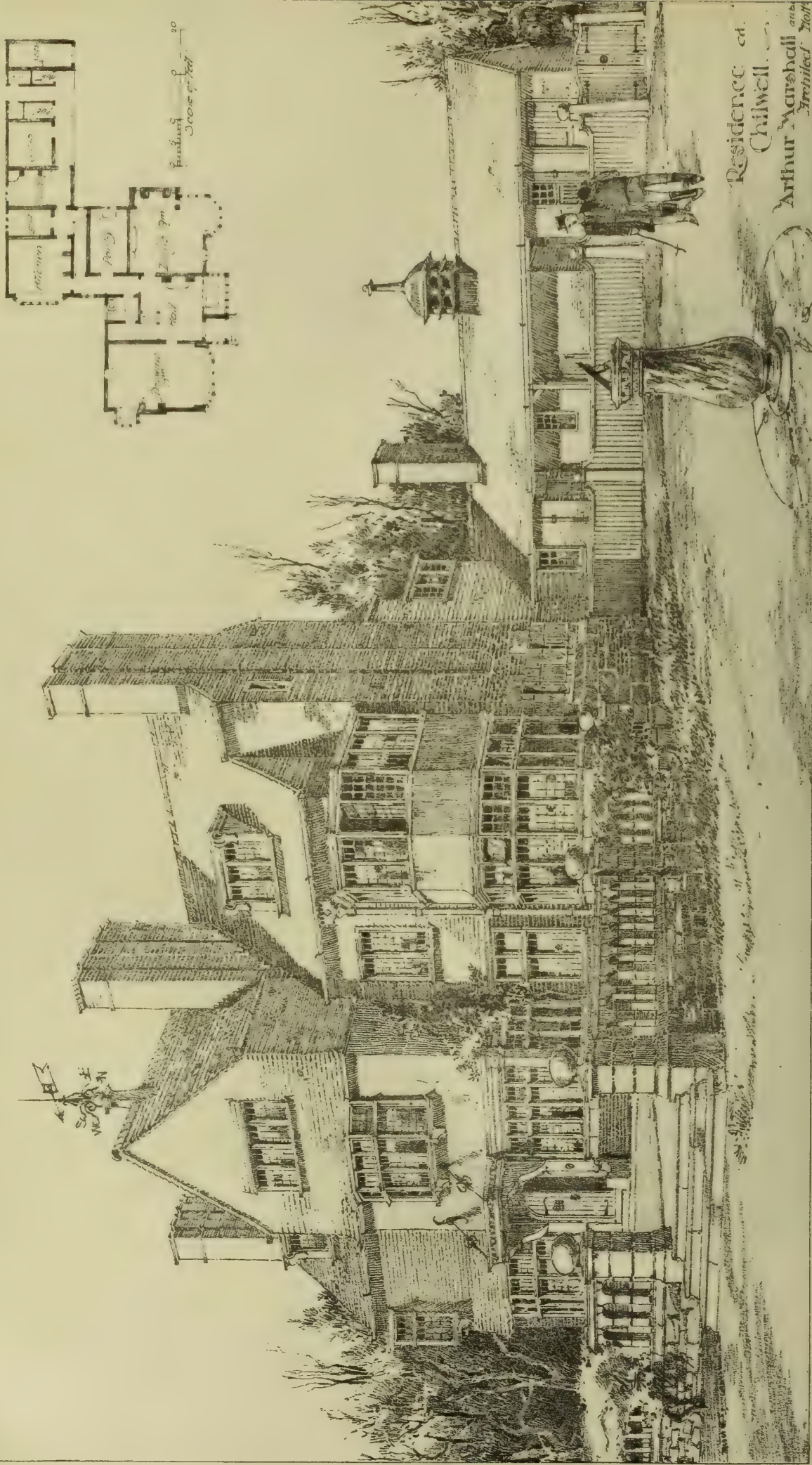
In the Queen's Bench Division on Wednesday, the County of London Improved Dwellings Company were awarded £16,500 damages against Mr. Alfred Cook, a civil engineer, the amount of shares he had underwritten. The defendant contended that circumstances had occurred during the formation of the company which justified him in refusing to carry out his contract. Execution was stayed with a view to an appeal.

On Wednesday week a memorial pulpit, erected as a testimonial to the Rev. George Rundle Prynn, M.A., who has now been the vicar of St. Peter's Parish, Plymouth, for over 50 years, was solemnly dedicated. The architect, alike for the church and pulpit, is Mr. Geo. H. Fellowes Prynn, P.A.A., of 6, Queen Anne's Gate, Westminster, S.W., the son of the vicar. The pulpit is, like the rest of the sacred edifice, designed in the Early English style, the parts being of stone and marble, whilst the upper portion is of hammered metal-work. This metal-work has been carried out by Messrs. Singer and Sons, of Frome, whilst the stone and marble portion has been wrought, and placed *in situ*, by Messrs. Harry Hems and Sons, of Exeter.



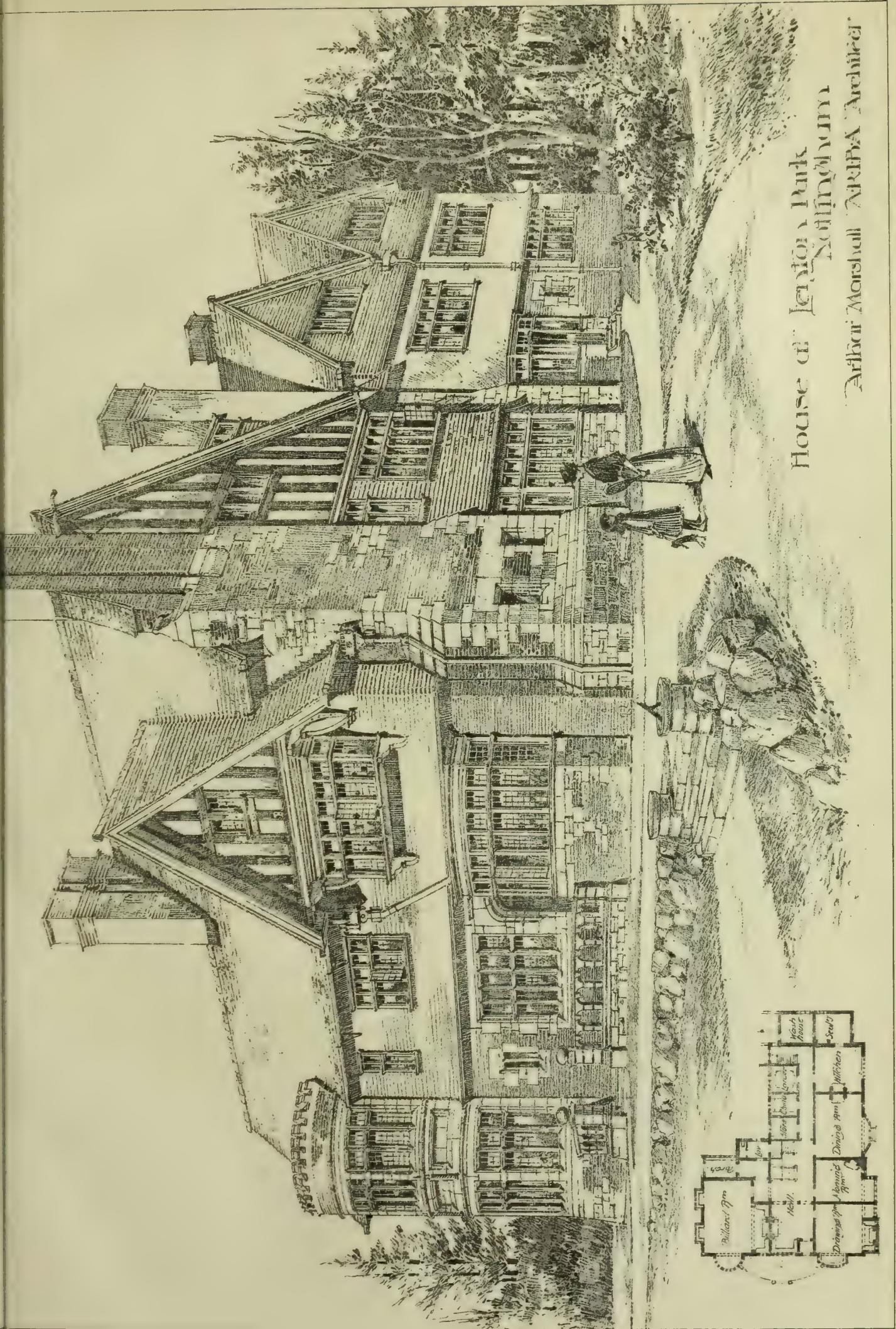




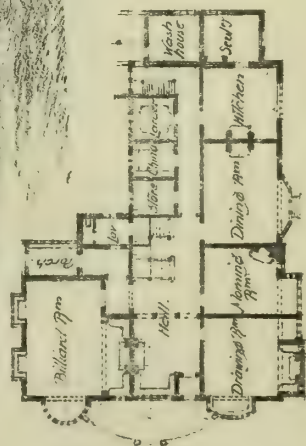


Residence of  
Arthur Marshall at  
Chilwell

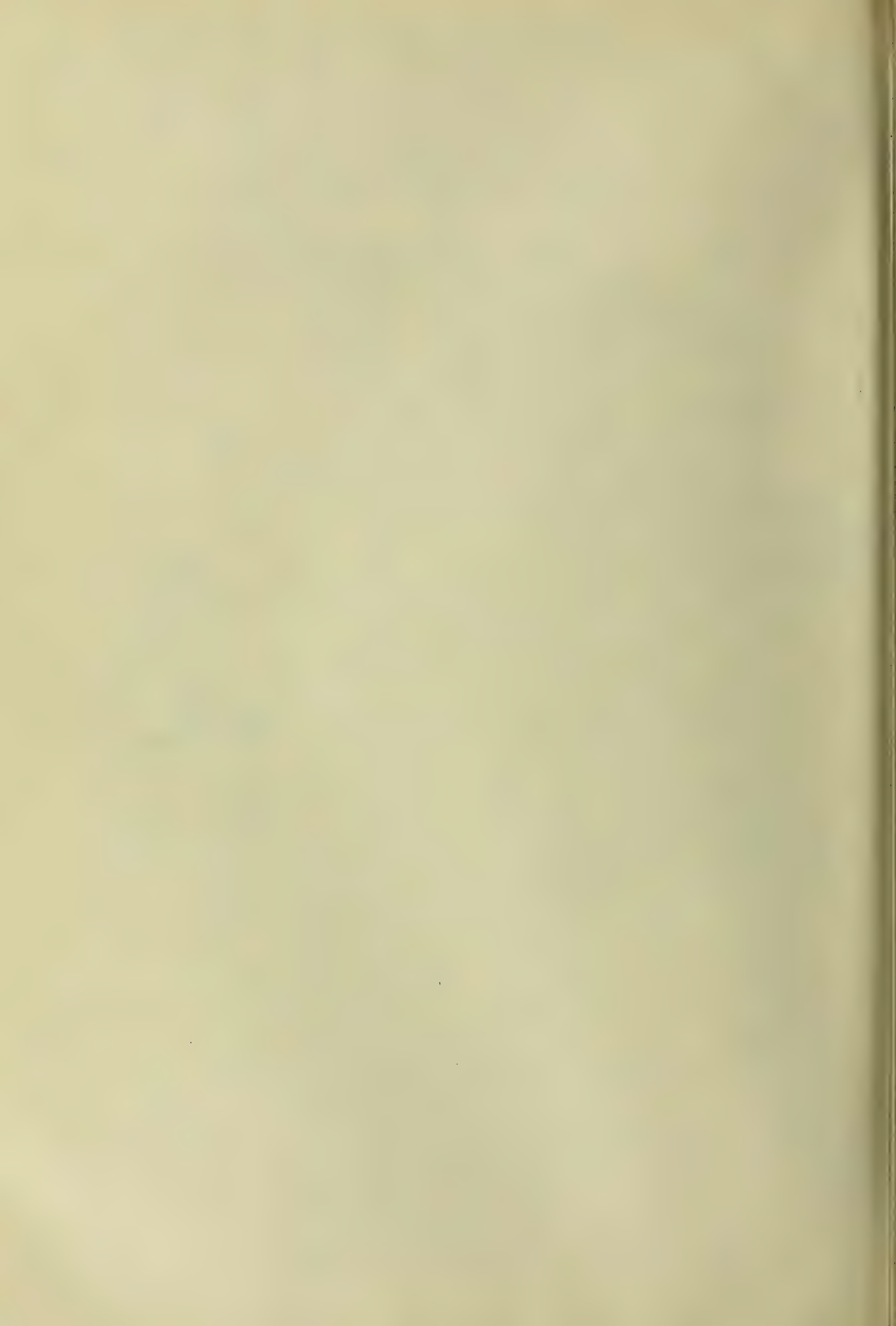




House at London Park  
 Nottingham  
 Arthur Marshall Architect













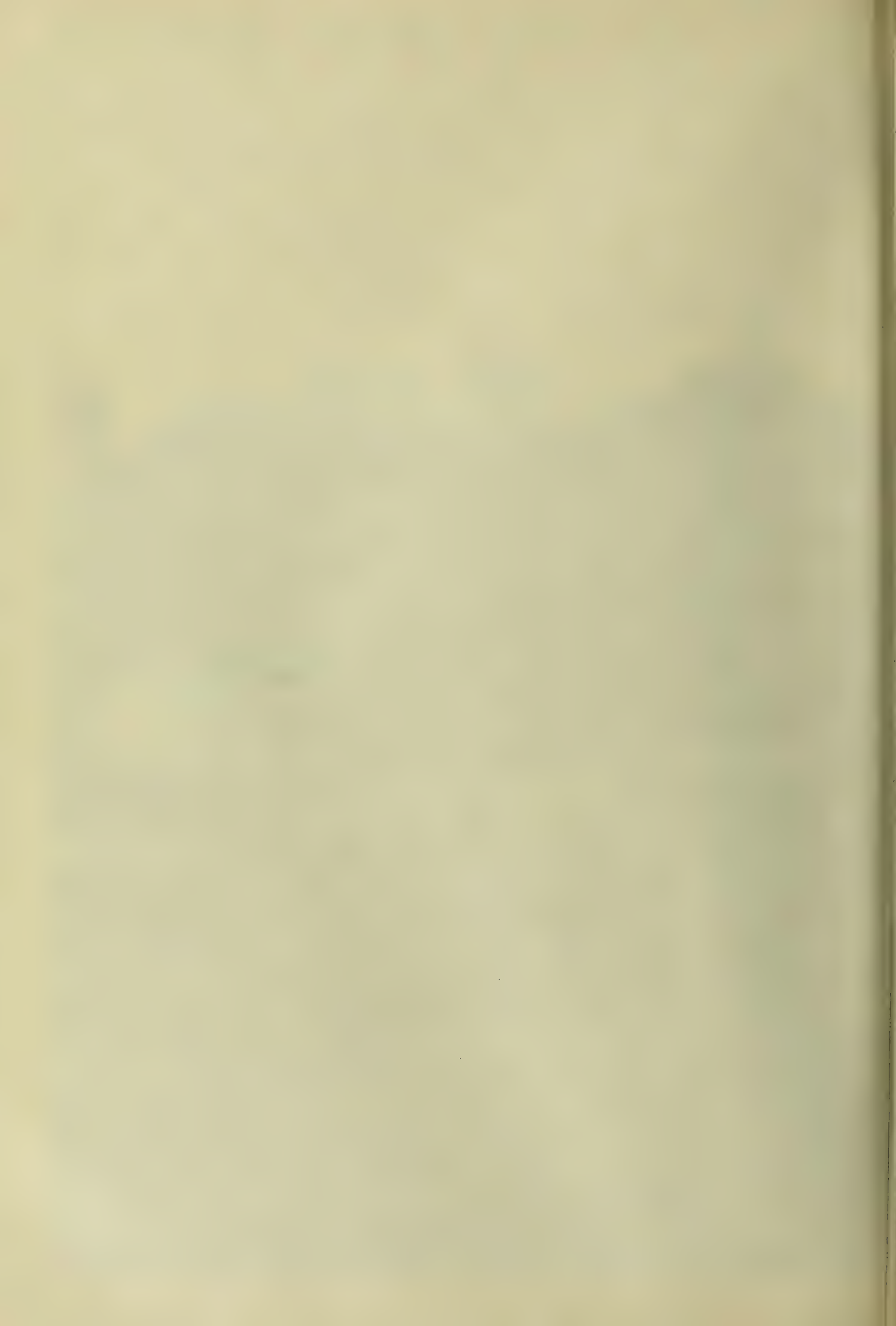
## THE NEW TAVERN · KENNINGTON OVAL

MESS<sup>RS</sup> MUIRHEAD & BALDWIN ARCHT<sup>S</sup>





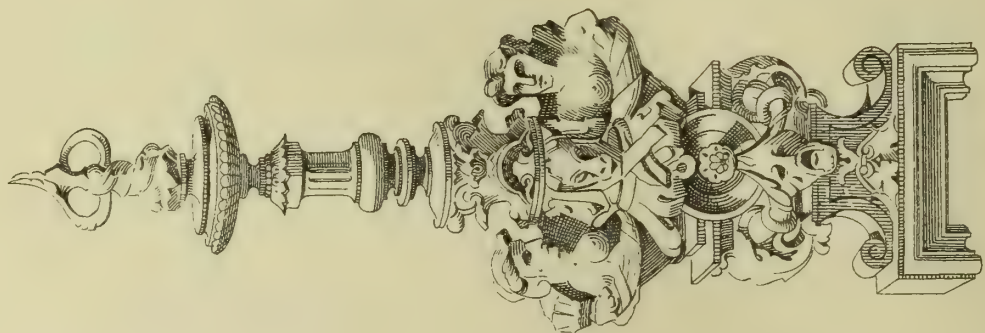








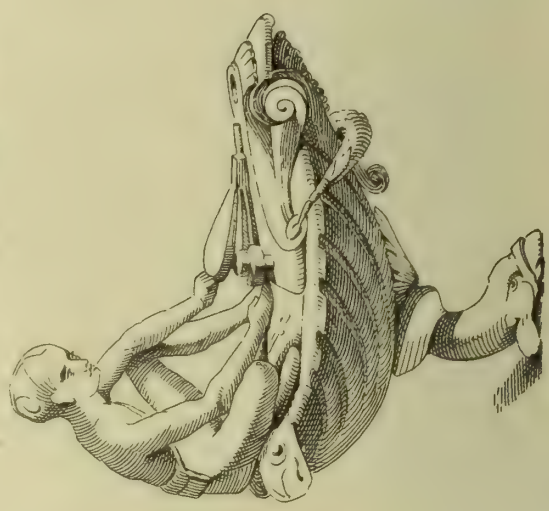




*Protein about 1800  
Fugate River, N. H.  
Modern example of the building is a  
stone vase form. Perhaps too heavy, but  
centre of composition are not very happily introduced*



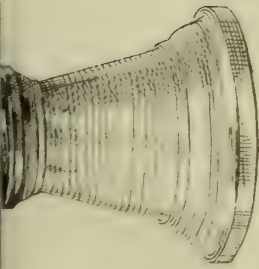
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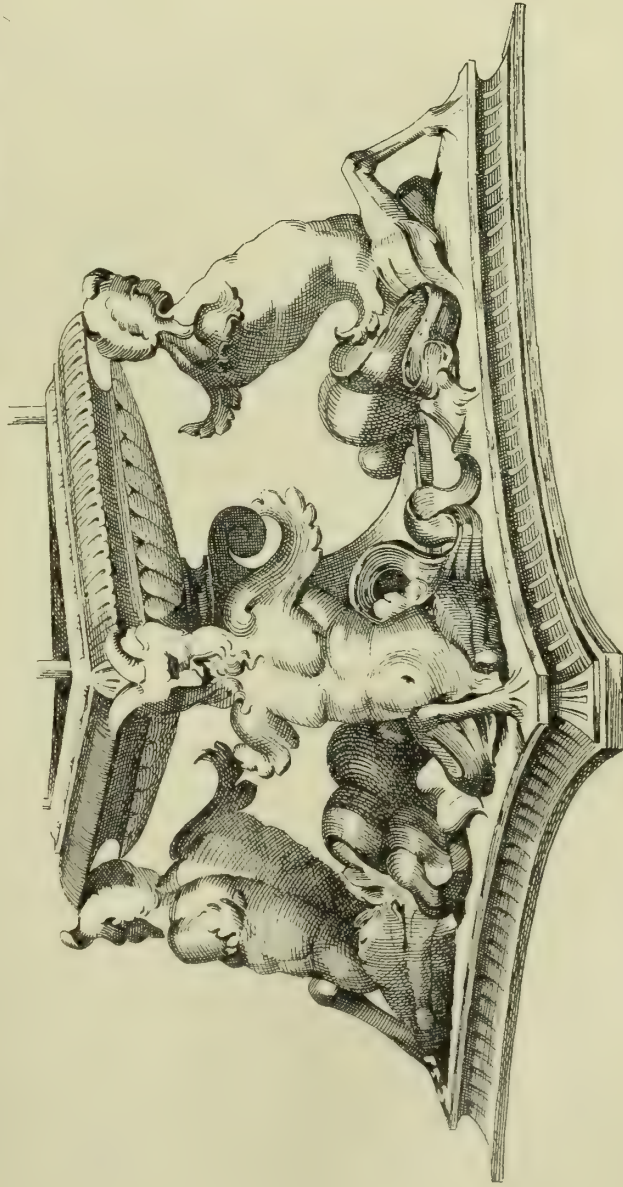


*Antique, 3<sup>rd</sup> centy.  
Some times formed by an eagle head, sometimes a deer.  
A lioness, or a balustrade of classical work. H. 34 to 47.  
Excellent vase, which is probably of the  
antique, made in Asia - others. The same somewhat varied,  
not so frequently occur in collections. This is a good example.*

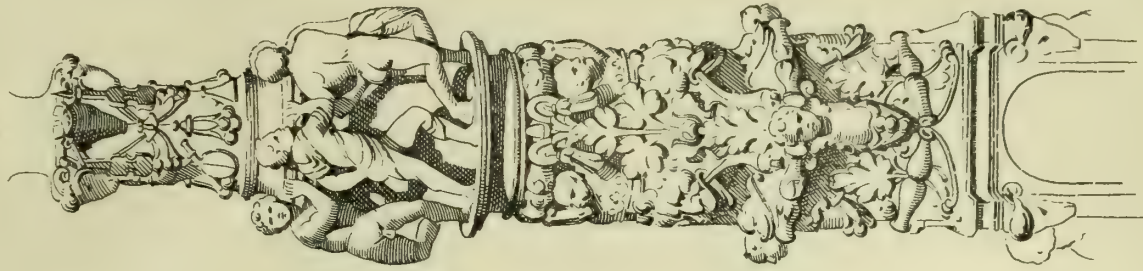


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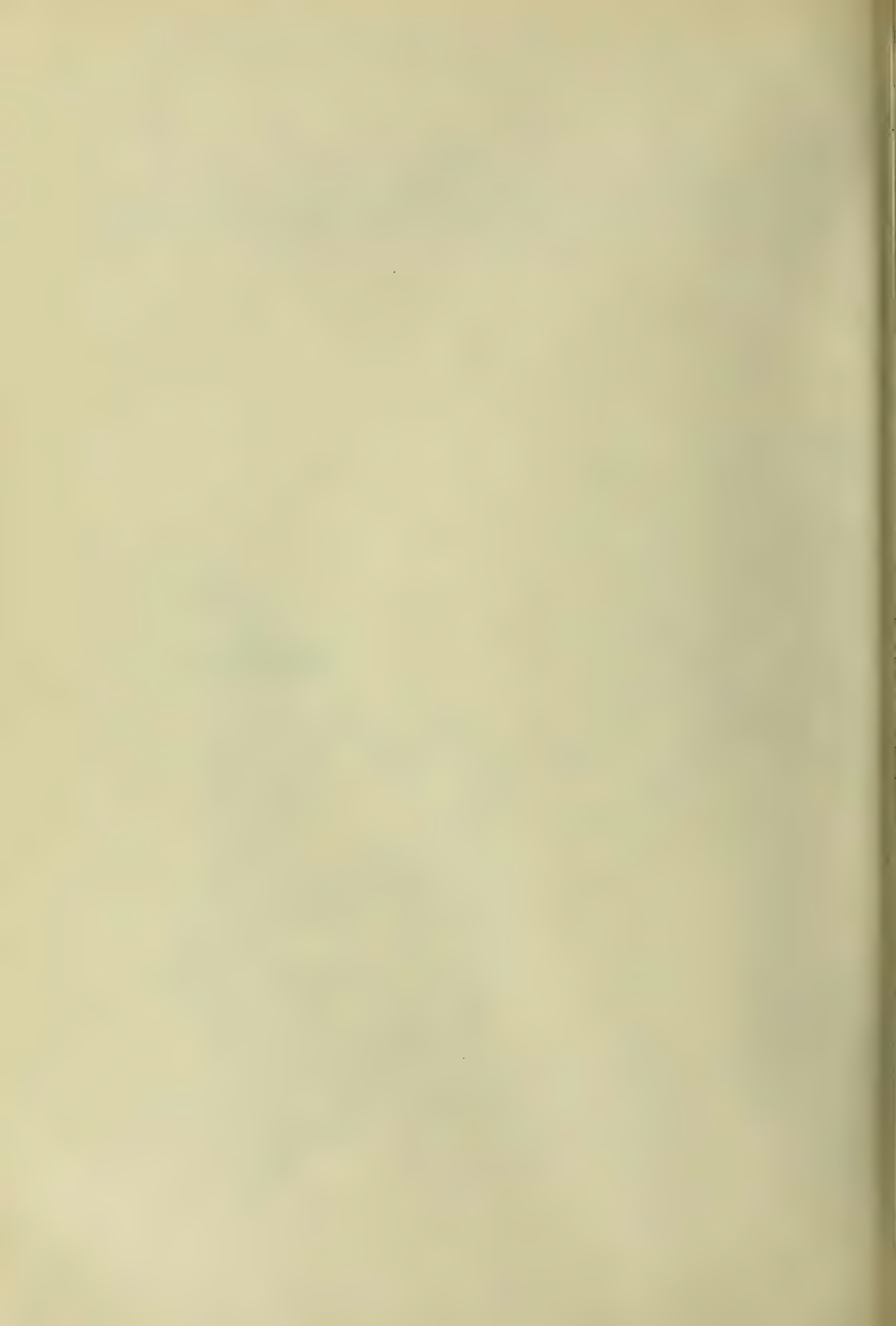


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METROPOLITAN ASYLUMS BOARD · SOUTHERN HO



NORTH ELEVATION



BACK ELEVATION



FRONT ELEVATION

SCALE

THE ADMINISTRATIVE BLOCK

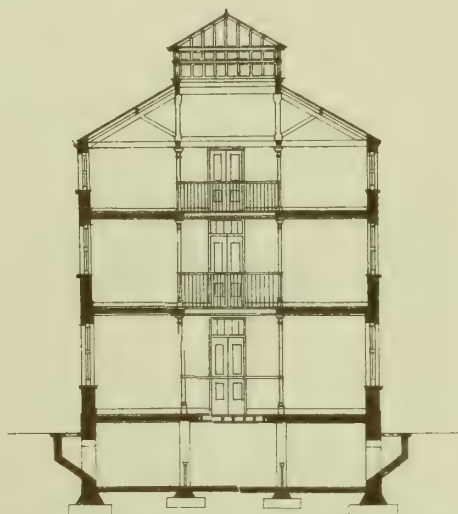


TAL CARSHARLTON

THIRD PREMIATED DESIGN    NEWMAN & NEWMAN ARCHT<sup>S</sup>



— HALF SECTION THROUGH FRONT BLOCK —



— SECTION THROUGH  
GENERAL STORE —



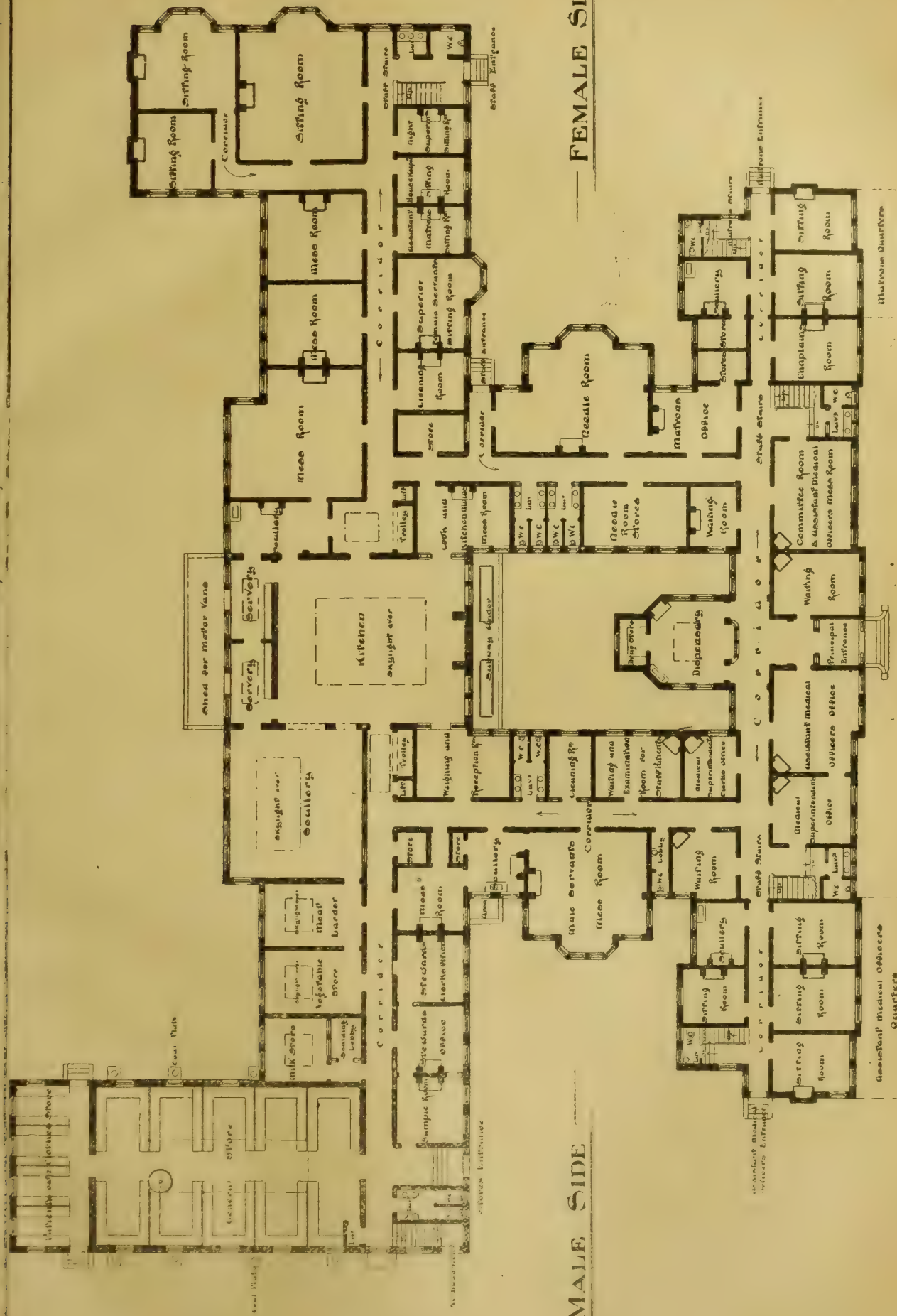
— SECTION THROUGH KITCHEN, DISPENSARY, ETC. —

OF FEET









MALE SIDE

FEMALE SIDE

GROUND FLOOR PLAN

SCALE 1/4" = 1' OF FEET



### TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the BUILDING NEWS, 392, Strand, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

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### NOTICE.

Bound copies of Vol. LXXIV. are now ready, and should be ordered early (price Twelve Shillings each) as only a limited number are done up. A few bound volumes of Vols. XXXIX., XL., XLVI., XLIX., LI., LII., LVIII., LIX., LXI., LXII., LXIII., LXIV., LXV., LXVI., LXVII., LXVIII., LXIX., LXX., LXXI., LXXII., and LXXIII., may still be had, price Twelve Shillings; all the other bound volumes are out of print. Most of the back numbers of former volumes are, however, to be had singly. Subscribers requiring any back numbers to complete volume just ended should order at once, as many of them soon run out of print.

RECEIVED.—B. T. B.—G. H. S.—W. N. and Co.—R. S.—M. H. Co.—F. L. K. (Belfast).—N. P.

### "BUILDING NEWS" DESIGNING CLUB.

#### THIRD LIST OF SUBJECTS.

C.—A Village Grocer's Shop, including a Post-office, with residence attached. On either side of the shop, which may project in the centre not more than 5ft., there are to be two cottages. The general frontage line of the whole block to set back 20ft. from the forecourt-line, the space in front of the shop being left open to the pavement without a boundary wall, which is to be shown to inclose the gardens in front of the cottages. The house forming part of the shop premises to have a living-room 14ft. by 14ft., or of that area; a kitchen, scullery, &c., and four bedrooms, a bath-room, box-room, and linen closet. To the rear of the shop there is to be a store, 20ft. by 15ft., the width of the shop. Each of the four cottages to have a living-room, 14ft. by 12ft., a kitchen, scullery, larder, bath space, w.c., and coal-place. Each dwelling to have its own rear yard, inclosed by walls 5ft. high, 18ft. deep, and the width of the tenement. The cottages to have three bedrooms each. The style of these buildings to be adapted to stone walling and slate-slab roofing. Windows to be metal casements in wooden mullions or frames. Chimneys to be in red brick. The upper-floor walls may be roughcast throughout, or in part. The group must be picturesquely treated in a plain, inexpensive, and country-side way. The end cottages may project if desired. The ground-floor line is 18in. above the pavement. Ground-floor rooms 10ft. pitch, first floor, 9ft. Scale, 8ft. to inch for the elevations and sections. Plans, 16ft. to the inch. A view of the block is essential.

DRAWINGS RECEIVED.—"Philomel," "Swan," "Alexem," "Claude," "Quadrant," "Red Lac," "Notts," "La Poupee," "Casual."

## Correspondence.

### A NEW ECCLESIASTICAL STYLE: A POSSIBILITY.

To the Editor of the BUILDING NEWS.

SIR,—It is no small matter of surprise to those who have not had the actual work of designing a church, that, with all the facilities of modern education, and the comparative ease with which

access can be had to the best examples both in home and foreign architecture, we have as yet developed no fresh style—nothing, in fact, which shall leave its mark upon the architectural history of the 19th century. From a pessimistic point of view this would seem to point to a want of sufficient originality to insure success in creating a fresh style of ecclesiastical architecture. When we say ecclesiastical architecture we rightly embrace the ethics of all good designs. As the history of our own national architecture amply shows—with the decadence of church Gothic after the Perpendicular style, our domestic architecture reached its highest excellence. Since then this has been practically also stationary, and, with the advance in the world of art, science, and letters which the 19th century can proudly claim to have accomplished, the fact remains that we are, in military parlance, "as we were" in any prolonged attempt to create, or more properly develop, a fresh architectural style. True, good men have attempted much; but, from accident or otherwise, the fruit of their endeavours never actually ripened. The late Mr. Sedding, in Holy Trinity Church, Sloane-square, approached very nearly to such in a blending of Renaissance and pure Gothic, that much of this fabric suggests the opening chords, so to speak, of an evolutionary note in church architecture; but it was willed that this accomplished artist should not live to perfect his work. Many other attempts have been made and are daily being made in practically the same direction, but go no further than the indication of what is desired—not its realisation. The tendency of all these efforts, however, is clearly the combination of the Renaissance with the Last Pointed period. Of course, many of these are mere copies in detail, more or less, of fragments of old work; but the prevalent motive is generally good, and augurs hopefully for the day when from apparent chaos a fresh style shall actually arise which shall take its place in the sequent history of English architecture. A few remarks as to some of the causes which have probably delayed the accomplishment of this may not be altogether impertinent.

Nothing which does not appear suitable to the medium in which it is carried out can ever be said to succeed, although in some Flamboyant Continental work an exception has certainly to be made. In this style pillars seemingly too light to carry half the superincumbent weight resting upon them; windows, the frames of which appear as if they would be unable to resist a moderate gale—the whole frequently carried to a height seemingly unsafe—these are the exceptions to what is, nevertheless, a safe precedent to follow—viz., the suitability of the materials for the methods employed in designing the fabric, and this leads to another possible reason, which can be found in the comparatively small use which has been so far made in the judicious adoption of iron in church construction. In domestic architecture, this material has been sadly abused lately. Why? Because its strength has been relied on only—ignoring that it has, in common with all other building materials, its weaknesses also. Its greatest enemy, fire, seems to be the least understood or guarded against. Ironwork is too frequently placed in juxtaposition to wood, and in such a manner as to almost invite accidents, and then it is pointed out how wooden beams have withstood and actually upheld the stone fabric, whilst the stronger material has bent like a willow before a breeze! The examples which deter the use of iron, because of the accidents at buildings like Spurgeon's Tabernacle, should rather point to a lesson as to better construction in the future. Whilst in the case of buildings which have fallen through too great a strain being placed upon the ironwork supports, too much cannot well be said upon the sham construction now too frequently in constant use. A pillar looks as if it were solid stone; whereas it is merely a foil for the honest iron column, upon which actually rests the building above. Why all this secrecy in attempting to conceal the actual construction? A material which can successfully defy the elements alone in the case of so many of our great bridges, is surely worthy of being honestly recognised as worthy of better treatment than being covered with bogus sheets of thin stone; whilst as to the beauty of the material itself, the art of Quintin Matsys alone has instanced what can be done in ornamental ironwork. Imagine a church, its roof supported upon lofty iron columns with foliated capitals,

tall and graceful; such a roof carried by ribs (also of iron); little, even if any, wood need be used in its construction; good outer walls of brick or stone. Such a building would be practically fireproof. The frames of the seats even could be of iron. A church built upon these lines would not only be at once a graceful structure, but the materials lend themselves to some chance of originality in its treatment. Many of our modern churches are plain and uninteresting from the simple reason that cost has precluded the architect from adopting more than the plainest Early English style; whilst when money has been not a main feature, most of our best church architects have been content to follow in the safe but hackneyed lines of the Mediaeval church designers. It must not be thought that an adaptation of the risky constructions, springing up all round us for shops and other buildings, and in which iron plays so important a part, are to be taken as models for suggesting a more liberal use of iron in ecclesiastical work. Heaven forbid this should be so! Only succeeding generations will, it is feared, actually realise the unsuitability of such flimsy buildings; but an honestly constructed fabric, using iron boldly, without attempt at concealment, should be at once graceful as a work of art, useful for the purpose intended, and also inexpensive. Further, would not this form of building, more generally employed, open up the possibility of a development in a fresh style? The immense span roof which could safely be allowed, the practically unrestricted height, suggests ideas for originality of design, hitherto apparently overlooked. We are generally accustomed to connect iron churches with the temporary and more or less unsightly galvanised-tin covered buildings, which appear to only put up to incite a desire of every artist to pull them down as quickly as possible. Let a genuine iron church be built, and it should prove to be a thing of beauty, reflecting alike the ability of its constructor and the artistic taste of the century which produced it. —I am, &c.

CHARLES E. SAVORY.

### CHIPS.

Mr. Meade King, C.E., inspector of the Local Government Board, held an inquiry at the Council Chamber, Darlington, on Friday, in respect of an application to borrow £600 and £1,575, sums required for improvements.

A new street is about to be constructed near Aldgate, connecting Crutched Friars with Fenchurch-street, just north of the London, Tilbury, and Southend Railway Co.'s terminus. The estimated cost of construction is £13,000, and the Corporation has undertaken to form sewers, subways (for cables of all kinds), and vaults beneath it. The new thoroughfare will be 450ft. long, and 40ft. wide. The tenants will have the right of "user" of the vaults. Towards the cost of the new street the owners of the site will contribute £6,000, in addition to giving all the land required.

A new Wesleyan chapel has been built in the Woolpit-road, Elmwell, Suffolk, on the site of an older one. The dimensions are 43ft. 6in., by 25ft., and the doors and seats are of stained deal. Messrs. Edde and Johns, of Ipswich, are the architects, and Messrs. R. Hogg and Son, of Coney Weston, the builders.

The Queen's Theatre, in Meadow-road, South Leeds, which will accommodate 3,500 people, will open on Boxing Night.

The old font at Paignton, long used as a flower-pot in a neighbouring garden, has been restored by Messrs. Harry Hems, of Exeter, and placed on a new base of Devonshire marble, and has now been re-erected in St. Andrew's new church, Paignton, under the direction of the architects, Messrs. Tait and Harvey, of Exeter.

The new water-supply for Bridge of Allan, N.B., was formally inaugurated on Friday by the opening of the new filters at Sunnylaw Farm. The filters, of which there are two, have been in course of construction for the past eight months; they are each 33ft. by 21ft., and are 7ft. deep. Mr. MacLuckie, Stirling, was the engineer of the works, and the contractors were Messrs. A. Headridge and Sons, Causewayhead.

At the parish church of Ipplepen, yesterday (Thursday), the Bishop of Exeter dedicated the 15th-century rood screen, which has been restored at a cost of £500. The work has been carried out by Mr. Herbert Read, of Exeter.

At Romsey, last week, new classrooms, added to the British Schools at a cost of £430, were opened. The buildings are red brickwork, with Portland stone dressings, and provide additional accommodation for 156 children.



# Intercommunication.

## QUESTIONS.

[12112].—**Fumigating-Room.**—I am rebuilding my premises, and should like to know how to get up a fumigating-room for treating oak, &c., joinery by the ammonia process? Any information will oblige.—J. L. D.

[12113].—**Private Drain or Public Sewer.**—According to the definition given in the Public Health Act, 1875, a "drain" means any drain of, and used for, the drainage of one building only, or premises within the same curtilage, and made merely for the purpose of communicating therefrom with a cesspool or other like receptacle for drainage, or with a sewer into which the drainage of two or more buildings or premises occupied by different persons is conveyed. Is it essential that the two or more buildings should belong to two or more different owners, or would it still be a public sewer if it drained two or more buildings belonging to one owner?—AMBERGITY.

[12114].—**"Keen's" or "Keene's" Cement.**—Which spelling is correct? Architects in their specifications give either form indifferently. Laxton's provides the inventor of this cement with a final "e," but many writers omit it.—STICKLER FOR ACCURACY.

[12115].—**Radiators.**—What kind of radiator would do to put into an ordinary house of two floors, and the size of the pipes, hot-water low-pressure, the connections, and what kind of boiler is best to use? Any particulars will oblige.—NOTICE.

## REPLIES.

[12106].—**Waterproofing Tile Roof.**—Perhaps one of the stone preservers might answer your purpose.—L. E.

[12106].—**Waterproofing Tile Roof.**—I should advise "Claypole" to try "Fusate," by giving the tiles a coating of two; or try Szerelmy's stone liquid. The former is made by the Bath Stone Firms, Limited, Bath, and is a waterproofing process. Write for particulars. The Szerelmy stone liquid also waterproofs stone and brick. Apply to Company, Rotherhithe New-road, S.E.—G. H. G.

[12107].—**Measuring the Cube Stone in Window Sills.**—The stone should be measured as being 8in. by 5in. all the way through; no allowance can be made for weathering. Thus, say the sill is 3ft. 6in. long, 8in. by 5in. by 4 1/2 in. = 1,680 cubic inches, at, say 3s. per cubic foot = 2s. 11d.—L. E.

[12109].—**Fire-Resisting Composition.**—You have pointed out the principal dangers. It must, however, be remembered that no building is strictly fireproof, but should be designed to be fire-resisting. I believe the Fire Prevention Committee publish literature on this important subject.—L. E.

[12109].—**Fire-Resisting Construction.**—"A Reader's" surmises are pretty correct. One great point is to divide a large building by party-walls into small portions—the smaller the better; to make every room or store as fireproof as possible by brick walls and fire-resisting floors; to use window frames of metal or glass, like the "Luxfer Prisms," which do not easily break; to cut off all communication by lift or stairway with upper or lower floors by iron doors. Avoid a large storage of combustible materials, if possible, especially inflammable goods. As to the construction, there are several excellent floors, like the "Dennett," the "Fawcett," "Homan and Rodgers," the "Lindsay," and others, which, if properly constructed, will arrest any fire spreading. For particulars, I should recommend "Reader" to apply to the British Fire Prevention Committee for their publications on the subject of fire-prevention. Many useful suggestions will be found, worth the attention of architects and others. In one word, separate or isolate as much as possible.—G. H. G.

[12110].—**Property in Materials.**—If the materials on the ground are the security for advances made, the building owner is certainly entitled to them; if not, the contractor appears to have just claim, or his creditors. As to joinery, the property in them does not pass until it is affixed to the freehold, and, therefore, I think the creditors can sue for such left (see "Tripp v. Armitage").—G. H. G.

[12110].—**Property in Materials.**—All materials on the ground at time of bankruptcy could certainly be charged for.—L. E.

Among the members returned to the first town council for Hove at the elections last week are Mr. Henry Cresswell and Mr. William Hollamby, local builders, and Mr. Edmund John Ockenden, brick-maker.

Sir John T. Brunner, Bart., M.P., has recently presented to Essex Church, Kensington, a very handsome case for the organ. The work has been designed in the style of the 14th-century screen work, and has been carried out in oak left in its natural colour. The organ is placed in the S.E. angle of south aisle, and shows to the church on two sides, which are divided into bays with open and cusped arcading surmounted with a carved cornice. This forms the main stage of the organ-case, all the spaces being filled in with burnished metal speaking pipes. The upper portion above cornice is arranged into gables with traceried panels and corbelled portions carrying a further tier of speaking pipes, and finishing in panelled pinnacles and crockets, the whole forming a pleasing feature to the interior of the church. The work has been designed by Mr. Howard Chatfield Clarke, and has been carried out by the builder of the organ, Mr. Alfred Kirkland, of Upper Holloway, N.

## LEGAL INTELLIGENCE.

THE LONDON BUILDING ACT AND RAILWAY COAL OFFICES.—At the Marylebone Police-court, on Nov. 25, Messrs. J. Elliott and Co., Messrs. J. K. Harrison and Co., and Messrs. Albert Usher and Co., all coal merchants, were summoned at the instance of the London County Council for unlawfully setting up and retaining certain structures, to which Part VII. of the London Building Act applied, without having obtained licenses, as required by that part of the Act. Mr. T. A. D. Chilvers, from the solicitors' department, represented the Council, and Mr. Louis Coward, instructed by Messrs. Cunliffe and Davenport, appeared for the defendants. It was arranged to proceed with the summonses against Messrs. Elliott, the other defendants to abide the result of that case; and Mr. Chilvers, in opening, stated that the defendants about the end of July purchased from Messrs. Humphreys and Co. the necessary materials for constructing a coal merchants' coal office; but as Messrs. Humphreys declined to erect the structure, the defendants early in August engaged a man formerly in Messrs. Humphreys' employ, of the name of Clarke, to put up the structure, and paid him for his services, the structure being set up in the yard of the Great Central Railway Co. at Carlisle-street, Marylebone; but was occupied by the defendants as an order office; and he (Mr. Chilvers) contended that, under these circumstances, the structure required a license from the Council. Witnesses were called, who deposed to the above facts; and, for the defence, Mr. Watkin, the mineral manager to the Great Central Railway Co., and Mr. Elliott, the defendant, were called, and stated that the structure was necessary for carrying on the coal traffic of the railway company, as the company could not get the coal cleared away unless the merchants had such offices. Mr. Coward contended on this evidence that the structure came within the exemption contained in section 86 of the London Building Act, which exempted all structures and erections erected or set up upon the premises of any railway company and used for the purposes of, or in connection with, the traffic of such railway company, and he submitted that these structures were erected for the purpose of developing the company's coal traffic, and unless they could have them that traffic would be crippled. Mr. Chilvers, in reply, submitted that the company's duties ceased as carriers when they delivered the coal at their yard, which then became the property of the coal merchant, and he referred the magistrates to two cases decided at that Court against coal merchants for erecting stables on the premises of railway companies, which the Court held did not come within the exemption. The magistrate, Mr. Curtis Bennett, in giving his decision, said it was not the first time he had occasion to consider the point raised, as he decided one of the cases in reference to the stables; but he thought the present case might be distinguished from these, and that those decisions must not be carried too far; but even on the evidence before him in this case it was clear, to his mind, that the structure was erected by, and for the use of, the coal merchant, and he was of opinion it did not come within the exemption, as contended for by the learned counsel for the defence, and he must decide the case in favour of the London County Council; but he would state a case for the opinion of the High Court if the defendants desired it, and in that case he should allow the Council five guineas costs, but otherwise he thought that two guineas would be sufficient.

AWARD IN NORTH BRIDGE-STREET ARBITRATION, EDINBURGH.—The oversman, Mr. David Dundas, Q.C., has now issued his proposed findings in the reference between the Equitable Loan Company and the Lord Provost, Magistrates, and Council of the City of Edinburgh, as to the claim of £27,600 in respect of compensation for the compulsory taking of the company's premises in Milne-square, and the consequent disturbance of their business. He proposes to award the claimants the sum of £13,880. The arbiters were Mr. J. Smith Clark, S.S.C., for the claimants; and Mr. John Blair, W.S.C., for the corporation.

PROPERTY ARBITRATION AT HULL.—Mr. Luke Hopper, the umpire appointed by the Board of Trade, has commenced at the town-hall, Hull, the hearing of the arbitration cases between the City Corporation and Colonel O. A. J. Grimston and Major W. Grimston in respect of property which the corporation propose to take for the new street scheme from the Monument Bridge to Prospect-street. The property in dispute is situated in two blocks. For Block A, at the corner of Medley-street and Chariot-street, with an area of 567sq. yds., the claimants ask £9,141, and the corporation offer £4,000. For Block B, between Vivien-street and Medley-street, having an area of 1,203sq. yds., the claimants ask £7,939, or minus certain deductions £6,825. The corporation valuation is £2,700.

THE ASSESSMENT OF A MAIN SEWER.—A case of considerable importance to local authorities has been decided at the Monmouthshire Quarter

Sessions, held at Usk, before Sir Henry Jackson and a bench of magistrates. The main sewer, constructed by the Ystradfydwg and Pontypridd Main Sewerage Board, runs through the parish of Rhymney and discharges into the Bristol Channel. The Newport Union Assessment Committee recently brought this portion of the sewer into assessment, and rated it at an assessment of £700 not ratable value. Against this assessment the sewerage board appealed. Counsel for the appellants relied on the judgment given by Lord Herschell in the House of Lords in the appeal of the London County Council on the proper assessment of the West Ham sewer. There were long legal arguments on both sides, but in the end the Court gave judgment for the appellants, and decided that only a very short length of the sewer—owing to its construction—was ratable, assessing that portion at £145 gross and £105 net ratable value, with costs to the appellants. Evidence was given by Mr. G. Humphreys-Davies and Mr. A. L. Ryde for the appellants, and by Mr. Mason and Mr. William Eve for the respondents.

ARBITRATION AT STAINES RESERVOIRS.—At the Surveyors' Institute, Savoy-street, on Friday, before Mr. A. R. Stanning, the case of "Gregory v. the Staines Reservoirs Joint Committee" was continued. Evidence was called on behalf of the defendants. Mr. R. E. Middleton, the joint engineer of the scheme, gave details as to the sites and construction of the aqueduct through the claimant's estate. In his view the works would do no appreciable damage to the property. The covered conduit through the park would be levelled and covered with herbage, and the slight raising of the level would not be apparent. The water would be conveyed across the Colne Brook by means of steel siphons, which would be sunk below the bed of the stream. The open part of the aqueduct would be 15ft. wide, and the top of the concrete would be below the level of the ground throughout the field. The width of land taken was 100ft., but this had been done in case it should be necessary in the future to increase the number of aqueducts to four. They had power to take 100 million gallons a day from the Thames, the Colne, the Wraysbury, and the other streams, so long as there was a flow of 265 million gallons over Bell Weir. They had statutory powers to take the whole waters of the Colne; but there was no intention of doing so, and, indeed, he did not consider this feasible. In cross-examination, witness allowed that, in case there should be any accident with the Thames sluices, they might deplete the Colne; but the contingency was a very remote one. Sir J. Whitaker Ellis, Mr. Edward Tewson, and Mr. E. H. Bousfield gave evidence as to the value of the estate. They agreed that the value of the easement should be £100, one-half the full value of the acre taken; the compensation for disturbance during the construction of the works they fixed at £100; £453 for the 2 1/2 acres of meadow taken for the open aqueduct; and £500 for the general depreciation in the value of the estate. That total of £1,153 they considered an equitable, and even a liberal, compensation for the works. The umpire reserved his award.

CLARKSON AND GROUT.—This case, which was tried before the Lord Chief Justice on Monday, is interesting, as it deals with surveyor's fees and solicitor's costs. The original was an action of ejectment to recover possession of 39 houses held by four different leases. At the hearing the Lord Chief Justice instructed Professor Banister Fletcher to make a report to the Court. This report showed that dilapidations existed to the extent of £198 12s. 3d., and that work had been done since the issue of the writ to the amount of £117 16s. 9d. The case had stood over to enable the defendants to execute repairs according to a schedule to be prepared by Professor Banister Fletcher. The works had now been done, and he had so reported to the Court. The question was, upon what terms the relief should be granted. Defendant's counsel, Mr. Dickens, Q.C., argued against the claim for £107 for surveyor's and solicitor's charges, and contended, if any costs were to be allowed, much less should be. He based the excessiveness of the charges on the fact that Professor Banister Fletcher, who had prepared the schedule, superintended the work, and made reports to the Court, had only charged forty guineas. Mr. De Witt, Q.C., having replied, his Lordship remarked that probably he would not have so much work to do, but that his low charge was much to his credit. In his judgment he allowed £2 2s. a house for surveyor and solicitor, but only the cost of one writ, not four, and, in addition, the defendant to pay Professor Banister Fletcher's fees.

Mr. Thomas, chief sanitary inspector to Bermondsey Vestry, applied to the magistrate at Southwark Police-court on Wednesday for an order to close thirteen houses in a court in Bermondsey New-road, stating that they were uninhabitable. Mr. Slade ordered them to be closed within twenty-eight days. He also ordered the payment of 5s. on each summons, and the same amount to each tenant.



## Our Office Table.

THE General Purposes Committee of the London County Council have not, as was anticipated, reduced the short list of nine selected candidates for the post of superintending architect to three, but the Council will proceed to vote next Tuesday on the whole list; we gave the names of the candidates in our last issue, p. 772. It has transpired that one of those who applied to the selection committee for the appointment of tramways manager, informed the members that if he were chosen he would be prepared and willing to combine with the regulation and management of the trams the duties of architect for the single salary offered for either post, £1,500 a year. It is perhaps needless to add that the name of this hard-working and versatile gentleman did not appear on the short list of those recommended.

THE question of the admission of lady architects to membership will come before the Royal Institute of British Architects at its meeting on Monday evening next, when one of the fourteen nominations for election as Associate recommended by the Council for acceptance is that of Miss Ethel Mary Charles, of York-street Chambers, W. Miss Charles was admitted as a Probationer of the Institute in 1894, and as a student in 1896, and qualified by examination for the Associateship this summer. Some opposition to the opening of the doors of the Institute is threatened, led by Mr. W. Hilton Nash, who, when Miss Charles's nomination was announced at a recent meeting of the Institute, stated that a requisition, signed by seven members, had been sent in to the Council, asking that an opportunity might be given to discuss the desirability of the nomination. Mr. Edward A. Grüning, vice-president, then explained that in 1892 an application was made on behalf of Miss Charles, inquiring as to whether she would be eligible for membership if she duly passed the examinations. The then Council came to the unanimous conclusion that there was no reason whatever why Miss Charles should not be nominated. Since then Miss Charles had done herself the honour to sit for the qualifying examination, and having passed with honours, had now been duly nominated. The present Council had that afternoon considered the nomination and Mr. Hilton Nash's requisition, and had come to the unanimous resolution that they saw no reason to depart from the decision of the Council in 1892, and they had further resolved to support Miss Charles's application in case of opposition to the election. The result of the ballot will be awaited with some interest.

At Tuesday's meeting of the London County Council Mr. John Young, at present manager of the Glasgow Corporation Tramways, was appointed chief officer of Council's tramways at a salary of £1,500 per annum. After a long debate, and the rejection of several amendments, a recommendation of the Housing of the Working Classes Committee, that housing accommodation should be provided for a number of persons equal to that of the working class displaced by any scheme under the Act of 1890, or any improvement Act, was carried. This pledges the Council to the policy of providing housing accommodation for a number of persons equal to that of the working classes displaced by any scheme under the Act of 1890. The proposal that all clearances which necessitate rehousing shall be done at the sole cost of the Council was also sanctioned. A third recommendation—that, apart from rehousing, the Council shall proceed under Part III. of the Act of 1890—remained under discussion at the adjournment. Under Part III. the Council would have power to buy land at the ordinary market value in or near London and erect dwellings thereon for the purpose of increasing the house accommodation of the county.

It is unusual for members of a political gathering to show the slightest symptom of interest in the preservation of ancient buildings or in any matters of art and æsthetics; but the Scottish Union of Conservative Associations has proved an exception to the rule, and at its meeting held in Edinburgh this week passed a resolution directing the attention of the Government to the condition of the old national buildings of Scotland, and asking that some liberal provision be made for their repair and upkeep; and that in cases where restoration can, with propriety, be effected, funds be provided for restoring the same to their original condition. In proposing the

motion, Mr. James Bruce, a writer to the signet practising in Edinburgh, remarked that the care of their old national buildings fell under the care either of the Board of Works or the War Department, and it was satisfactory to find that both Mr. Akers Douglas and Lord Lansdowne had admitted their responsibility in this matter. The resolution proposed to strengthen their hands. In the case of Holyrood Palace, something was being done. When one found a total for the upkeep of English palaces of £57,000, and only £1,500 for Holyrood, they could not help a sigh. With regard to Edinburgh Castle, one was pleased to note the good taste and good keeping of the new buildings. At Linlithgow, things were as they had been. At Stirling, the Royal chapel was still fitted up as a receptacle for military requirements, and stuffed with miscellaneous stores, and the palace had been cut up for barrack room and canteen accommodation, till it was almost beyond recognition.

At the meeting of the Manchester Association of Engineers, held at the Grand Hotel, Manchester, on Saturday, Mr. Edward Wood read a paper on "The Use of Steel in Buildings." Mr. Wood said that, in the opinion of many persons, the English were behind the Americans in the use of steel for buildings. In America, the high buildings were constructed almost entirely of steel, with the walls and floors filled in afterwards. English architects and engineers were now falling into line, and the American system was being largely adopted. The difference in the practice of steel construction between the American and the English system was accounted for to a large extent by the difference in the conditions. The architects in each country were bound by the respective building laws, and whereas what were considered fireproof buildings in England would not very likely be passed in the United States, it was almost certain that the authorities would not allow buildings to be erected in Manchester 20 or 30 stories high—or, as they were called, "skyscrapers." Mr. Wood adduced reasons showing why steel was the best material for use in the constructional parts of warehouses, manufactories, engineering works, and similar buildings; and also described the most recent adaptation of steel as applied by some of the leading architects and engineers of the day.

THE 76th report of the Commissioners of Her Majesty's Woods and Forests just issued as a Blue-book, contains the report of Mr. E. Stafford Howard, the Commissioner in charge of the New and Dean Forests and certain Crown property elsewhere, for the year ended March 31 last. With reference to the New Forest, Mr. Stafford Howard reports that sales of forest produce realised £8,624 16s. 7d., as compared with £7,355 4s. 11d. in 1896-97, and certain surface rents realised £3,073 10s. 8d., as compared with £3,099 11s. 8d. in 1896-97. The Commissioners' attention has been specially drawn to the condition of certain of the old woods in different parts of the forest which are rapidly decaying, and must inevitably perish and disappear in the course of time if no steps are taken to prevent it. The area of these woods is estimated to be about 5,000 acres. Under the New Forest Act of 1877 they cannot be reenclosed or in any way protected with a view to their regeneration. In a few of them, owing to favourable circumstances, natural regeneration is taking place to a large extent. As regards others, there is a partial regeneration, as to the sufficiency of which opinions may perhaps reasonably differ; but there are some whole woods and portions of others as to which there cannot be two opinions, and unless means be adopted to encourage and protect a young growth of trees, these woods must in course of time disappear.

WHEN Professor A. H. Church, F.R.S., resumes work next year upon the wall paintings in the Palace of Westminster he will probably bring into use a new apparatus, which has been constructed to his order, for the better cleansing of these frescoes. The object of this machine is to produce, by means of a manual air compressor, a powerful air-jet, charged with bread-crumbs, which are distributed over the surface of the picture. It was first tried last autumn in the Royal Gallery, where MacIse's paintings are situated, but had to be sent back to the makers in order that certain alterations in its construction might be effected, but even when these were done it did not prove altogether satisfactory. During next summer the professor proposes to cleanse once again the whole of the frescoes in

the House of Lords, as well as the four glazed paintings in the Peers and Commons corridors, the surfaces of which are covered with numerous dark patches, which he believes to be of fungoid growth.

"A SUGGESTED STANDARD FOR DRAIN TESTING" was the subject read before the Royal Scottish Society of Arts at Edinburgh, on Monday, by Mr. Gilbert Thomson, C.E., Glasgow. Since the desirability of having an air-tight system of house-drainage was first recognised, many improvements had, he said, been made both in construction and in methods of testing. At present the standard of construction appeared to be rather above the standard of ordinary testing. The early tests, such as paraffin and peppermint, being only small tests, did not indicate the exact position of any leakage, and had been superseded by the universally-known smoke-test. That test, although very useful, had one serious weakness, in that it gave only a negative proof of soundness; and although it was very common to find it reported that drains had been smoke-tested and found all right, all that could really be said was that nothing was found to be wrong. This was not the same thing, and might be very different. In testing old work it was, perhaps, the best that could be done; but for new work it was desirable to have a positive, and not only a negative, proof of soundness. Two such tests were available, and frequently used—the water-test and the air-test. The latter was the more generally applicable, and might be made a standard to which all drains and pipes put in under building by-laws might be made to conform. So far, it had usually been applied in a rough-and-ready fashion, and even then was much superior to smoke. It could easily be made to give exact numerical results, and the suggestion was that by-laws and specifications should not stipulate in general terms that the work was to be satisfactory, but that it should stand an air-pressure of so many inches of water, and should retain it without perceptible loss for so many minutes. Mr. Thomson exhibited and illustrated an instrument designed to apply such a test.

## MEETINGS FOR THE ENSUING WEEK.

- FRIDAY (TO-NIGHT).—Architectural Association. Discussion Section. "Santa Sophia, Constantinople, and Excursions into Asia Minor," by A. E. Henderson. 7 p.m.
- MONDAY.—Society of Arts. "Acetylene," Cantor Lecture No. 3, by Professor Vivian B. Lewes. 8 p.m.
- Royal Institute of British Architects. "Fireproof Construction in the United States," by E. W. Gibson, of New York. 8 p.m.
- Society of Engineers. "Bacterial Treatment of Sewage," by Geo. Thudicum, F.C.S. 8 p.m.
- Leeds and Yorkshire Architectural Society. "Brickwork Tests," by Max Clarke, A.R.I.B.A. 6.30 p.m.
- Liverpool Architectural Society. "Early Renaissance Sculptors," by W. H. Thorpe. 6 p.m.
- TUESDAY.—Society of Arts. "The Yangtze Basin and the English Sphere," by Archibald Little. 4.30 p.m.
- The Institution of Civil Engineers. Discussion on "The Effect of Subidence due to Coal-Workings upon Bridges and other Structures." 8 p.m.
- WEDNESDAY.—Society of Arts. "Egypt and the Soudan in 1897 and 1898," by W. T. Maud. 8 p.m.
- FRIDAY.—Architectural Association. "The Position of Architecture Among the Arts," by Edwin T. Hall, F.R.I.B.A. 7.30 p.m.
- Royal Institute of British Architects. Annual Dinner at the Grand Hotel, Birmingham. 7.30 p.m.

## THE ARCHITECTURAL ASSOCIATION.

DECEMBER 9th.—ORDINARY MEETING, 9, Conduit-street, W., 7.30 p.m. Mr. EDWIN T. HALL, on "THE POSITION OF ARCHITECTURE AMONG THE ARTS." E. HOWLEY SIMS, G. B. CARVILL } Hon. Secs.

Mr. H. Bicknell, an inspector of the Local Government Board, conducted an inquiry at the town-hall, Leyton, on Friday, into an application by the urban district council for sanction to borrow £4,965 for purposes of public street improvement, and £3,230 for works of private street improvement.

Mr. Christopher Oakley, of Cromlix, Chislehurst, formerly president of the Surveyors' Institution, and of the firm of Daniel Smith, Son, and Oakley, of 10, Waterloo-place, Pall Mall, who died on Oct. 4, aged 32, leaving personal estate valued at £86,707, bequeathed £250 to the Incorporated Auctioneers' Benevolent Fund.



# THE BUILDING NEWS AND ENGINEERING JOURNAL.

VOL. LXXV.—No. 2292.

FRIDAY, DECEMBER 9, 1898.

## THE RIGHT AND WRONG IN BUILDING.

OUR streets and squares proclaim a variety of resource in design. That now worn-out platitude which distinguished our dull architecture as that of "Gower or Baker Streets" only serves to indicate the advances we have made in the design and building of our houses and shops. We can no longer complain of their dullness or gloomy character. Wherever we go we find the once dominating dingy brick front, with its neat pointing and gauged flat arches, is gradually disappearing, or its solid complacency, so characteristic of the 18th-century English character, broken though by the stirring activities of commercial competition. Everywhere we find a restless desire to introduce something new, occasionally very excrement and erratic; not only a variety of material, but a diversity of feature. Foreign importation has not been without its influence in this reaction from dull monotony. We may see what it has done in such important thoroughfares as the Strand and Oxford-street. They are full of experiments in the way of bay-windowed fronts, arcaded and recessed loggias, features borrowed from foreign lands, visions of cities like Bruges, or Ghent, or Amsterdam, or Venice, pleasing breaks in the monotonous line of shop-fronts, though some of them strangely exotic to English usage. Then we have the rivalries of competing trades; effusive displays of metal-work, lead-glazing, mahogany, and electric light—all bewildering manifestations of the aggressive attitude of industrial progress, so great is the change that has come over the aspect of our streets. These changes have not been without their redeeming points. To take the modern shop-front. There is a decided attempt to retrieve the vulgar obtrusiveness of plate glass by making the framework more ornamental, by dividing the glass into smaller panes, by shaping them ornamentally. A further attempt is to recess the window or make it bay-like, so as to introduce outside recesses or lobbies. Much inventiveness has been shown in some of these arrangements of a glass front; though often the attempt is more "clever" than pleasing—bordering on the fantastic or rococo. The effort to do something new has overreached itself; all we get is something eccentric or fidgety. We refer any of our readers to a few new shop exteriors in the Strand to prove this craze. Opposite the Charing Cross Station a new stone buffet has been added to a large well-known hotel. Upright triangular-shaped piers of red granite that point outwards carry thin stone cantilevers at the top, and within these recesses are flat octagonal bays. At the ends are projecting canopied porches of stone corbelled out underneath in a very quaint and awkward manner. Such a buffet front would have been pronounced preposterous a few years ago. Two or three other restaurant fronts in the Strand farther eastward are bold attempts to make arched recesses a feature, and to give variety to the shop front. One has a circular shape, the annular space round the centre door being a quadrant in plan, which is carried all round the doorway with radiating bars. A similar fan or shell-shaped front is also to be seen in Piccadilly. But these are only examples of the "new" architectural craze—half-French, half-American—with which we are threatened. Ingenuity seems taxed to the uttermost to produce a little sensation. Amidst this ple-

thora of caprice or excrescences it is as well that we sometimes look beneath the surface, and give reasons for the faith that is within us.

The remarks made by Mr. Paul Waterhouse at the Architectural Association on what he called "The Morality of the Bay," may be extended to other features as well. At least the same principles of criticism may be found to apply to many other things. With regard to the bay windows, Mr. Waterhouse referred to some of the main objects of their existence: the desire to increase either the size or the amenity of a room; to enable the occupants to look out obliquely; the desire to attract oblique sunshine to a room; or that of pure ambition. All these motives are reasonable and laudable grounds for the existence of a bay window; indeed, if we could bring forward as many reasons for other features, we should not have much to find fault with them. And it is not merely utilitarian grounds that we should consider, important as these are: there is such a motive as appearing to be pleasant, of making our houses look more cheerful and hospitable, both from without and within. These amenities of building deserve as much attention as the more selfish motives of stealing more room, and of enabling the occupants to obtain side glances or oblique views. It is a narrow ground to object to a bay window because it savours of a device to get a few more feet cheaply. Does it not often improve the external appearance and variety of not only villas, but often City frontages? One speaker in the discussion rightly referred to the pleasing and piquant effect given to the villas at Eastbourne, and to the very admirable flat segmental-bayed front in Walbrook—a clubhouse designed by a Liverpool architect. In situations like Eastbourne or Folkestone, the bay window is a feature that could be ill afforded to be given up. Imagine the Radnor Estate without its bay windows or angle-turrets—how extremely depressing! The flat window in our narrow City streets is, after all, a very gloomy feature. Without some optical device, like the "Luxfer prism," it gives little light. As to the question of lighting, the bay-window may give very little, if any, more light, as the real thing is the size of opening, its width and height, whether filled by a flat or a bow window; but there is an appearance of greater light with a bay window, and, as a matter of fact, a projecting window is generally wider than a flat one, so that more light is admitted between the walls.

What was said by Mr. Waterhouse on the multiplicity of bay windows in some towns and "genteel" suburbs is very true. Some roads would have been better without them. The speculative builder has done his worst—or best—by repeating the bay window, with its stop-chamfers and carved foliage, till everyone is heartily sick of them; but the "jerry"-builder always vulgarises a thing, and it is no evidence that the feature itself, if treated properly, is not of value. The remarks on circular or segmental bays are to the point; the value of accentuating the horizontal lines is often unheeded. The old Tudor or Elizabethan bays emphasised the circularity of the window by transoms; the modern version is often without this feature. Then the circular window should have its proper complement of vertical mullions or bars, for we know the disastrous effect produced by a curved lintel or head without support. As Mr. Waterhouse said: "The axiom of all good circular work is that the vertical supports must always be sufficiently close together to prevent the appearance of the horizontal members being unsupported." In fact the frequency of mullions should be directly as the radius of bay: the flatter the bay, the less need of supports. The gabled bay is certainly an undesirable feature, yet it is seen in all our suburbs and seaside resorts. A gable

overhanging a canted bay window is one of those things about which we cannot argue very logically in its favour, and, as the lecturer said, it seems to be an exception to a sound rule. This form leads to other questionable things, like the frequent use of large brackets to carry the square projection of gable, and which brackets cast a shadow on the bay beneath. The rationale of this feature, as of oriels or corbelled bays, is not very often considered; certainly they ought to receive more attention than they do. There are other features equally important about which the rules of propriety may be observed. The gable is one of these; it is used often without any *raison d'être* at all, or in juxtaposition with very disagreeable features. We have often seen it spring out of a flat, unbroken wall. Then we see gables at an angle on two fronts, always an awkward arrangement, to say nothing of what we may term "sample" gables of brick, timber, and plaster. The "corner" in our streets is also by no means a feature that is made the best of. We may see in the City—Broad-street, Moorgate-street—a few ambitious designs, one or two clever treatments; but we often find them in situations that hardly suggest a strong motive, or where other modes would have been better. Again, the circular arch below a corbelled oriel is often found in connection with corners, than which few things are more unpleasing, even in spite of the structural devices of steel joists and other jugglery we can imagine behind. More objectionable, perhaps, is the placing of a bay at the corner of a room, the wall angle having to be carried by an arrangement of iron joists, or by a pillar at the angle in the bay itself; the latter may even be made a feature, but the wall angle externally over the bay is not so easily got over: it remains a source of weakness and clumsiness, which no disguised ingenuity can atone for. Of course, there are ways of getting over the difficulty, of just clearing the line of the bay, and allowing the wall angle to be visibly brought down outside, as by a pier of masonry or by placing the bay on one side. Such anomalies or indiscretions ought to be avoided for the sense of weakness or anxiety they inflict on the eye. The ordinary builder looks upon them as unimportant trifles; but they are points in design which show how the designer has brought thought and art to his task.

## MODEL SPECIFICATIONS.—XLII.

PLASTERER'S WORK: SPECIAL CEMENTS AND PROCESSES.

WE now refer to a few special kinds of plasterer's work. Parian cement is a valuable material for interior walls and ceilings, &c.; so are Keene's, Martin's, and Robinson's. All may be finished on a backing of Portland cement, 1 of cement and 2 of sand. These special cements are manufactured by recalcining plaster of Paris with different substances, and are laid on the backing in a thin coating of about  $\frac{1}{16}$  in. thickness. For skirtings, cornices, mouldings, pilasters, angle-beads, and other finishings, these cements are admirably adapted, and many of them can be brought to a hard polished surface, and ready to receive paint in a few hours.

For cornices, a backing of coarse stuff like Portland cement is generally used; where the projection is several inches, bracketing or cradling is necessary at intervals of 10 in. or 12 in. Upon these, laths are nailed, and "pricked up" with a coat of coarse stuff. Moulds should be of zinc, or of beech, with fine edges. Ornaments or enrichments are made of plaster of Paris, cast in beeswax moulds; heavy enrichments should be secured to the woodwork by screws (see sketches).

We refer in more detail to a few special



cements:—Selenitic plaster, made by adding a small proportion of plaster of Paris to hydraulic lime, is another valuable material, producing a hard surface. For lath-work and setting and trowelled stucco it is recommended. Selenitic clay finish, composed of prepared selenitic lime 1 bushel, selenitic clay 3 bushels, and of fine washed sand 2 bushels, with 1 hod of chalk-lime putty, is said to produce a mixture that, if hand-floated and well-trowelled, will equal, as a surface, Parian or Keene's cement; it is well adapted for hospital-walls and school-walls, non-absorbent, and easily washed. (See circular of patentees.)

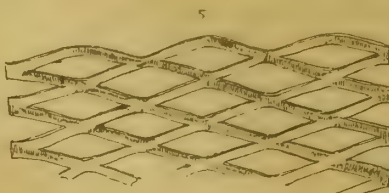
Robinson's fireproof cement and "Paragon" plasters are produced from alabaster or gypsum; they are easy to work, set as hard as granite, and present a smooth, finished surface. We refer the reader to the firm's instructions for the execution of work with this cement. The firm's model specification under head of "Materials" states: "The sand used to be clean, sharp river or pit sand, free from earthy matter or other impurities, &c. As a substitute for sand, Portland stone dust, or other stone dust with rough or irregular grains may be used. It is to be noted that there are few deposits of sand so pure as to render preliminary cleansing or washing unnecessary. No. 1 quality of cement to be used for finishing, No. 2 quality for rendering or for foundations and scratching coat." According to the directions, the cement and sand are to be mixed together dry, in small quantities in the gauging-box, and to be run through a  $\frac{1}{2}$  in. riddle, and as little water added as will form a paste. They are to be at once applied to walls or other surfaces, as quickly as possible with little manipulation. The floating should be dashed on and floated off the rule only, avoiding the use of hand float. The materials are to be mixed as follows by measure. "The floating, or first coat, on walls in the proportion of three of sand and one of cement. The rendering or first coat on wire netting or laths to ceiling or partitions, one of sand to three of cement; the floating coat on laths, one of sand to two of cement. The finishing or setting coat to be the best cement (No. 1 quality)." The water to average  $9\frac{1}{2}$  gallons to 1 cwt. of material. Other directions are given for gauging; the laths to be nailed  $\frac{1}{2}$  in. apart, and cleft laths are recommended, and galvanised nails, or the heads of ordinary ones, painted or steeped in oil.

Other materials demand the attention of the architect in specifying particular or special work. Instead of wood laths, metal lathing is much used in buildings, especially when protection against fire is considered. The "expanded metal" or fireproof lathing is one of the best kinds. It is manufactured out of mild steel plates of 24 B.W.G., with  $\frac{3}{8}$  in. mesh, 24 gauge, and forms a capital key for the plaster, and can be bent round brackets or coves, can be cut and attached by nails, wire, or clips to the wood joists, studs, or brackets. The sheets are made 6 ft. by 2 ft., 7 ft. by 2 ft., and 8 ft. by 2 ft. 3 in. Any plaster can be used. It should be mixed stiff, and the plaster can be "gauged" with plaster of Paris or Portland cement, and mixed with hair. The Expanded Metal Co., Ltd., supply directions and instructions for its use, and recommend a "lime plaster composed of 1 part of well-burned and fresh-slaked lime to 1 or 2 parts of clean sharp pit or fresh-water sand, with which 1 lb. of dry, long, and well-beaten bullock's hair to every 30 ft. of plaster may be incorporated. This mixture may be 'gauged' to accelerate setting." The plaster is applied as a "render, float, and setting" coat, the three coats being about  $\frac{3}{8}$  in. in thickness; the finishing coat may be of fine lime putty. A plaster of Portland cement, sand, and hair is also recommended in damp places. As a fireproof material, "expanded metal" has been ex-



clusively used for protecting ceilings, beams, and girders, and several modes of applying the metal are shown in the Company's treatise, to which we shall refer. Flat fireproof ceilings can be suspended from arched floors; and the "expanded metal" can also be applied to interior details and decorations, as we shall show.

The "Jhilmil" patent metal lathing of Hayward Brothers and Eckstein is another application of metal superseding wood lathing; the sheet is slightly corrugated,



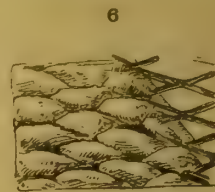
with slits alternately forming a "key" for the plaster, and can be bent to any shape. It has been largely used in many public buildings and theatres.

The Roebling fireproof system, so largely in use in America, offers excellent means of protecting iron floors. The arched system, with flat ceiling, is a useful type. The arches between I beams consist of steel rib woven or a "wire cloth," bent to the shape; the woven-in steel rods spring between the beams on lower flange, and stiffen the cloth. On this wire centring Portland-cement concrete is deposited, and allowed to harden. The upper surface of concrete arches level with top of beams can be prepared with sleepers for wood flooring. The ceiling of the Roebling Standard wire lathing crossed by woven-in steel ribs is supported by rods, supported on lower beam flanges by a patent clamp, and going beneath them. In the centre of arches are suspending iron rods. The plaster ceiling is formed to this lathing. Another arrangement is flat, without arches. 2 in. by 3-16 in. flat bars, 16 in. apart, rest on and clip the upper flanges of beams, and support a slab of  $3\frac{1}{2}$  in. concrete for flooring; vertical suspending bars from the former support similar flat bars, crossing below beams  $\frac{3}{8}$  in. by 3-16 in., upon which the wire lathing is strained for the plaster ceiling; and the

beams are also incased, and the whole iron framework is imbedded in concrete.

For ornamental ceilings, cornices and coves, &c., fibrous plaster, carton-pierre, or papier-mâché made of paper pulp forced into moulds, and fixed *in situ* as slabs or sections to the joists or wood cradling and fixed by screws, are largely employed for ornamental purposes.

The sketches we give show four kinds of bracketed cornices; the last (4) is a cove formed on built-up ribs 2 in. thick, placed



about 12 in. apart, and lathed to receive the plaster. It is necessary to avoid considerable projection of plaster on any part. The mouldings should be kept as flat as possible, not exceeding  $1\frac{1}{2}$  to 2 in. thickness of plaster. Any mouldings projecting beyond should be bracketed out. Sketches 5 and 6 illustrate the expanded metal lathing—the first shows the ordinary No. 1 mesh of  $\frac{3}{8}$  in. for ceilings; the latter shows the expanded metal plastered on one side and the excellent "key" the mesh gives. Partitions are made 2 in. in thickness, in which is imbedded the metal lathing. We shall refer to other applications of its use.

11. *Gauged Plaster.*—The gauged plaster to be composed of 3 parts sand, 1 part lime, and 1 lb. of hair to a bushel of lime mixed with 1 part of plaster of Paris (or Portland cement), and the setting coat to be 1 part lime putty to 1 part plaster of Paris; or the gauged plaster to be composed of 2 parts sand, 1 part lime, 1 lb. of hair to a bushel of lime, and 1 part of plaster of Paris. The settings to be of pure lime putty, or to be finished in Keene's fine marble cement, highly polished. (Specify "single" or "double" laths).
12. *Plaster Roof.*—Lath with single laths and plaster one coat to the slate or tile battens between the rafters.
13. *Concrete Floors.*—Hack over all concrete soffits to floors to form key for cement or plaster, and render, float, and set in plaster all these surfaces; or the concrete surface to be hacked over, and the



render, float, and set in "gauged" stuff the same (or to be finished in Parian or Keene's cement).

14. *Pugging to Floors.*—Pug the floors with 2in. (or 3in.) layer of chopped hay, lime, and sand (or coarse stuff) on ½in. rough boarding between joists laid upon lin. by 1½in. fillets spiked to joists; or pug the floors with a layer of silicate cotton or McNeil's slag-wool placed between joists on ½in. boarding (or tacked as directed over the joists).

15. *Cornices to Upper Rooms.*—Run plaster cornices to all rooms on the second and third floor, 10in. girth on rough plaster backings.

16. *First-Floor Cornices.*—Run moulded cornices, of 1 part pure lime to 1 of plaster of Paris, according to details, to rooms on the first floor, 12in. (or 18in) girth on deal brackets and plaster backing. Or—

*Plain Cornices.*—Run moulded cornices to rooms on second-floor 8in. (or 10in.) girth on rough plaster backing. Or—

Run fine plaster cornices, 6in. (or 9in.) girth in rooms on second floor, and of 12in. to 18in. girth in first floor, main corridors, with enrichment as shown, 4in. girth.

17. *Enriched Cornices.*—Run enriched plaster cornices 12in. (or 18in.) girth to dining-room, drawing-room, and library, according to details to be supplied, on 1½in. or 2in. deal brackets and fillets and lath and half-laths, with two plaster enrichments (an egg-and-tongue or leaf) ornament on the lower part, and a guilloche enrichment (or scroll) to design in the flat band round ceiling. Or—

*Staircase Hall, Coved Cornice, and Ribbed Ceiling.*—The staircase hall ceiling to have a coved cornice (see design) in gauged plaster or Robinson's cement, the cove to be formed on brackets built up in pieces, as shown, with two sets of mouldings, a cornice with enrichment round wall, and a set of mouldings with ornamental band on ceiling. The ceiling to have moulded ribs in gauged plaster 4in. (or 6in.) girth, according to detail, to mitre into margin band, and the intersections and mitres to be accurately and neatly made.

18. *Coved Cornice.*—Form a plaster cove 18in. or 24in. girth, as shown in detail to ceiling of dining and billiard-rooms on deal brackets filleted and lath with lath-and-half. Plaster, float and set, and run two sets of plaster mouldings for enrichments 12in. and 8in. girth respectively. The enrichments to be cast to design supplied by the architect.

19. *Cornices in Robinson's Cement.*—The cornices of reception-rooms to be 10in., 12in., and 18in. girth to profiles, and to be run in Robinson's cement, No. 1 quality. The moulds to be cut out of zinc or galvanised iron. Laths, ½in. apart, to be nailed to brackets with galvanised nails. The brackets to be plugged to wall 12in. apart. Or—

20. *Metal Lath and Plaster.*—The cornices to be formed on cradles or brackets and covered with ½in. mesh of the Expanded Metal Co.'s metal lathing. "Prick up" the same with 1 part of fresh-slaked lime to 1 part of clean, sharp sand, mixed with well-beaten long bullock's hair. The floating coat to be 1 of lime and 2 of sand, and the setting coat to be of fine lime, putty "gauged" (or Keene's or Robinson's cement).

21. *Expanded Metal and Plaster Ceiling.*—The ceilings to ground and first floors constructed of iron or steel joists and concrete to have flat suspended ceilings, constructed on the Expanded Metal Co.'s system, in sheets of 8ft. by 2ft. 3in., with ½in. or ¾in. mesh, placed lengthwise across the underside of beams, secured to ceiling bars, 2ft. or 3ft. apart, fixed by clips to flanges of joists, as shown in detail (or according to the instructions of the Company). The underside of metal sheets to be pricked up, floated, and set. The lime plaster to be composed of 1 part of well-burned fresh lime to 2 of clean, sharp pit sand, mixed with bullock's hair. Or—

The iron and concrete floors to have approved metal lathing of ½in. mesh, the sheets placed all one way, slightly lapped at ends, and secured to flat bars, ½in. by ¾in., 16in. apart, passing underneath lower flanges of beams. The plastering to be of three coats, the first composed of 1 part of well-burned and fresh-slaked lime to 1 (or 2 parts) of clean, sharp sand, mixed with long bullock's hair, and worked stiff. The setting coat to be "gauged" (or as directed). The whole thickness of ceiling to be about ½in. Specify if ceiling is to be polished, whitewashed, or distempered.

22. *Metal Lathed Ceiling.*—The ceilings to be formed of 7ft. by 2ft. (or 8ft. by 2ft. 3in.) sheets of No. 1 ½in. mesh expanded metal placed one way, nailed to wooden joists with galvanised staples 1½in. long (or, if to iron joists, by steel clips). The ends of sheets to be overlapped. Prick up the lathing with 1 part fresh lime to 1 (or 2) part

of clean, sharp pit sand, mixed with long hair, floated and finished according to directions.

23. *"Jhilmil" Fireproof Ceilings.*—The ceilings to be formed of Hayward Brothers and Eckstein's "Jhilmil" metal lathing in sheets of 6ft. by 2ft. (or 6ft. by 1ft. 6in.), properly lapped and nailed to joists with galvanised nails, and to be plastered with Robinson's fireproof cement, "B" Paragon quality, finished according to instructions of patentees.

24. *Fibrous Plaster Ceiling.*—The ceilings and partitions to be formed of Frederick Jones and Co.'s fibrous plaster slabs, wire-lined, fixed to proper backings, or according to manufacturers' directions.

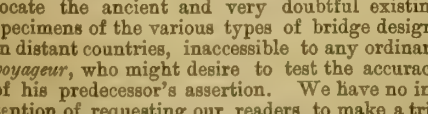
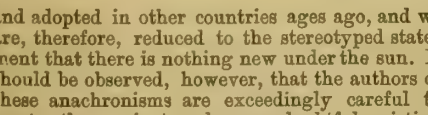
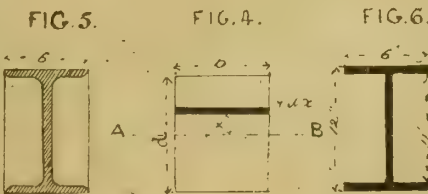
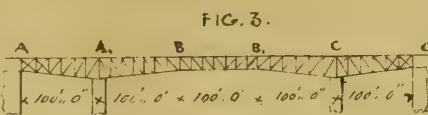
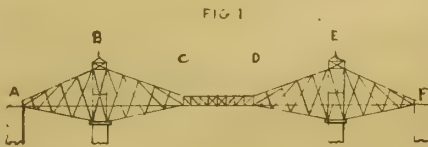
25. *Metal Lathing Partition.*—Construct the partitions on top floors of fireproof lathing, rendered, floated, and set in plaster or cement, to be 2in. thickness when finished; or the partitions to be constructed of sheets of ½in. mesh approved metal lathing, plastered, floated, and set with granite silicon plaster 2in. thickness, according to instructions supplied. Or—

The partitions to be solid, of expanded metal lathing interwoven with wire studs or uprights, and imbedded in cement. Or—

Lath partitions with Hayward Brothers and Eckstein's "Jhilmil" metal lathing in sheets of 6ft. by 2ft., properly lapped and nailed to studs with galvanised iron nails; the same to be plastered, floated, and set according to instructions.

#### THE CANTILEVER BRIDGE: ITS DESIGN AND CONSTRUCTION.—V.

IT has been remarked of the cantilever system, in the same manner as it has been stated of the application of every constructive principle to practical purposes, that it has been recognised



and adopted in other countries ages ago, and we are, therefore, reduced to the stereotyped statement that there is nothing new under the sun. It should be observed, however, that the authors of these anachronisms are exceedingly careful to locate the ancient and very doubtful existing specimens of the various types of bridge designs in distant countries, inaccessible to any ordinary voyager, who might desire to test the accuracy of his predecessor's assertion. We have no intention of requesting our readers to make a trip to far Cathay, to the land of the Rising Sun, or to the dominions of the Grand Llama, to verify the truth of these travellers' tales, although a cantilever bridge of some 150ft. span is, with some reason, supposed to have been erected in Thibet. Coming nearer to our own times, it would appear from an old work relating to bridges, republished a year ago, that the introduction of the cantilever principle was due to a miscalculation of an unknown distance. It is an old idea, that of throwing out cantilever arms from the opposite banks of a river or stream as far as they could reach, and then bridging

the intervening space between them by an independent girder, as shown by C—D in Fig. 2. It is, however, claimed that, in the first attempt, the two projecting arms were intended to meet each other, and that when it was found they failed to accomplish this result, the bridging-over of the hiatus between the two free ends of the cantilever arms was a secondary thought altogether. It should be borne in mind that there is no improbability in this idea, and it is quite possible that the same building-out method might have been adopted in the case of a pair of semi-arches, as is frequently done at the present time. When they failed to meet at the centre of the span, it was impossible to introduce a central independent girder, and the cantilever principle in its entirety, as embodied in a bridge of that type, was evidently inapplicable to a pair of opposite half-arches which failed to cover the intended span.

In addition to the couple of types of distinctly different designs for cantilever bridges described and illustrated in Article IV., there is a third represented in the accompanying Fig. 1, which is, in fact, a combination of the two preceding examples. It is imperative that the cantilever arms BC and DE, whatever may be their particular form and dimensions, must have a certain minimum depth at the points of support over the piers. According to the manner in which these arms are arranged with respect to the level of the horizontal roadway, shown by the line AF in Fig. 1, so will the structure be a deck or a through bridge. If the cantilever arm be wholly, for its full depth, below the level of the roadway, as in the first type, the design will be that of a deck bridge. On the other hand, when the arms are wholly above the same level, as in our second example, a through bridge is the result, as is also the case with the third design in our present article. An obvious advantage is gained when the combined type—so to term it—can be adopted, as it allows of the height of the towers to be reduced, which are very expensive items in both cantilever and suspension bridges. A reference to the drawings will at once indicate that the height of the towers is least in the deck structure, greatest in the through, and occupies an intermediate position in the third or combined type. For the sake of uniformity, and with a proper regard for appearance, the level of the central independent girder is adapted to harmonise with that of the roadway. But there is no real necessity for this adjustment, because in all the three designs selected, the central girder might be placed either above or below the level of the datum line referred to. Under this arrangement, the cantilever arms might form the deck portion of the bridge and the central girder the through part, or vice-versa, as the position of the independent girder might determine. There are a few more points of difference between our three examples to which attention must be directed, as they exercise some influence upon the character and value of the stresses to which the various members of the structure are subjected. It may be mentioned here that the combined type in Fig. 1 is that of the existing Forth Bridge, the *chef-d'œuvre par excellence* of engineering and building construction in this or any other country. It is obvious that when the cantilever arms are raised above the level of the roadway, and attached to towers, the whole structure assumes to some extent the appearance of a suspension bridge. If we regard the truss in a suspension bridge as partly supported by the ordinary cable and partly by diagonally-inclined stays or tie-rods, which last could not be extended in bridges of large dimensions to the centre of the span, we arrive, by dispensing with the cable and retaining the stays, at the design shown in Fig. 1. This includes all the characteristic features of the modern cantilever principle, although it has been already stated that, under certain conditions, the towers and raking stays are not necessary.

It is barely twenty years ago since one of the first cantilever bridges on a very moderate scale was erected over the river Mississippi, and in 1884 another was put up on the Canadian Pacific Railway. At this period the proper economical proportions for the anchor and cantilever arms, as well as for the central independent girder, had not been so fully investigated as they are at the present time. This will be at once apparent by referring to Fig. 3, which represents a skeleton elevation of this early type of cantilever trusses. It should be noticed that the spans of the anchor arms, of the cantilever arms, and of the central girder



truss are all equal, each measuring 100ft. in length, an equality of dimensions which no longer prevails in designs of this type of construction. The same disproportion is also apparent with respect to the respective maximum and minimum depths of the anchorage and cantilever arms. Both of these parts of the whole bridge have a common maximum depth over the A and C, and as well an equal minimum depth at each abutment A and C, and at the points of contrary flexure B and B<sub>1</sub>, where the attachment is made between the cantilever arms and the central independent girder. As already explained, this connection may be accomplished by means of a slot, a hinge, or a pivot, or, from a purely theoretical point of view, by simple juxtaposition in one chord or the other. Practical considerations, however, forbid this last-mentioned incomplete mode of adjustment. In the example in Fig. 3, since the anchor and the cantilever arms are of equal length and weight for a uniformly distributed dead load, they would exactly balance each other over their joint centre of support at the piers A and C. But this simple equality between the two arms is destroyed by the additional load thrown upon the cantilever arms A<sub>1</sub> B and C B<sub>1</sub>, due to the weight and loading of each half of the central girder B B<sub>1</sub>, and therefore it becomes necessary to anchor down the terminal trusses at A and C, their final supports, by rods, chains, or other sections of iron or steel suitable for resisting tensile stresses. Although in open-web girders and trusses a much greater latitude is allowed for the proportion of span to depth than in the plate or solid-sided system, yet there is a limit to the depth of the former class of structures which must not be exceeded. In our present example the depth of the central—or as it is sometimes termed not very appropriately—the suspended girder is 16ft., which is rather excessive. Very nearly the same depth is allotted to the ends of the anchor spans at A and C, while the maximum depth of the two anchor arms over the supports at B and E is equal to one-fourth of their lengths or a little over 25ft. It will be seen, when we proceed to the description and analysis of more modern and up-to-date examples of the cantilever bridge, that these large ratios are no longer adhered to.

In all calculations respecting every type of bridge construction, especially those relating to their deflection, there are two theoretical assumptions made, which are absolutely necessary, but practically never exist. In other words, there is a gulf between theory and practice which cannot be bridged over—a very appreciable discrepancy which neither science nor experience can eliminate, though it should be stated that the disagreement is by no means equal in all structures. These two assumptions are that (1) the cross-section is constant throughout the whole of the span, and that (2) the moment of inertia is also uniform. The nearest approach to the accurate fulfilment of these two conditions takes place in the solid-arched rib system, and there are no doubt some instances in which the depth of the arch and the cross-section at the crown are constant and uniform throughout the whole span. The pure suspension bridge or the arch inverted is not far from thus reconciling the dictates of theory and practice, though the different lengths of the vertical suspension rods, from a maximum at the towers, are reduced frequently very nearly to zero at the centre of the span. The bowstring bridge, when under a uniform load, also closely assimilates in this *rapprochement*, for the cross-sectional area of the bow and the string are nearly uniform; but as the depth varies from the centre to the ends, the weight of the bracing varies in like proportion. Of the two assumptions alluded to, the second is really a corollary or consequence of the first; but as this point is one that is often a little puzzling to the student and professional beginner, it will be as well to give a little more attention to the details of the connection between them. With reference to the cross-section of a simple rectangular beam, or of any other piece of construction, its moment of inertia depends not so much upon the actual area of that section as upon the form or shape of it, that is, upon the manner in which the material is disposed about the neutral axis.

Let us take the case of a rectangular solid beam shown in Fig. 4, and determine its moment of inertia about its neutral axis. Put  $b$  and  $d$  to represent the breadth and depth of the beam respectively, and the line AB its neutral axis. To commence with, suppose a very thin or in-

finitely small layer, shown by the strong black line in the figure, situated at a distance  $x$  from the neutral axis of the beam, and having, therefore, a thickness equal to  $dx$ . Now the moment of inertia, so far as it applies to the strength and resistance of beams and girders of any form or design, is the sum of the area of all the thin layers into which the whole area of the beam may be supposed to be divided, multiplied by the squares of their several distances from the neutral axis. The area of the small layer in Fig. 4 is evidently equal to  $b \times dx$ , and representing the moment of inertia by MI, we have—

$$MI = b \times dx \times x^2 \dots\dots\dots(1)$$

In a similar manner the calculation might be repeated for any number of indefinitely small areas; but though moments of inertia can be ascertained by the graphical process, they are much more readily obtained by a very simple application of the integral calculus. Since the moment of inertia of any particular section at a distance  $x$  from the neutral axis is given in equation (1), it is obvious that the moment of all the thin layers will be obtained by the summation or integration of that equation, which gives for the value of it—

$$MI = \int b \times dx \times x^2 \dots\dots\dots(2)$$

which expression may be written—

$$MI = b \int_{-\frac{d}{2}}^{\frac{d}{2}} x^2 dx \dots\dots\dots(3)$$

from which we obtain by simple integration—

$$MI = \frac{b x^3}{3}$$

Taking  $x = \frac{d}{2}$  for one-half of the beam, the equation becomes for it—

$$MI = \frac{b \times d^3}{24} \dots\dots\dots(4)$$

and, consequently, we have for the whole beam—

$$MI = \frac{b \times d^3}{12} \dots\dots\dots(5)$$

and when the beam is square in cross-section

$$MI = \frac{d^4}{12} \dots\dots\dots(6)$$

An inspection of formula (5) will point out that it may be written—

$$MI = \frac{bd \times d^2}{12} \dots\dots\dots(7)$$

but  $bd$  = the area of the cross-section of the beam, and putting it equal to  $A$ , the moment of inertia is also correctly given by the equation—

$$MI = \frac{A \times d^2}{12} \dots\dots\dots(8)$$

This last expression proves, mathematically, the truth of our previous statement—that the value of the moment of inertia does not depend so much upon the actual amount of area in the cross-section of any beam, as upon its form. It is obvious, therefore, from both (7) and (8), that while the MI increases only in direct proportion to the area of the section, it augments in the ratio of the square of its depth. One or two practical examples will render this point quite clear, for it is one of importance. Commencing by a beam 6in. square, and as comparison is our object, formula (8) should be employed.

Our data are  $A = 36$ , and  $d = 6$ , so that we have—

$$MI = \frac{36 \times 36}{12} = 108 \dots\dots\dots(9)$$

Secondly, while keeping the area constant, make  $b = 3$  and  $d = 12$ in., and the value of the moment of inertia becomes—

$$MI_1 = \frac{36 \times 144}{12} = 432 \dots\dots\dots(10)$$

a result which might be obtained by simple inspection, according to the rule laid down, in which

$$MI_1 : MI :: 144 : 36 \dots\dots\dots(11)$$

that is as four to one. An exactly proportional decrease in the value of the moment of inertia will take place if the dimension of  $d$  be reduced, notwithstanding that the value of  $b$  is augmented so as still to preserve the area uniform. For instance, if we make—to take an extreme case— $d = 1$  and  $b = 36$ , we shall find the respective moments of inertia of the square beam, and of this example in the proportion of 1 to 36, or as 3 to 108. When it is borne in mind that the strength and resistance of beams is a direct function of their moment of inertia, one is

tempted to draw the apparently logical conclusion, that the deeper they were made, the stronger they would be. Theoretically, this reasoning might, perhaps, hold; but practical considerations and the exigencies of both design and construction have long ago demonstrated its fallacy. Apart from all purely theoretical or scientific principles whatever, a certain proportion or relationship of dimensions, whether lineal, square, or cubical, must be observed between the different parts and members of all structures. In many instances, the latitude allowed is wide; but there are certain maxima and minima proportions assigned by practice and experience which cannot be departed from with impunity.

As the flanged form of girder has, in architectural and engineering structures on any scale of magnitude, greatly superseded the solid beam, it will be advisable to select an example of the more modern type, and show the application to it of the formula already determined for the beam. It is clear that an ordinary flanged girder or rolled joist, such as is shown in Fig. 5, may be regarded, at any rate, with sufficient accuracy for the present purpose, as a solid beam with the two parts left white in the figure removed, and reduced for calculation to the square-cut shape in Fig. 6. Putting  $b$  for the breadth of the flanges  $b$  for that of the web, and  $A$  for its area,  $d$  for the depth from out to out or over all, and  $d_1$  for the depth inside the flanges, we obtain by a combination of equations (5) and (8)—

$$MI = \frac{b(d^2 - d_1^2) + A \times d_1^2}{12} \dots\dots\dots(12)$$

Let the value of the symbols in the section under calculation be as follows:  $b = 6$ in.,  $d_1 = \frac{1}{2}$ in.,  $d = 12$ in.,  $d_1 = 11$ in., and thus  $A$  will equal  $6\frac{1}{2}$ sq.in. Substituting these values in formula (12) it becomes—

$$MI = \frac{6(1,728 - 1,331) + 5.5 \times 121}{12} = 253.5 \dots\dots\dots(13)$$

Or, we may reason in the following manner:—The moment of inertia of the rolled joist is evidently equal to the moment of inertia of the solid beam, minus the moment of inertia of the two parts removed from each side of the web. We have from equation (5) then the following value—

$$MI = \frac{(72 \times 144 - 60.5 \times 121)}{12} = 253.95 \dots\dots\dots(14)$$

a result practically identical with that obtained by the other process in (13). There are two or three more examples of cantilever bridges to be investigated, and also two questions to be inquired into, one in which the anchor and the cantilever spans are supported at one point that is immediately over the centre of the pier, and the other where their joint bearing is continuous over the whole width of the pier, or intermediate support. In the great Forth Bridge the width of the pier is 145ft., and this subject of continuity of bearing and the reverse have an important influence upon the stresses in the members of the adjoining spans. T. C.

#### SMYRNA MANSIONS.

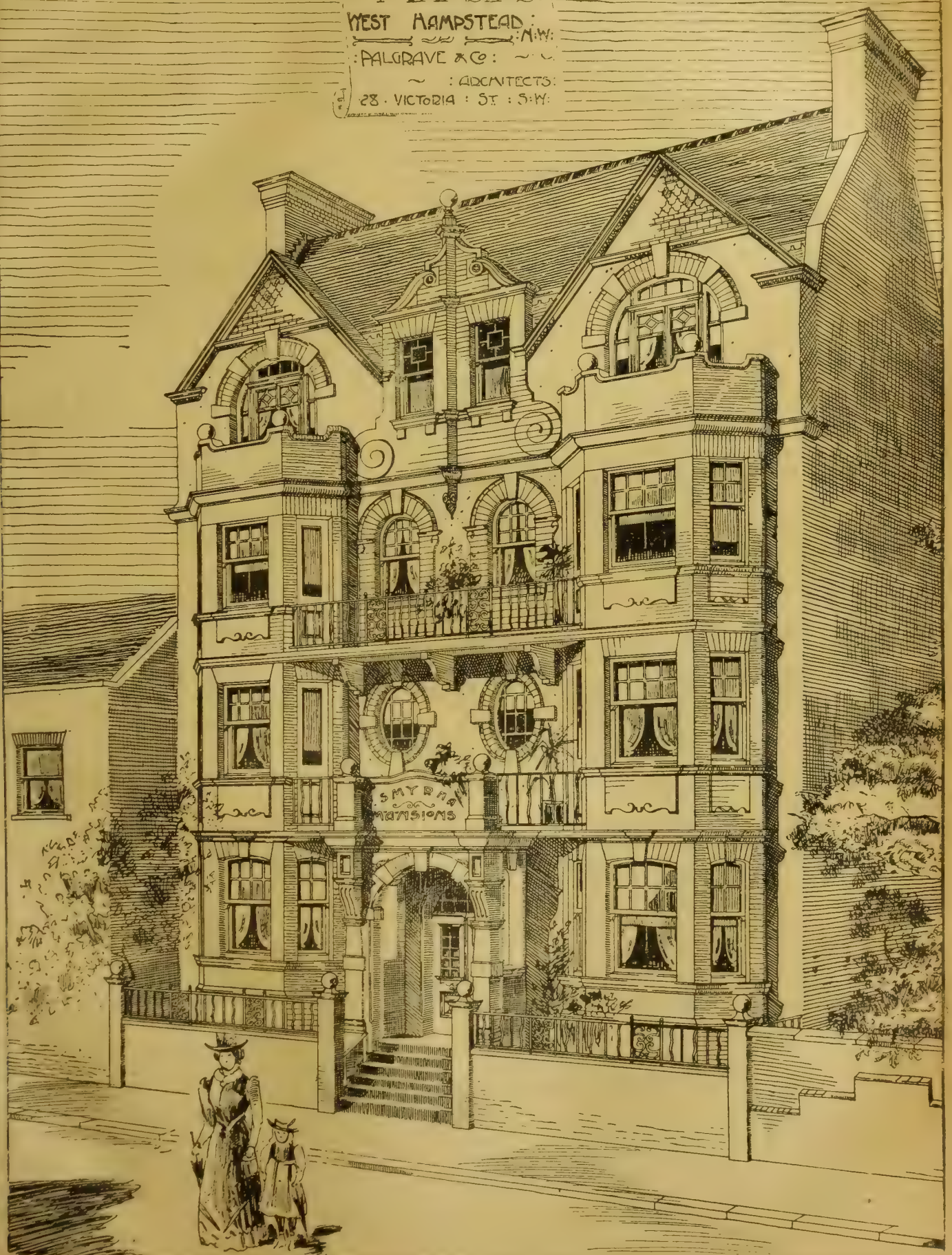
THIS building is now in course of erection in Smyrna-road, West Hampstead, N.W., and is arranged for self-contained residential flats which are fitted with the latest sanitary and domestic improvements. The front will be carried out with red bricks and Bath stone dressings. Messrs. James Smith and Sons, of Norwood, are the contractors, and Messrs. Palgrave and Co., Victoria-street, S.W., are the architects for the work.

The Weston Underwood estate, which is noted for its association with the poet Cowper, who lived at the lodge for several years, was sold by auction at the Mart, Tokenhouse-yard, on Monday, for £40,500. This property is situated two miles from Olney, and embraces nearly the whole parish of Weston Underwood, having a total area of 1,554 acres and a rent roll of £1,900 per annum.

We are pleased to hear, on the authority of Alderman Charles Burt, Mayor of Richmond, that the dispute between the Thames Conservancy and the trustees of the Dysart estates at Richmond and Ham, in regard to the riverside lands, has been brought to a conclusion. An agreement has been entered into under which these lands will remain uninclosed for all time from the existing fences. This secures to the public a strip several miles in length, extending from River-lane, at the foot of Richmond Hill, to the further side of Teddington Lock.



SMYRNA  
 MANSIONS  
 WEST HAMPSHIRE  
 PALGRAVE & CO.  
 ARCHITECTS  
 28, VICTORIA ST. S.W.





# ROYAL INSTITUTE OF BRITISH ARCHITECTS.

## TRIUMPH OF THE LADY ARCHITECT.

THERE was a record attendance of members at the business meeting of the Royal Institute of British Architects on Monday evening, the attraction being the consideration of the question as to whether or no lady architects should be admitted to membership, arising from the fact that among the fourteen candidates nominated and to be balloted upon for the rank of Associate, after having passed the qualifying examination, the name occurred of Miss Ethel Mary Charles, of York-street Chambers, W., and who had been proposed by Messrs. Ernest George, J. M. Brydon, and Alexander Graham. The President, Professor Aitchison, R.A., occupied the chair, and an animated discussion, often interspersed by outbursts of laughter, took place. The representatives of the Press were excluded from the meeting; but after arguments *pro* and *con*. lasting some three-quarters of an hour, a ballot was taken, when the numbers appeared: For the election of Miss Charles, 51; against, 16—a decision received with a long and hearty outburst of applause. The other candidates, all of whom were elected, were: as Fellows (4), Robert Lockhart McCowat, of Johannesburg; William White Cooper, M.A., of Grahamstown, Cape Colony; Henry Thomas Hare (Associate), 13, Hart-street, Bloomsbury-square; and William Henry Duffield (Associate), 34, Queen-street, E.C. As Associates (14), including Miss Charles: John Cecil Baines, Princes-street, Westminster; Christopher William Surrey, Blackfriars-road, S.E.; Albert Herbert, Leicester; Louis Moore, Southampton; Percival Cherry Blow, St. Alban's; James Stockdale Harrison, Leicester; Arthur Reatlinger Gough, Bristol; Charles Riddey, Wellingborough; Victor Evans Bøesher, St. Leonard's-on-Sea; Robert Walter Carden, Craven-street, W.C.; Arthur William Vercoe, Lee, S.E.; Alexander Cowie, Norfolk-street, Strand; and Gerald McMichael, Birmingham. As Hon. Associate: Sir Alexander R. Binnie, engineer to the London County Council.

A general meeting was then held, when a full and valuable paper on

## "FIREPROOF CONSTRUCTIONS OF BUILDINGS IN THE UNITED STATES,"

contributed by Mr. R. W. Gibson, now of New York, and formerly of London, was read in the author's absence by Mr. H. D. SEARLES-WOOD. In his introductory remarks Mr. Gibson gave a brief but lucid sketch of the development of fireproof construction in the United States, showing that the first efforts had been disappointing through lack of perception of the difference between incombustible materials and fireproof materials. The exposed iron systems had failed signally, collapsing to the heat of burning fittings, furniture, and stored goods. The modern system had developed from these experiences upon an ancient pattern of floors composed of wooden beams buried in masonry, using steel and iron instead of wood, and perfecting and systematising fireproof protection. The latest phase was the entire elimination of the combustible materials hitherto used for doors, floors, architraves, &c.; the selection of materials, fire-resisting as well as incombustible, and the use of these to protect others which must not be used unless so protected. Materials most available were steel or iron for strain-bearing purposes, and brick or terracotta and plaster to clothe and protect the metal. Masonry materials required careful selection, some granites and marbles being liable to destruction at the earliest blasts of a severe fire. Fireproofing must be such that, when the fire occurs, it will not be washed off by the heavy torrents of water thrown upon it by the modern fire-engine. Of the several classes of fireproofing accumulated experience pointed to the infinite superiority of

## FIRE-RESISTING TERRACOTTA,

which had always performed the duty required of it. Probably 95 per cent. of existing fireproof work was of terracotta construction. The structural ironwork might be divided into three classes, suited to as many types of fireproof buildings. First, the building of ten stories or less, erected by the old methods of supporting walls and superimposed columns carrying floors and roof, and with only small beams and girders or occasional independent trusses. Secondly, the building of more than ten stories, which accumu-

lated such strains upon its walls that they must be reinforced by posts to carry the girder loads, by slabs of terracotta, secured with hooks and bars and wiring, and usually getting their outer form by means of metal lath upon light iron bracketing to receive the finished plastering. The lower portion of walls and columns are frequently finished with marble slabs 1 in. thick, or with tiling. Those methods are preferable which place the fireproofing material close to the metal and preserve numerous and frequently broken air spaces in their own substances.

## HORIZONTAL STABILITY SUPPLIED BY RIGID RIVETING

of all connections of posts one upon the other, and of girders to posts, and beams to girders, and by the addition of bracing in ties and struts and gusset brackets, thus developing the so-called cage construction, wherein the steel receives and transmits all loads to the foundations; and the walls have become mere panels, not only without vertical loads, but without transverse bracing strains. Thirdly, an intermediate type of building where all the internal structure and all the floor loads were supported upon columns, some being placed in the outside walls, the outside walls being made of self-supporting thicknesses in cases where architectural treatment demanded sufficient mass for the purpose, and where the foundation presented no difficulty. In buildings of the third type, erected in many stories and let for business purposes, almost perfect fireproof qualities had been achieved. In such buildings there was no danger to life from fire, or of the fire spreading from the room where it first occurred. This type had become systematised by custom and experience, so that its structure was uniform throughout the country. The floor loads are supported upon columns of rectangular shapes of rolled steel, the outer columns being set in the outer walls in grooves, close-fitting but without bond, so as to permit of unequal movements and settlements and contraction. Girders are of rolled steel, built and riveted for large sizes, and of I-beams for smaller (24 in. and under); they are all riveted to the side columns, so that these may be continued right through the height of the building in practically one length. Bracing is done with gusset-plates and angles. Beams supporting the floors are small (8 in. or 9 in.) rolled steel I-beams, laid 4½ ft. apart. The sizes of the beams and spacing arise from

## THE USE OF THE TERRACOTTA ARCH,

of from 8 in. to 10 in. in thickness. These arches, which are very economical, very adaptable, and elastic in their application, are made of hollow terracotta blocks, with joints inclined at a fixed angle. The blocks are of three patterns—viz., the springer, which rests on the flanges of the floor-beam; the intermediate blocks, which are all cut to the same inclination; and the key-block, with the sloped joint on both sides. The work is set upon a centring consisting of simple scaffold-boards hung 1½ in. below the soffits of the iron beams; upon this centring the arch-blocks are laid, and then jointed and flushed in cement. When the work is set, the centring is removed to a new panel, so the work goes on continually. Upon the arches a layer of cinder concrete is deposited, and upon this the finished floor, consisting of paving or tiling, or a composition of a concrete nature, or sleepers and wooden floor. For buildings having floors weighing from 75 lb. to 95 lb. dead load per foot, and supporting live loads from 75 lb. to 150 lb., the distance between the main girders would be between 14 ft. and 18 ft., which, being a convenient size for a single office, is also taken as the unit of room width and the space allotted in the outer walls to a pair of windows. The roof is constructed with arches, the same as the floors, except that sometimes the steel beams are laid to the necessary pitch of about half an inch to the foot, so as to avoid the weight and expense of filling, which would be necessitated by level beams and arches. The thickness of the walls is about two-thirds that required for walls supporting the floor loads, and they are secured to the metal framework so as to receive its assistance in resisting horizontal wind pressure. Thicknesses of walls for buildings of varying height and construction were quoted. The thickness necessary to resist the weather is found to be 12 in. at least of brickwork, with terracotta interior furring. The furrings are hollow terracotta slabs or tiles 2 in. thick, and 16 in. by 8 in., or other convenient sizes, built up against the inside face of the wall and secured with iron where necessary. The interior of the steel frame is protected over all its exposed surfaces by 2 in. of terracotta furring. The girders are protected

labeled such strains upon its walls that they must be reinforced by posts to carry the girder loads, by slabs of terracotta, secured with hooks and bars and wiring, and usually getting their outer form by means of metal lath upon light iron bracketing to receive the finished plastering. The lower portion of walls and columns are frequently finished with marble slabs 1 in. thick, or with tiling. Those methods are preferable which place the fireproofing material close to the metal and preserve numerous and frequently broken air spaces in their own substances.

## GREATLY IMPROVED AND CONSIDERABLY CHEAPER COLUMN PROTECTION

can be made by using one coat of metal lath and cement in contact with the column, and a second coat furled out from the first upon metal lath upon light iron bars, so as to preserve an air space between the two thicknesses of cement. This protection is finished with hard plaster, proof against the fire-hose. Partitions are built after the structural steel is protected. The best are of terracotta blocks, 4 in. thick for average heights, 3 in. for moderate heights, and 6 in. for great heights of story. They may be stiffened with angle-iron framing, but show extraordinary strength when well set in Portland cement. Minor partitions, and sometimes all the partitions except those next corridors, are frequently built by using light angle-iron posts or quarters covered with metal lath, and plastered either like the old-fashioned wood plastered partitions, or sometimes with very thin posts and one sheet of metal lathing only, so as to make a solid plastered partition about 2½ in. thick. Three-inch tile partitions dry quicker and cost only a little more. So far the building has nothing combustible in its construction, and the tendency is to more and more reduce the amount of woodwork admitted after this stage. Wooden floors are permitted, but doors and architraves should be of sheet metal, wooden cores being tolerated. Window architraves and jambs should be of hard plaster, and window frames and sashes of chemically-treated fireproof wood or of metal. Windows in internal partitions and doors should have wired glass. Office furniture should be non-combustible—e.g., metallic book-shelving desks, cabinets, letter files, &c. In ordinary fireproof buildings, halls, stairs, corridors, and elevator shafts are entirely incombustible. The author next discussed the principal sources of fire, and the manner in which it spreads—the latter a point but little understood, except by firemen; the effect of heat upon metal; an alternative system of steel construction; various forms of floors in use, and the merits of porous terracotta, a material preferred by many experts. In conclusion, the paper dealt at considerable length with the principles to be applied in calculating the strength of beams, girders, columns, and foundations in proportion to the loads required to be borne, quoting the building regulations respecting the matter in New York and Chicago, and the differences of opinion and practice existing among architects there in regard to column and foundation loads. The author's own calculations for a first-class bank and office building designed by him and recently erected in Syracuse were given as follows:—

Load on all beams .....	= total dead load
	+ 70 lb. per ft. live load.
Load on all girders .....	= total dead load
	+ 60 lb. per ft. live load.
Load on columns of three } .....	= total dead load
upper stories .....	+ 60 lb. per ft. live load.
Load on columns of re- } .....	= total dead load
maining stories .....	+ 40 lb. per ft. live load.
Load on foundations .....	= total dead load
	+ 20 lb. per ft. live load.

A large number of lantern illustrations was shown after the paper had been read, including a set of working drawings and specifications, and strain and load diagrams of a bank designed by Mr. Gibson at Syracuse, N.Y., the photographs showing the building in course of erection at various stages, and also a series of slides reproducing details of construction of a thirty-story building.

Mr. EDWIN O. SACHS commented on the lantern illustrations shown, remarking that, notwithstanding the impression conveyed by alarmist newspaper reports of the total destruction of fireproof buildings, there had not been as yet a single instance of a structure of first-class work which had failed to protect the goods stored within it when fire broke out in the neighbourhood.

Mr. PERCIVAL GORDON SMITH, as chairman of the Science Standing Committee, proposed a vote



of thanks to Mr. Gibson, and said he sincerely hoped we should not have in London many of the 30-story buildings that had been depicted on the screen that evening. A most important point would have been to learn how the actual work of construction was controlled during the erection of these sky-scrappers. The amended building law now in force in New York was extraordinarily wordy and complicative, and he was glad to hear that it was at the present time under revision.

Professor W. CANTHORNE UNWIN, F.R.S., said they had nothing to do that evening with the question of the relative desirability of building horizontally, as adopted in London, or vertically, as in the United States; the method of planning large buildings was decided by commercial and social issues and not by constructional ones. American methods of business made it convenient that a large number of people should be within easy reach of each other. To meet this requirement a system of iron and steel construction, masked by stone and terracotta panels, had come into fashion, as had been so cleverly described by Mr. Gibson, and by it every particle of strain was carried directly to the foundations. The result was that the walls were treated as pure panels no greater in thickness on the ground floor than on the 29th or 30th story. The expansion of the ironwork presented no difficulties, for, as would be seen by the diagrams, full allowance was made for alterations in bulk caused by extremes of temperature. In Chicago, where the foundation soil was probably the worst in the world, enormous, heavy, and lofty buildings, unsurpassed elsewhere in dimensions, had been put up, and yet, owing to the care taken in calculating weights and strains, no trouble had resulted from settlement. There was, indeed, a great settlement, averaging from 8 in. to 12 in., and even 14 in., on these tall buildings; but the system of piling and of support by girders beneath the structures was so complete that the sinking was continuous and uniform. The average pressure on per square foot of piling in Chicago was from 3,000 lb. to 3,500 lb. He thought there was much to learn from Mr. Gibson's paper.

Mr. LEWIS W. SOLOMON exhibited the voluminous specification for the bank at Syracuse sent over by Mr. Gibson, in illustration of his paper, and commented on its leading features. He said he had been struck by the completeness of this huge document, and by the many divergences from our methods of practice which it disclosed. Some provisions seemed extravagant; thus, Portland cement used in the proportion of 2 to 1 of sand was wasteful if the cement was of good quality. On the other hand, a bond of two leaders every fifth course looked to us slipshod, and white glazed bricks were set in white cement instead of putty. It was stipulated that the work should be carried up together—no part to be "more than two stories ahead" of adjoining work, which to us seemed a liberal allowance. Every girder had to rest on ironwork, suggesting a defect which existed in the London Building Act of 1894, which provided that each girder should rest on iron and brickwork, the former being an unshrinkable material, while the brickwork must settle as the mortar dried. They used copper for roofing much more freely than we do, and also in all building work; thus, the "Luxfer prisms" now being introduced from the States for pavement-lighting were, members would have noticed, set in copper frames. For both risers and handrails to stairs cast iron was used, in the speaker's opinion a material open to grave objection, especially should a fire break out. The use of wood was prodigal; their floors were specified to be of  $\frac{1}{2}$  in. stuff, tongued and grooved. Many of the names differed from those now employed—thus, "waincot" was used for "cover," "columns" for "stanchions" of rectangular form, "chutes" for coal "shoots," and "vault" lights for those in "pavements." Every column was carried through each floor from basement to roof, as they had seen on the screen, and an excellent feature of the plans and sections was that each column bore the same distinctive letter throughout the building, and a section was prepared, on which was figured and calculated on every floor the dead and live weight borne by each column; and this was carried down from floor to floor, the additional weight being added each time, so that an error of omission could be seen by a casual glance at the section.

Mr. R. J. G. REED, M.Inst.C.E., thought this plan of estimating the weight borne by each floor and the methods of proportioning the steel structure shown in the diagrams were preferable

to those we adopted. The depth of the floors was greater than we were accustomed to in the Metropolis.

Mr. R. LANGTON COLE questioned whether there would not be considerable difficulty in getting the required sizes of girders and stanchions and filling-in sections of terracotta if it were thought desirable to construct a warehouse in this fashion in London. With wire-glass, he had found it impossible to use pieces of larger dimensions than 2 ft. square, because of the delay that would have been caused in its manufacture and delivery from America.

Mr. C. H. BRODIE said the American terracotta was a comparatively soft material, and would be regarded by us as slack-baked. A good deal of lining paper, of a quality resembling our Willesden paper, was employed in house construction to line walls. The greatest difference was in the roofs, which were generally of copper, and which, in spite of the great variations of temperature in New York, kept perfectly watertight. Cheaper roofs were the so-called "tin," and these also were wonderfully sound.

A member remarked that these "tin" roofs were simply galvanised iron given a coating of tin; they were laid flat, with a standing lap, and, as Mr. Brodie had said, kept out the water efficiently, notwithstanding the great varieties of climate.

Mr. MAX CLARKE and others having spoken, Mr. DELISSA JOSEPH congratulated the Council on having at last got a really practical paper. He had studied this question of American steel and panel construction, and its applicability to massive warehouses in the Metropolis, but found no advantage would be gained by its adoption, as the framings would have to be cased with needless solid material to meet the requirements of the London Building Act of 1894. The question further arose whether London architects would be inclined to introduce more fire-resisting provisions and materials than that Act absolutely demanded for the insurance companies gave absolutely no assistance in reducing their rates for buildings so protected, and they had withdrawn the old schedule, which worked well. The fire insurance rate was based upon the risks of the district in which the property was situated. In the well-known Cripple-gate area he introduced, in rebuilding for a client, 30 per cent. of extra material, so as to reduce the danger of fire, but the ring of insurance companies positively refused to make any reduction on this account, and until the monopoly was broken up it would be useless to discuss any other improved methods of building suggested by such a paper as that to which they had listened that evening.

#### SANITARY ENGINEERING.\*

ALTHOUGH we have numerous works and treatises on this subject in its many branches, there has been no comprehensive work dealing with the subject as a whole. Colonel E. C. S. MOORE, R.E., formerly Instructor in Construction at the School of Military Engineering, Chatham, has prepared a volume of portly thickness, illustrated by 539 wood blocks and 70 large plates, which summarises in a complete manner all the main data and principles that bear on sanitary engineering in its wider sense. The work will, therefore, whatever may be its shortcomings, be regarded as a textbook of reference for all engineers, surveyors, medical officers, and municipal authorities. The methods of sewage purification and disposal and refuse destruction are very fully treated in the opening chapters. The principles of the various systems in use—such as the water-carriage system, combined or separate; the pneumatic system, known as Shone's hydro-pneumatic ejector system, or the Liernur system, used on the Continent; and the interception or dry-method system—are described, also the methods of collection by wooden pails, Moule's earth-closet, dry apparatus, &c. The author deals with these concisely, and compares results. Thus, as to the conservancy system, we read, "Water-carriage is rapidly displacing the conservancy system, and, in consequence of the difficulties involved, towns like Glasgow, Birmingham, Nottingham, Leicester, &c., have decided to abandon the pail system altogether in favour of water-carriage, pure and

simple, and even in Manchester, where the pail closet replaced the privy and middens which obtained there until 1871, water-closets are being introduced. The pail system is only being fully retained in Hull, Rochdale, Warrington, and Darwen." Again, it is asserted that in Leicester the typhoid cases were more numerous in those districts where the fecal matters were collected in tubs than in the sewered portion of the town. Sewerage is very fully described. Col. Moore discusses the advantages and disadvantages of the "absolutely" separate system, and quotes Mr. W. Santo Crimp, Mr. W. B. G. Bennett, C.E., Southampton, in favour of the separate system as being less costly, as smaller sewers can be made available, and the old drains can be retained for the rainfall. At Southampton, a tide-locked condition of affairs prevails. The old sewers are very large, and at a level which prevents their discharge at high water, and Mr. Bennett has, to prevent flooding of the basements, very common in the lower parts of the town and near the docks, advised a new set of sewers to permit of discharge at any state of the tide. The "partially separate system" seems to be generally recommended. Drainage is considered under the heads of—(a) Sewerage, including foul water from w.c.'s, urinals, sinks, &c.; (b) surface drainage, with water from roofs, roads, pavements, &c.; and (c) subsoil drainage. Reference is made to the Public Health Act and other statutes as to the meaning to be attached to a "drain" and a "sewer"; but the law leaves the question undecided. Many very valuable plates showing sewer ramps, junction between high and low level drains, sewer outlets on tidal river and on sea coast, showing overflow for flood-water, Shone's hydro-pneumatic ejectors, sections of manhole, Warley Barracks drainage, &c., and many other details are given in this chapter. The author describes in some detail the general principles necessary in carrying out any system. Of course, many of these are known to all engineers, as the necessity of bedding stoneware pipes in steep gradients in concrete, or using iron pipes, and to have an extra fall at curves and junctions to compensate for friction, straight lines between manholes, &c. The mistake of spelling siphon with a y is repeated in this volume. In a large and ambitious work like this, written by a Colonel of the Royal Engineers and Instructor of Construction at the School of Military Engineering, such a slip is almost inexcusable.

A section is given showing a good form of inspection pit which does away with an inspection arm, and Sir R. Rawlinson's siphon-drops for breaking rapid falls adopted at Rochdale. Tidal valves, storage tanks, inverted siphons, pumping and lifting the sewage are treated briefly. Shone's pneumatic ejector is fully explained and illustrated, and the advantages of the system are quoted from the patentee. It is needless to point them out. These ejectors can be placed at various points to be drained, and are worked by compressed air from a central station, thus dividing the area into a number of districts, each with its separate outfall and discharging station, the several discharges converging to one main leading to the common outfall. The interception of the bulk of sewage at higher levels saves pumping the whole bulk at one point from the lowest level, and the provision of short self-cleansing gradients, the severance of each district from main sewer, avoidance of deep cuttings and large sewers are decided merits. This system is illustrated by a plan of Rangoon, showing the sewage and compressed air mains and ejector stations, and the system as applied there is fully described. Next the vacuum system of sewage lifting (the Liernur) for the transmission and collection of sewage is described. In this suction draws the sewage into a cylinder from which it is liberated. Adams's patent automatic sewage lift is also illustrated—a very valuable auxiliary in raising sewage from low levels and basements, &c., the same principle can be used where the various chambers are at a distance.

"Construction and Materials" is a useful chapter epitomising the various materials used for sanitary work. The information respecting stoneware and other pipes, interceptors, patent joints, inverts, including many well-known joints like Stanford's, Doulton's, Sykes', Hassall's, the Paragon, and others is complete and well illustrated. Manhole and chamber construction, or junction pits, covers, coating iron, traps, lead soil-pipes, connections, stable draining, &c., are considered. The chapter on ventilation treats of all the chief theories, and gives every type of air

\* Sanitary Engineering: a Practical Treatise on the Collection, Removal, and Disposal of Sewage, &c. By Colonel E. C. S. MOORE, R.E., &c. London: B. T. Batsford.



inlet and outlet, ventilating shaft, sewer-gas extractor, disconnecting pits, the Kenon intercepting trap, house drainage, &c. In this section we notice several modern improvements like Duckett's self-cleansing channel gully, Boyle's well-known air-pump ventilators. House drainage is well illustrated. Other chapters deal exhaustively with traps of all types, closet apparatus, subsoil drainage, surface-water collection, &c.; but we must conclude this notice by saying Colonel Moore's treatise must take its place among the leading treatises on sanitary engineering. It is well printed, and very copiously illustrated with letterpress engravings and folded plates.

### VOIDS IN MORTAR AND CONCRETE.

TO anyone who has attentively watched the process of properly and efficiently mixing mortar in a pugmill, or by any other of the numerous appliances used for that purpose, it must appear well-nigh impossible that voids, interstices, or unfilled spaces could exist in the thoroughly amalgamated mass. Yet notwithstanding all the care bestowed upon the trituration and the incorporation of the several ingredients, experience has proved that voids do exist, although it is barely possible to detect them until the mortar, whether cement or lime, is laid and set—that is, until it is too late to remedy the defect. In both descriptions of mortar sand is used in variable proportions; but it is not absolutely necessary to employ it in cement mortar at all. It is indispensable in the case of lime mortar in order to obviate the inevitable shrinkage and disintegration that would otherwise take place. Possibly sand increases the resistance of lime mortar to crushing; but even if so, it undoubtedly reduces its tensile strength. It also unquestionably in some degree promotes the absorption of carbonic acid by the mortar, especially if the latter be not allowed to dry too rapidly. Sand, if mixed with lime in too large a proportion, renders the mortar brittle and liable to break up in small pieces. As a rule, a fairly coarse sand is preferred for lime mortar, although the opinions of architects and engineers are by no means unanimous on this point. It will be seen, as we proceed with our article, that the size of the grains of sand used for both kinds of mortar, as well as the dimensions of the gravel, broken brick, or stone composing concrete, very materially modify the number and volume of the interstices or empty spaces.

The fact is frequently lost sight of that the combination of the sand and the lime in mortar is one of a purely mechanical character, the chemical action between them being of too trivial a nature to be taken into account. When thoroughly well set, the mortar is virtually, to all intents and purposes, an artificially-made sandstone, and, similarly to all those preparations, wanting in hardness, strength, and durability. There is one distinguishing characteristic of cement mortar which serves to separate it from that made of lime. Cement mortars set and harden from causes due to internal chemical action. Lime mortars, on the contrary, become indurated by the action of external causes, in which the atmosphere plays the chief part. It may not be generally known that, in some works of considerable pretensions, both lime and cement have been used together in the manufacture of mortar, in the proportion of one to one, or one to two, of lime to cement. The result of the mixture does not appear to have been attended with any particular success, and its practical utility is more than doubtful.

It has frequently been contended that lime mortars require a less proportional quantity of lime than cement mortars do of cement, to render them equally well suited for the duties demanded of them. For the sake of comparison, the proportion of sand in each instance may be regarded as a constant quantity. Some experiments have been recently carried out in Austria with a view to determine this question, which are deserving of notice. Looking at this subject from another standpoint, it reduces itself into the question whether there are more voids in lime or in cement mortar, for obviously that description of mortar which contains the lesser number is the more compact, more impermeable, and more dense of the two. The experiments were conducted in the following manner, and we select a good average example, out of the many undertaken, to illustrate our article. The results may be first put in the form of a simple general

equation, and the amount of the voids in the two different descriptions of mortar readily determined by substituting for the symbols in the formula their respective values.

Let  $x$  equal a given weight of cement, which has a volume equal to  $y$ . Put  $w$  to represent the volume of water, and the volume of the mixture equal to  $Q$ , and we have

$$V = (y + w) \dots\dots\dots(1)$$

Making  $V$  equal to the volume of the voids in the sand, and  $V_1$  to that of the mortar when ready to be laid, we obtain

$$V_1 = V - (y + w) \dots\dots\dots(2)$$

But as a large part of the water will be lost by evaporation and other causes, the voids will be increased. Put this increase equal to  $t$ , and let  $V_2$  represent the total volume of the voids, then

$$V_2 = (V_1 + t) \dots\dots\dots(3)$$

In the example selected for illustration the above symbols had the following respective values,  $y = 3.16$ ,  $w = 4.3$ ,  $t = 1.53$ ,  $V = 17$ , from which the calculations become in cubic feet

$$Q = 7.46, V_1 = 9.54, \text{ and } V_2 = 11.07.$$

When it is a case of lime mortars, the same formulae will apply, but the numerical values of some of the symbols will vary. This discrepancy is due to two principal causes. The one is that a lime mortar, with the same proportion  $x$  of lime as there was of cement in the cement mortar, will not yield the same solid volume represented in equation (1) and (2) by the symbol  $y$ . Again, there is, in spite of all precautions, some 10 or 12 per cent. of carbonic acid and water in the most carefully prepared limes, and, in addition, a greater quantity of water is required in the mixing process. These conditions will render  $y = 2.65$ , and  $w = 7.11$ , so that we shall have—

$$Q = 9.76, V_1 = 7.24, \text{ and } V_2 = 8.46,$$

since  $t = 1.22$ . Consequently, it would appear that there are at first sight less voids in the lime than in the cement mortar. But although a larger quantity of water is mixed with the lime mortar, a comparatively small quantity remains in it which is equal to  $t$ . The total volume of solid matter composing the mortar will therefore be equal to—

$$(y + t) = (2.65 + 1.22) = 3.87,$$

and the value for  $V_2$  will therefore be—

$$V_2 = V - (y + t) = 13.13.$$

The difference in percentage is 30 per cent. for the cement, and 40 per cent. for the lime-mortar. But the points in favour of the cement-mortar are that the voids in it can be very considerably reduced—even to some 10 or 12 per cent., whereas those in lime-mortar remain at their original high figure. The same conditions are found to obtain in concrete. With broken stone and gravel, the voids in numerous experiments amounted to 25 and 35 per cent. of the whole mass, and in instances in which the broken stone was of uniform size the voids reached to 50 per cent. of the total. If concrete be composed, as it frequently is, of broken stone, gravel, sand, and cement, the proportions of the ingredients should be so arranged that the gravel should fill the voids in the stone, the sand those in the gravel, and the cement those in the sand. Commencing with the last mentioned material the ratios would approximately be as  $\frac{1}{3}$  to  $\frac{1}{2}$  to  $\frac{1}{3}$  to 1. The great object to be attained in mixing mortar is that every grain of sand should be separated from its neighbour by a film of lime or cement. The best sand is one which has grains of different sizes, as the greater the unevenness of the sizes—within proper limits—the less will be the volumetric total of the voids, and the smaller the quantity of cement or lime required.

T. C.

### IRON CONSTRUCTION IN DRAINAGE WORK.—II.\*

By T. E. COLEMAN, F.S.I.

WITH the object of avoiding, as far as possible, the use of unduly light and weak castings, it is in all cases desirable to state that the limit of variation permissible in the weight of any drain-pipe of specified dimensions and thickness must not exceed 5 per cent. of the mean or average weight of such pipes.

Fig. 3 is a section through a caulked lead joint such as is generally used for cast-iron

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spigot and socket drain-pipes. The joint is made by first inserting a few strands of yarn, and forcing them well home to the end of the socket. A band of well-tempered clay is then placed round the outer end of the socket, leaving a small opening at the top for pouring in the lead. The remaining space within the socket is

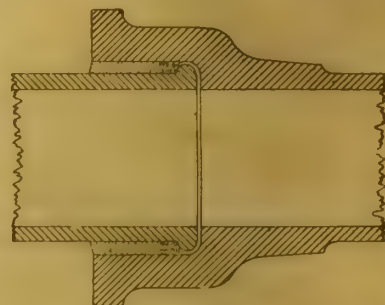


FIG. 3.

run with molten lead, which is afterwards tightly compressed or caulked by means of a caulking tool. The small bead cast on the spigot end of the pipe assists in obtaining concentricity of the pipes, and preventing any protrusion of yarn in the interior. When properly made a thoroughly air- and water-tight joint is obtained, which is capable of successfully resisting considerably more than the greatest hydrostatic pressure that will be required in practice or for testing purposes.

The quantity of lead required for jointing

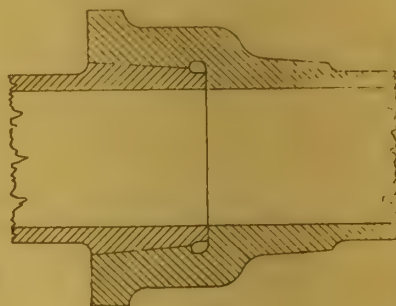


FIG. 4.

strong cast-iron spigot and socket drain-pipes is approximately 1lb. for every inch in diameter for pipes up to 5in. Pipes from 6in. to 9in. in diameter generally require about 1½lb. per inch; whilst for pipes exceeding 9in. each joint will average 1½lb. of lead per inch of diameter. For instance, iron pipes 4in. in diameter require about 4lb.; 6in. pipes about 7½lb.; 9in. pipes, 11½lb.; and 12in. pipes about 18lb. of lead for every joint made.

A rust-joint, formed with "iron" or "rust" cement, is sometimes used in lieu of molten lead.

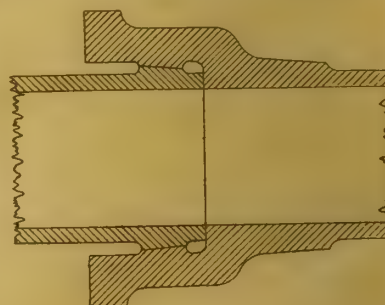


FIG. 5.

The cement consists of fine iron borings mixed with salammianic, sulphur, and water, so that the whole rusts or oxidises into one homogeneous mass. It may be made either quick or slow setting, according to the proportions of materials used. A slow-setting rust-joint cement is composed (by weight) of 200 parts of fine iron borings (previously passed through a sieve to remove large pieces), 2 parts of powdered salammianic, and 1 part flowers of sulphur, the whole being intimately mixed and made into a paste with water.



The proportions for a quick-setting cement are 80 parts of fine iron borings, 1 part of powdered sal ammoniac, and 2 parts flowers of sulphur. The rust-joint is made by first inserting a few strands of yarn, then taking a sufficient quantity of the moistened rust-cement, and well caulking it into the joint with a caulking-iron. It may be remarked that a slow-setting cement is best when the joint is not required to be put under pressure immediately, but can be allowed about twelve hours to thoroughly set. Whenever practicable, however, preference should be given to the ordinary caulked lead joint.

In waterlogged ground and other situations where the ordinary spigot and socket-pipes with lead joint cannot be used, iron pipes with turned and bored joints are frequently provided. Fig. 4 is a section through what is known as a "full"

dipped into a very hot bath of pitch, coal-tar, and linseed oil. After immersion for a short time they are gradually withdrawn, the surfaces being thickly coated both inside and outside with the mixture.

In the "Bower-Barff" process the pipes are

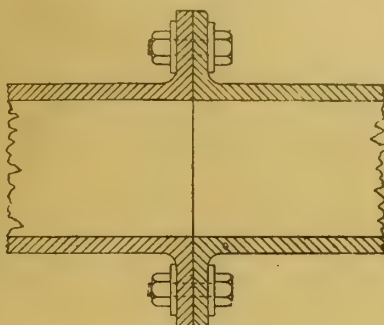


FIG. 8.

raised to a very high temperature, and subjected to the action of superheated steam, so that the surfaces are covered with a very hard coating of magnetic iron oxide.

"Glass-enamelled" drain-pipes are also extensively used. The interior surface of these pipes is covered with a perfectly smooth vitreous glaze, which prevents rust and allows the sewage matters to flow easily along the channels.

Cast-iron drain-pipes are generally laid in 9ft. lengths, but may be readily obtained in shorter lengths varying from 1ft. 6in. upwards. When it is found necessary to cut an iron pipe to a special length during the execution of the work, a wrought-iron ring should be tightly shrunk on to the newly-made spigot end, so as to form a bead for stopping the yarn when making the lead joint.

All drains should be laid in perfectly straight lines, and with uniform gradient from point to point. Where two or more drains are brought together, or any change of direction is required, proper junctions and bends having access-pipes fitted with air-tight covers, should be provided. The access-pipes should be conveniently arranged within inspection chambers provided with iron covers and frames.

Fig. 10 is the basement plan of a small town house, on which is indicated the general arrangement of the drainage system. When designing and laying down the main lines for a drainage system of this description, all inspection chambers, bends, junctions, &c., should, as far as practicable, be placed outside the house. The different branch drains should therefore be grouped together so that their junction with the main drain is conveniently effected in one or more inspection chambers placed in the open areas or yards immediately connected with the building. The following explanatory notes have reference to the plan (Fig. 10).

DRAINAGE PLAN FOR SMALL TOWN RESIDENCE.

Reference table:—A, gully or shoe to receive rain-water pipes; B, trapped gully receiving

The whole of the drains are of cast iron, with properly caulked lead joints. All rain-water shoes or gullies, A A, discharge into trapped gullies, B B. The branch drains are grouped and arranged to converge towards the inspection-chambers. An iron access-pipe, with air-tight cover, is provided within each inspection-chamber for the purpose of receiving the branch drains, and to afford facilities for future examination. An intercepting-trap is fixed at F, in order to disconnect the house-drain from the public sewer. The house-drain is ventilated by means of a fresh-air inlet, E, directly connected to the drain within the inspection-chamber; the high-level vitiated-air outlet being arranged at D, where a soil and ventilating pipe is fixed. The sink discharges into a flushing-rim grease gully, C, in

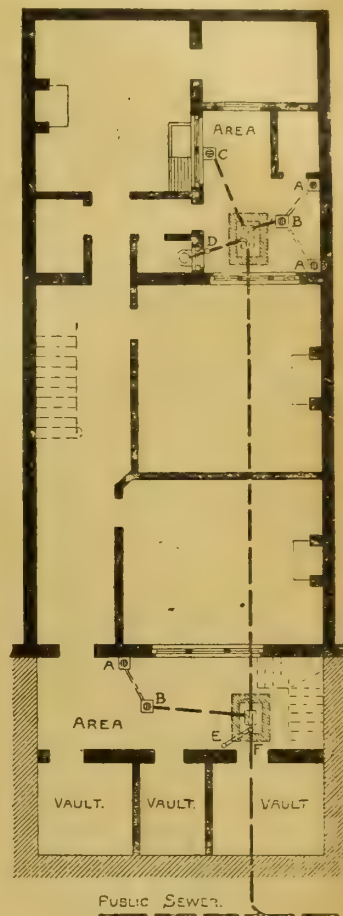


FIG. 10.

connection with which an automatic-flushing cistern is provided at this point. The inspection-chambers are each furnished with a cast-iron air-tight manhole cover at the floor-level of the respective areas.

#### THE SUPERINTENDING ARCHITECT TO THE L.C.C.

THE General Purposes Committee of the London County Council, after carefully considering the applications received in response to the official advertisement for an architect to fill the position of Superintending Architect to the Council, have reported that they cannot see their way to submit the names of any of the candidates as possessing in their opinion the qualifications necessary for so important a position. There were twenty-seven applications, and nine of the candidates, whose names have already been made public, were interviewed by the committee. As, after all, the "Superintending Architect" of the Council is simply a sort of bishop of the district surveyors, one fancies it would have been difficult to have attracted more eligible names than those already brought before the committee.

Certainly, the duties associated with the position of Superintending Architect have had very little to do with architecture at all. The manifold and technical intricacies of the London Building Act have, of course, principally found the "Superintending Architect" work. It is of the utmost

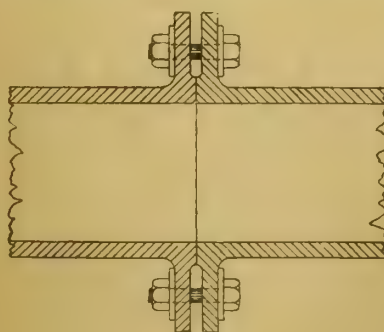


FIG. 9.

surface-water and rain-water drains; C, flushing rim grease gully, with automatic flushing cistern connected thereto; D, soil and ventilating pipe; E, fresh-air inlet; F, intercepting trap.

In this illustration (Fig. 10), it will be observed that inspection-chambers (shown by dotted lines) are constructed in the back and front areas, the main drain passing directly under the building.

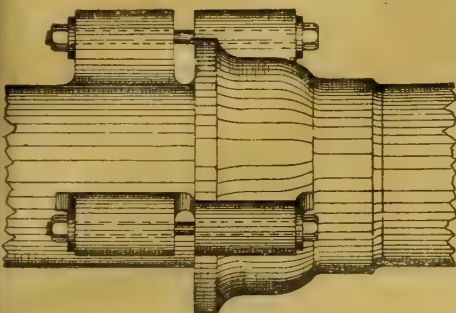


FIG. 6.

turned and bored joint. Another form of turned and bored joint is seen in Fig. 5, and illustrates the type which is in general use whenever a joint of this description is required. It is technically known as a "half"-turned and bored joint. A portion of each spigot and socket is accurately turned and bored, so that when brought together they form a tightly-fitting metallic contact joint. Before inserting the spigot, the turned portion is well coated with red-lead cement as thick as can be applied with a brush. Sometimes a cement formed with sal ammoniac is used for painting the spigot-end, for the purpose of thoroughly rusting the turned surfaces together.

Fig. 6 is a sketch showing cast-iron pipes with "half"-turned and bored joints, and having three strong lugs cast on the pipes near each end, so that the whole may be tightly screwed together. This particular form of joint is more especially suited for a sea outfall, where the pipes are supported on piles, and directly exposed to the force of the waves.

Cast-iron pipes with flanged joints, and put

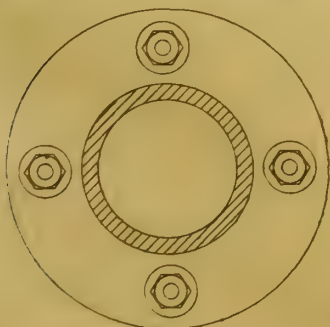


FIG. 7.

together with bolts and nuts, are also used in some situations. The abutting faces of the flanges should be planed to a true surface, so as to obtain a close metallic contact between the pipes. Figs. 7 and 8 show the elevation and section of a flanged pipe with plain faces, whilst Fig. 9 is the section through a flanged pipe with facing strips. In the former case, the entire surface of each flange must be brought to a true plane; but in pipes of the latter description, the facing strip alone requires to be planed. The pipes are bolted together with four strong wrought-iron screw-bolts to each joint.

All iron drain-pipes should be coated with some preservative before being laid. The Dr. Angus Smith preservative process is well known and largely adopted. It is comparatively inexpensive and easily applied. The pipes are



consequence that the Council should have an impartial opinion on points of this kind, and also that the promoters of building schemes may feel, when presenting plans for the approval of the Council, that they will be adequately and fairly dealt with. Hitherto this seems to have been the limit—and a very good limit—of the duties at Spring Gardens. The advertisement issued by the Council on the present occasion certainly suggested no change in the intentions of that body in this respect, while the salary offered of £1,500 a year was not an unduly extravagant one, seeing that any one accepting the position must give up his private practice and not expect any pension from his new employers at the termination of his engagement. The salary is identical with that given by the Council to their Tramway Manager.

It might be as well for the London County Council to consider what they really do want, and to formulate their requirements accordingly. One way out of the difficulty would be to appoint an architect and a surveyor—the former to advise and act on questions of design and construction, and the latter to deal with the Building Act. We admit that it is quite possible that even then the Council might be disappointed. No one ever seriously believed that Sir Horace Jones added much to the reputation of civic architecture in his capacity as architect to the City of London! So far, the London County Council lack, and are likely to lack, what they are about to lose in the person of Mr. Blashill, who combined a real and sympathetic knowledge of architecture without any of the fuss of the "art-architect," with the strictest integrity, the honest desire to please all honest people, and a complete knowledge of the business side of his profession, which is, of course, despised by the mere disciples of aestheticism. Still, we should have thought gentlemen like Mr. Lovegrove, or Mr. Collard, or Mr. Marsland—we name these at random, and with no invidious preference—might have proved equal to the duties of a successor to Mr. Blashill. There may, of course, be objections that we know nothing of. There may be some favoured individual in the background whom it is determined to job into the post. Or the Council may be waiting till an obliging Providence rolls Mr. Waterhouse and Sir Arthur Blomfield and Mr. Norman Shaw, or some other three equally eminent architects, all into a single personality, and offers the Council the free enjoyment of its ability and genius—all for £1,500 a year. We hope they may get it.

#### EXAMINATIONS IN CARPENTRY.

THE annual examination in building and sanitary construction was held by the Carpenters' Company in their hall last week. The following gentlemen helped the Company in the work of examining:—Colonel Stanley Bird, Professor A. Wynter Blyth, Professor Banister Fletcher, F.R.I.B.A., Professor Henry Robinson, M.Inst.C.E., John Wilson (warden of the Company), Professor T. Roger Smith, F.R.I.B.A., J. Howard Colls, Stanton William Preston, the President of the Royal Institute of British Architects, the President of the Architectural Association, and the President of the Institute of Builders. The number of candidates entering exceeded that of the previous year's, and they came from various parts of the company as well as London. The Company make a great point of the practical nature of their examinations, the candidates being brought face to face with the actual objects they encounter in building, &c. The following is a list of the successful candidates arranged in order of merit:—

Gold Medal: Mr. T. Cherrill Way. Silver Medals: Messrs. F. Hartnoll, A. C. Remnant, and Jno. Sanderson (eq.). Bronze Medals: Messrs. E. F. Brown and T. E. Kinch (eq.). Certificates:—Mr. A. Harrington and Mr. W. H. Masters; Messrs. J. G. Anderson and C. R. Tinson (eq.); Mr. L. Bate, Mr. A. Norton, Mr. W. J. Andrew, Mr. S. W. Hayward, Mr. A. C. H. Pendlebury, Mr. C. R. Fenn, Mr. T. R. Tanner, and Mr. Geo. Gout.

#### EARLY RENAISSANCE SCULPTORS.

MR. W. H. THORP, F.R.I.B.A., delivered a lecture on Friday evening at the Leeds School of Art on "Early Renaissance Sculptors and their Work." Having referred to the work of the Florentine sculptors, he sketched the three great schools of sculpture—viz.: (1) The Greek of the time of Pericles; (2) the Early Italian Renaissance of the 15th century; (3) the

later or culminating period of the Renaissance. Speaking of the Early Italian Renaissance, he remarked that the year 1400 was notable in the annals of art as being the date of the celebrated competition for the Baptistery doors at Florence between Brunelleschi and Ghiberti. With the advent of these two artists sculpture gradually emerged from its Medieval manner, and while retaining much of the devotional and mystical spirit characterising the earlier work of the period, it burst the bounds of Middle Age tradition. There was a closer approach to nature, a greater sense of proportion, and a feeling of refinement and subtlety, which appeared to blend the best elements of Greek art with the spiritual inwardness which marked the Early Italian artistic work. The sculpture of this epoch, although in a state of development, which culminated in the work of Michael Angelo, was, notwithstanding, in itself perfect within certain limitations. Its perfection lay chiefly in its bas-reliefs, a system of low relief being relied on by the artists to express their creations in marble, bronze, or terracotta. In many cases the form was so slightly modelled that it hardly appeared to emerge from the surface of the marble, and almost lost itself in the ground. The element of evanescence and delicate refinement was common, not only to the bas-reliefs, but also to the statues and effigies which form so prominent a feature of the tombs met with in the churches of Florence. It was left to Donatello to indicate the true character and spirit of Renaissance sculpture, in which natural truth was wedded to a legitimate appreciation of the excellence of antique statuary. The sculpture of this period had influenced for good the creations of artists of the present day.

#### VENTILATION OF TUNNELS AND BUILDINGS.

AT the ordinary meeting, on Tuesday, of the Institution of Civil Engineers, Mr. W. H. Preece, C.B., F.R.S., president, in the chair, the paper read was on "The Ventilation of Tunnels and Buildings," by Mr. Francis Fox, M.Inst.C.E. In regard to the first part of the subject, the author enunciated the proposition that if the amount of carbon dioxide in the air of a railway tunnel did not exceed 20 parts in 10,000, then the ventilation might be deemed satisfactory. On this basis, and allowing 29c.ft. of poisonous gas for each pound of coal consumed per mile, multiplied by 29, multiplied by 500, and divided by the number of minutes' interval between the trains, would give the volume of air which must be introduced into the tunnel per minute. The ventilation of the Severn and Mersey tunnels had been determined by this rule, and had been referred to as satisfactory in the report of the Departmental Committee of the Board of Trade on the "Ventilation of the Metropolitan Railway Tunnels," 1897. In regard to the Mersey Tunnel, it was, however, to be regretted that, owing to the poverty of the company, inferior coal was being used, and the fans were run at a lower speed than was intended. Even with these drawbacks, however, the purity of the air in the Mersey tunnel was well within the limits proposed by the author. The case of the Metropolitan Railway tunnels, having been the result of recent investigation, was not mentioned otherwise than to recall the fact that the amount of carbon-dioxide in the air had been shown to be as much as 86 parts per 10,000. The great Alpine tunnels were next referred to. In the case of that under Mont Cenis,  $8\frac{1}{2}$  miles long and 26ft. wide, the higher altitude of the middle of the tunnel above its entrances was inimical to good ventilation, and at times great difficulty was experienced in carrying on the traffic. The antiquated system at present employed was merely palliative, consisting in the injection of only 70 cubic metres per minute of air compressed to 75lb. per square inch, discharged at points one kilometre apart throughout the tunnel. Owing to the bad ventilation, not only were the men working in the tunnel subjected to great discomfort, but the corrosion of the rails was excessive, about 300 tons having to be relaid every year. The St. Gothard Tunnel,  $9\frac{1}{2}$  miles in length, and 26ft. wide, was nearly level from end to end, and until recently, natural ventilation only sufficed; but owing to increase of the traffic and the use of briquette fuel, the Saccardo system had lately been introduced. This consisted in blowing into the mouth of the tunnel a large volume of air which, on the

principle of the injector, caused an induced current in the annular space between the interior surface of the tunnel and the gauge of maximum construction. This system had been adopted with success in the case of the Pracchia tunnel on the main line between Florence and Bologna, the state of which was recently dangerous to human life. Experiments made by the author in this tunnel showed the following results. Before starting the fan the tunnel was filled with a dense volume of smoke from end to end, the temperature being 107° Fahr., with 97° of moisture, or nearly complete saturation. With the fan running the thermometer indicated 80° Fahr. (the temperature of the external air), and the moisture was normal. The volume of air injected by the fan was 164,000c.ft. per minute, and that by the induced current 46,000c.ft., making a total of 210,000c.ft. of air per minute passing through the tunnel. It was not improbable that the Saccardo system would be selected for the ventilation of the two parallel tunnels  $12\frac{1}{2}$  miles long, now being constructed under the Simplon. In the second part of the paper the author animadverted on the inconsistency of keeping houses clean, streets swept, and sewers flushed, with the object of preserving the air in a pure condition, while allowing it to become absolutely foul and putrid for want of proper ventilation. Air passed through human lungs had been well designated "air-sewage." It was highly poisonous, and the breathing of it over and over again was fraught with the gravest consequences to health. It had been asserted by Dr. Ransome, F.R.S., that 70,000 deaths occurred annually in Great Britain from tuberculous disease, nearly all of which could be saved were the subject of fresh air both understood and acted upon by the community. Competent medical authority considered that the quantity of carbon dioxide in the air of rooms should not exceed 10 parts per 10,000, equivalent to about 16c.ft. per head per minute. In French hospitals 50c.ft. per patient per minute was allowed. The author considered that 20c.ft. per minute would be sufficient for ordinary purposes. Tables were given of the impurity in the air of schools, with different systems of ventilation, of that in dwelling-houses, and of that in sewers; from which it appeared that the latter was the least impure of the three. Proceeding to consider the ventilation of particular public buildings, the author illustrated his views by reference to special cases which had come within his experience. The fact should not be lost sight of that the air in a room might be quite cold and yet very foul; whilst, on the other hand, it might be warm and yet perfectly fresh. To avoid draught, the air should enter through a large number of small orifices, so as to thoroughly diffuse the current. This was done by gratings, but unfortunately these seriously diminished the volume of air passing through, owing to the friction of the bars. The same remark applied to extracting flues. The author was of opinion that no large building could be successfully ventilated without some mechanical force furnished by steam, electricity, falling water, or other such agency. Then, fans could be worked with certain results, whereas automatic extractors not infrequently became inlets, thus reversing the whole system. The inlets should be by Tobin or similar tubes, about 5ft. above the floor. In one American State Legislation building, the warmed fresh air entered on the level and in front of the desks of each member. In conclusion, the author urged the desirability of educating the public to the value and merits of fresh air.

#### THE LONDON BUILDING ACT AND THE OFFICIAL SUPERVISION OF BUILDINGS.

AT the ordinary general meeting of the Institution of Surveyors, on Monday next, Mr. W. Weaver, F.S.I., will read a paper on the above subject, which we hope to report next week, and which we hope will be fully discussed, as it raises some very important questions. The object of the paper is to invite attention to the present system of official supervision over buildings and building estates in the County of London, and to point out the inconvenience and defects arising from the dual and overlapping jurisdiction exercised by the district surveyor and the surveyor to the local vestry or district board. It is suggested that the shortcomings of the present Metropolitan system of building supervision are not attributable to defects in the new Act,



but rather to the method of supervision adopted in the enforcement of its provisions. According to the reports of the London County Council, district surveyors are appointed for the purpose of seeing that buildings are erected in accordance with the law, whereas, as a matter of fact, only a part of the law regulating building construction is covered by the supervision of those officials. The paper touches upon the inconsistency of the present mode of appointing the district surveyors, who are selected for their professional skill as architects, the exercise of which is prohibited under the terms of their appointment. It is suggested that the proposed district councils for London should be entrusted and maintained in a sound, safe, and sanitary manner. The imposition of this duty would tend to elevate the functions of the local authority, as recommended by several conferences and by the Royal Commission on the Government of London. The work of building supervision in London would thus be placed on the footing that prevails in the towns throughout the kingdom. The district surveyor and the parish surveyor would merge into one official, corresponding to the borough surveyor and engineer outside London. In some parishes the present district surveyors would be the best persons to discharge the amalgamated functions, and in other districts the parish surveyors would possibly afford the better choice; but in every case care should be taken to prevent any individual case of injustice through deprivation of office, and also to insure the practical and technical fitness of the selected officials. By the proposed change it is urged that the loss and inconvenience arising from the present dual system of supervision would be saved, and every information connected with building operations would be ascertainable at the public offices or town hall of the district. The paper furnishes instances of the difficulties and friction arising out of the present divided and overlapping jurisdiction, and touches upon the evils arising from infringements and evasions of the Act which occur after the supervision of the district surveyor has ceased. Reference is also made to the loss and inconvenience occasioned to the local authority by reason of the district surveyor having no knowledge of the sewerage and drainage of his district. The unsatisfactory nature of the present procedure as to dangerous structures is also alluded to; it is pointed out that at present it is nobody's duty to find out dangerous structures, and the collapse of a building may be the first notification of its dangerous condition. The paper recommends the abolition of fees, charging the expense of supervision to the general rate of the district.

#### THE COST OF THE BROOK HOSPITAL.

At the meeting, on Saturday, of the Metropolitan Asylums Board, a letter was read from the Local Government Board referring to the managers' application for an order authorising the borrowing of a further sum of £2,413 4s. 6d. in respect of alterations and additions to the South-Western Hospital, stating that they observed that there had been similar irregularities on the part of Mr. Aldwinckle, the architect, as in the erection of the Brook Hospital, and that they would, therefore, omit from the order the amount which, under ordinary circumstances, would be due to him as commission on the cost of certain works—namely, £62.

The Chairman moved that a copy of the letter be forwarded to Mr. Aldwinckle.

The Rev. G. W. Pope thought they ought to consider the question of Mr. Aldwinckle's further employment by the Board. He moved as an amendment that the letter be referred to the General Purposes Committee for consideration and report. The amendment was not seconded, and the chairman's motion was agreed to.

The Clerk read a letter from Mr. Aldwinckle with reference to the Local Government Board's report on the Brook Hospital inquiry. The writer stated that Mr. Knollys, the inspector who conducted the inquiry, had carefully classified all the items which were authorised by or executed with the knowledge of the managers or the committee, leaving only £12,000 to be accounted for. Mr. Knollys had stated that a considerable part of that not authorised by the committee was necessary, or, at least, very desirable, in connection with the erection and fitting-up of the building; and he only mentioned two items—£655 for teak flooring and £663 for ward stoves—

as having been ordered by him "without any justification whatever." While not agreeing with the inspector that these were unnecessary outlays, he desired to point out that this was a very small matter in connection with an expenditure of over £250,000. There was no suggestion that there had been any waste of public money, or that the managers had not received full value for the expenditure. He maintained that the managers' interests had not suffered by reason of his ordering work without the authority of the committee. He was glad to have the inspector's opinion that, in acting as he did, he was actuated by a desire to "produce a hospital of the best possible type and fitted with all the newest improvements." He indignantly repudiated any suggestion that he had increased the amount of work in order to augment his fees, and reminded the managers that on one occasion he voluntarily surrendered £2,200 of the fees which were legitimately due to him in connection with the erected of the Fountain Hospital. Criticising the Local Government Board's letters, he claimed that the expression "grave irregularities" was unjustifiable. That there had been no waste of public money was proved by the fact that, after allowance had been made for the additional expenditure caused by the nature of the site, the cost of the Brook Hospital was not above that of the two other hospitals recently erected by the managers. At the same time, it was admitted on all hands that the Brook Hospital, although the pioneer of hospitals of its class, was a good hospital, completely finished in all respects and worthy of London. It was resolved to enter the communication on the minutes, to forward a copy to the Local Government Board, and to circulate it generally.

#### OBITUARY.

WE regret to announce the sudden death of Mr. WILLIAM HAMILTON BEATTIE, architect, Edinburgh, at the age of 55 years. He had been in ordinary health, and on Tuesday in last week was at his office as usual, where, on his return from a business run to North Berwick, he spent some time dictating a pre cognition to one of his clerks. At half-past six o'clock he went home, and when sitting at dinner, suddenly raised his hand to his head, and almost the same moment expired. The cause of death was the bursting of a blood-vessel in the brain. Mr. Hamilton Beattie, the *Scotsman* remarks, came of a family the members of which have been builders and architects in Edinburgh for nearly half a century. He was a son of the late George Beattie, who came into prominence in his profession by securing by competitive design the commission for the erection of Craiglockhart Poorhouse, the adjudicator being the late Mr. Bryce. In the carrying out of those plans Mr. Hamilton Beattie was associated with his father, and from that time dated his first entry into the firm. Since then he has accomplished an immense amount of work. A man of exceptional industry, ceaseless energy, and constant activity, Mr. Hamilton Beattie seldom, the *Scotsman* adds, laid aside the cares of business. In later years his services have been much sought after as an expert and skilled witness in connection with local and Parliamentary inquiries and valuations, and he proved so strong a man in this capacity that he came to be looked upon as indispensable in a reference of any consequence. It was largely due to him that the Caledonian Underground Railway scheme was thrown out by the Parliamentary Committee. In all questions of compensation arising in arbitrations, as well as in all matters of valuation of properties, he was generally called in as an expert witness, and, gifted with a retentive memory, he was able to furnish from recollection references which at a moment's notice might be demanded. Coupled with this, he had a clear grasp of the intricate legal principles involved in compensation cases. He has been the chief expert adviser to the city of Edinburgh all through the North Bridge-street arbitration, and only three days before his death he was engaged for several hours giving evidence in one of these cases. When the discrepancy in the figures of the proposed Usher Hall sites was discovered a few weeks ago, he was called in to make an independent valuation, and mainly owing to the statement he laid before the council, the High-street site, which previously had been greatly favoured, was set aside. For many years he undertook similarly important duties, not only for the corporation, but for the North British

Railway Company, who engaged him as their chief adviser in numerous arbitrations. His power to concentrate his mind upon the business he had on hand, his ability to adapt himself with readiness to any special set of circumstances, his untiring diligence, and never-failing application, and his consistent courtesy made him a very successful man of business. In Princes-street there are several examples of his work, including the Royal Hotel, the Clarendon Hotel, the Central Hotel, Charles Jenner and Company's handsome pile of buildings, and the new North British Station Hotel, in process of erection. He was also architect for the northmost section of the new Commercial Bank Buildings in North Bridge-street, and his elevations for the blocks to be erected by Mr. White, the builder on the same side of the street, were shown for the first time in the council-chamber on the day of his death. The Royal Insurance Buildings, George-street; the Imperial Hotel in Market-street; the Marine Hotel, North Berwick; and Pattison's bonded stores at Bonnington were built from his designs, and the Waterloo Hotel has been reconstructed as railway company offices from his plans. It was largely owing to Mr. Hamilton Beattie the cable system was first introduced into Edinburgh, for he was not only the engineer of the first line to Goldenacre, but he, along with Mr. Mann, S.S.C., was the original promoter of the company. Mr. Hamilton Beattie was a widower. He leaves one son, who is at present at Rugby.

MR. FREDERICK BARNES, the senior member of the architectural profession in East Anglia, died at his residence, Mill-hill, Anglessea-road, Ipswich, on Tuesday last, in his 85th year. He had carried out a large amount of work in Ipswich and the counties of Suffolk and Essex, including the restoration of many churches, the building of chapels (in which he frequently, as at Museum-street Wesleyan Chapel, Ipswich, adopted a French type of Early Decorated), and various private residences, and was greatly respected in the locality. He had taken no part in public life in Ipswich. He was formerly a Fellow of the Royal Institute of British Architects, but retired some years since on relinquishing the active practice of his profession.

MR. JOSEPH GIBBONS SANKEY, M.A., Cantab., F.R.I.B.A., of 104, King-street, Manchester, died on the 1st inst., at his residence, Bollinghurst Disley, Chester, at the early age of 38 years. Mr. Sankey won the Pugin Studentship in 1884, and joined the Institute of Architects as a Fellow last year. He was also a Fellow and member of the present Council of the Manchester Society of Architects.

#### CHIPS.

A new Wesleyan chapel and schools are about to be built at Stanley, Co. Durham, at an estimated cost of £4,500. The style adopted is Gothic, and the chapel will be seated for 850 people.

The restoration of the parish church of Ashill, Norfolk, has just been completed by the rebuilding in Ketton stone of the upper part of the tower, including a new roof and new battlemented parapet. Messrs. Miller and Hall, of London, have been architects for the restoration, which has cost in all £3,000, and the present section has been carried out by Messrs. Waters and Son, of Watton, Norfolk.

Colonel A. G. Durnford, R.E., held an inquiry at the Institute, Headcorn, on Friday, into an application by the Hollingbourne Rural District Council to borrow the sum of £3,755, to provide a proper supply of water for Headcorn and the adjoining hamlet of Grafty Green. The engineers of the scheme are Messrs. Stephenson and Burstal, of Westminster.

The urban district council of Southborough have voted their surveyor, Mr. Harmer, £150 for extra work in connection with planning and superintending the erection of the Victoria Hall just opened in that town.

The Corporation of the City have recently resolved to connect the Foreign Cattle Market at Dapford with the Dapford wharf of the London, Brighton, and South Coast Railway by means of a short railway, and to undertake other works, at a cost of £100,000. The first sod of the new railway will be turned on Tuesday next.

Plans were lodged on Monday with the sheriff-clerk at Dunblane for the doubling of the railway line between Dunblane and Callander. It is proposed to apply for powers as soon as Parliament assembles, and when these are obtained to immediately proceed with the work, which will probably be completed in the autumn of next year.



## Building Intelligence.

CAPE TOWN.—A meeting was recently held at Cape Town to inaugurate the project of building a new cathedral for the English Church in that capital. The present building, erected 70 years ago, is somewhat like the parish church of Worthing in architecture and size, and it is considered inadequate in both respects. His Excellency the Administrator (Major-General Cox), who presided at the meeting, said the present cathedral was unsightly and unworthy of the mother city of South Africa, and it was hoped it would soon be a thing of the past. The estimated cost of the new cathedral was £150,000; the eastern portion, which would first be built, would cost £50,000. A magnificent site had been secured, Parliament having passed a Bill authorising the use of the land on which the school now stands, so that the tower would face St. George's-street (one of the chief thoroughfares, parallel with Adderley-street).

CONSETT, NORTH-WEST DURHAM.—The foundation stone of a technical institute, to be erected at a cost of £5,000, was formally laid on Monday. The institute faces Park-road, and adjoins the public park. The style is a plain treatment of Renaissance character. The exterior walls are faced with red pressed brick and Prudham stone dressings. The principal entrance has a deeply-recessed arched doorway, leading through a vestibule with stained-glass screen into the entrance-hall, from which direct access is obtained to the whole of the ground-floor rooms. Right and left of the entrance are retiring rooms. Immediately opposite is the head-master's room, with store-room adjoining. On the left of the hall are two classrooms, each 22ft. by 20ft. divided by sliding glazed screens, and on the right of the hall is the physics laboratory, 28ft. by 20ft., with classroom, 16ft. by 20ft., adjoining. Detached from the main building is a room 47ft. by 16ft. for manual instruction; this room will be lighted and warmed by means of hot-water pipes and radiators similarly to the main building. Mr. C. E. Oliver, of Newcastle-on-Tyne, is the architect, and the contractors are Messrs. John Marshall and Sons, of Hawick.

GLASGOW.—At a meeting of the electricity committee of Glasgow Corporation on Monday, a report was submitted by Mr. Chamen, the engineer of the department, and Mr. Myles, architect, on the proposed new electricity works at Coplawhill, on the south side of the city. The total cost for building and plant is estimated at £59,000, of which £16,000 has already been authorised by the corporation for the new generating station. The reporters say that the works will of necessity take a considerable time to complete—say, two or three years—and judging from the experience connected with the station at Port Dundas, even longer. They do not think, in view of the enormous and rapidly-growing demand for electric supply, that any risk can be run of being further hampered as they have been up till now for want of the necessary buildings. Although the completion of the whole buildings might take from two to three years, sufficient progress might be made to allow of the first part of the plant being erected, though perhaps under temporary cover, within a period of nine months from the date of acceptance of tenders.

LEOMINSTER.—The foundation-stone of a cottage hospital was laid last week. The institution will be erected in two distinct blocks. The nurses' home faces South-street, whilst the hospital proper will be placed diagonally to the site, the front of the wards facing the south-east, direct communication being provided by a covered corridor. The hospital block of buildings will contain a central hall, with male and female wards on either side, each equipped with two beds. Another room is provided for operations, and has a top light from a lantern. The remaining accommodation consists of service kitchen, bathroom and lavatory, and each of the wards has separate closet conveniences with through-ventilation in each case. Similar conveniences are also provided for the staff. Coal and wood houses have also been provided. The front of the hospital will be of red brick, with half-timbered gables over the roof of bay windows. The nurses' home will contain porch, entrance hall, and vestibule, two front parlours, each having bay windows, and kitchen, scullery, pantry, china pantry, and lavatory accommodation. On the first floor will

be four bedrooms, bathroom, and linen closet. The elevation to the street is being built of red pressed brick, terracotta panels, and overhanging half-timbered oak gables. All the roofs will be covered with red Broseley tiles. The architect is Mr. Ernest G. Davies, M.S.A., of Hereford. The tender of Mr. John Watkins, builder, Leominster, has been accepted for £1,300.

LUTON.—The Grand Theatre, which is to be opened on Monday next, is a two-tier house constructed on the cantilever system. There are only two columns upon the pit level and upper circle level to obstruct the view. The whole of the floors are of concrete. There is seating accommodation for 1,000 persons, and standing room for 350 persons in addition. The proscenium opening is opening is 24ft. by 24ft., and the stage has a total depth of 30ft., with an extreme width of 46ft., with an additional area of 5ft. by 15ft. on the prompt side. The proscenium opening is fitted with a fire-resisting curtain, and the stage with all latest mechanical appliance. Provision has been made for 10 dressing-rooms and a band-room. Three refreshment bars have been provided, together with all cloakroom and lavatory accommodation. Upon the pit level there are 13 entrances and exits, including two to the dressing-rooms in case of fire. Hydrants have been provided in the event of an outbreak of fire, as well as sprinklers above the stage. The theatre is lighted by gas, there being no electric system of lighting at the present time in Luton. The exterior is faced with grey Luton bricks relieved with quoins and dressings of red bricks and St. Aldhelm Box Ground stone for cornice strings, bands, &c., the gable being carried out in stone. The work has been designed and carried out under the superintendence of Mr. Charles Herbert Shoppee, F.R.I.B.A., of 22, John-street, Bedford-row, London, while the contractor is Mr. W. G. Dunham.

THE LONDON LIBRARY, ST. JAMES'S SQUARE.—The remodelling of these premises is now nearly completed. The two large book stores, which will hold about 240,000 volumes, the new reading-room on the first floor measuring about 56ft. by 30ft., the hall below it on the ground floor for the distribution and registration of the books, and the large basement having accommodation for the staff and storage for special books, were formally opened for use on Monday, December 5. The interior walls of the old building have been removed to form the large reading-room, the upper book store above it, and the hall on the ground floor. The lower book store now occupies the site of a former store and the librarian's room in the rear. Access to it is obtained by two short corridors on the ground floor, one in the basement, and off the first landing of the stairs. A wide staircase constructed of teak leads from the ground floor to the reading-room and upper book store. Near the staircase are lavatories, those for the staff being in the basement. Later on accommodation for the committee, secretary, and librarian, students, &c., will be formed in the adjoining premises. The front next St. James's-square has been entirely rebuilt in Portland stone. The book lifts are from Messrs. Waygood and Co., Ltd. The builders are Messrs. W. Cubitt and Co., of Gray's Inn-road, and the architect is Mr. J. Osborne Smith, F.R.I.B.A., of Old Queen-street, Westminster.

WOLVERHAMPTON.—The Empire Palace of Varieties in Queen-square was opened on Monday. The façade is executed in red brick and stone dressings, Moresque in character. The principal feature is a centre gable, surmounted with an octagonal turret. The orchestral stalls are fitted with old gold upholstered tip-up seats; the pit has American leather upholstered seating, and the floor is covered with linoleum. The circle is fitted with tip-up seats, upholstered with electric blue velvet. The gallery is spacious. The decorations have been carried out by Messrs. A. R. Dean, Ltd., of Birmingham. The contractor for the building was Mr. F. Lindsay Jones, of Wolverhampton; Messrs. Phillips and Jones, Wolverhampton, undertook the furnishing; the electricians are Messrs. Young and Co., Birmingham; and the architects are Messrs. Owen and Ward, of Birmingham.—A new workhouse, with infirmary, is about to be built at New Cross, one mile and a half from the town. Mr. Arthur Marshall, A.R.I.B.A., of Nottingham, is the architect. Accommodation is provided for 1,301 persons, of whom 669 will be accommodated in the workhouse, 332 in the infirmary, and 180 in the imbecile block; the casual wards will

house 70, and a nurses' home will be provided with 20 beds. There is one main entrance only, and this is controlled by the porter's lodge with weighing-house. The road passes by the board-room and out-relief department on the left and the receiving wards on the right. The chapel is passed and the main entrance to the workhouse reached. On either side of this are the master and matron's residence, assistant-master's rooms, &c., the dining-hall and administrative block being behind. On either side are covered ways leading to the aged and able-bodied blocks. Electricity will be used for lighting.

## Engineering Notes.

LIGHT RAILWAY SCHEMES.—The number of schemes deposited with the Light Railway Commissioners in the past six months shows an enormous advance upon any previous period during which the Act has been in operation. The proposed lines are of the estimated length of 492½ miles, and the cost, exclusive of plant and rolling stock, is estimated at £3,300,000. The specifications show that electricity is rapidly coming to the front as the motive power. Among the 54 projected lines are the following:—Barnsley and district, length 3½ miles; Colne and district, 5½ miles; Doncaster and district, 5½ miles; Doncaster Corporation, 7½ miles; Dudley and district (extension), 3½ miles; Middleton (extension), two miles; Nelson and district, 1½ miles; Nelson, Colne, &c., 6½ miles; North Lincolnshire, 35½ miles; North Lindsey, 14½ miles; St. Helens, Leigh, and Bolton, 24 miles; South Staffordshire, 4½ miles; Spen Valley, 7½ miles; Trent Valley (amending), 15 miles; North Wales, Narrow Gauge Railways (Beddgelert extension), 4½ miles; Rhyl and Prestatyn, 3½ miles; Swansea, 7½ miles. Applications for light railways are received by the Commissioners twice a year, in the months of May and November. The total number of applications previously received in the four half-years since the appointment of the Light Railway Commission in 1896 amounted to 121 for 1,302½ miles of line at an estimated cost of £7,555,976 for construction.

## PROFESSIONAL AND TRADE SOCIETIES.

GLASGOW BUILDING TRADES' EXCHANGE.—A meeting of the Glasgow Building Trades' Exchange was held on the 2nd inst., Mr. Andrew Gray presiding. Colonel Bennett read a paper on "The Relationship the Building Exchange ought to have to the Technical College." In Glasgow, he said, they had no sound technical schools worthy of the name, and for this he blamed their merchant princes, their Chamber of Commerce, their Merchants' House, their Trades' House, themselves, and the workmen. What was everybody's business was nobody's. The Merchants' House, the Trades' House, and the Council had large sums lying beside them for the purposes of technical education, yet no definite action had been taken to have a proper and adequate scheme carried out. In the Technical College last year 216 plumbers attended the lectures, 112 the workshop classes, 201 the painting classes, and 316 building construction. Was that, he asked, a fair proportion for the building trades of a city like Glasgow? Yet if more had applied they would have required to have been taught in the streets. In this respect Germany had taught the whole world a lesson, colleges being established in all the large towns, maintained by the municipalities, aided by State grants. For the building trades there should be a duly qualified set of practical traders and a visiting committee of qualified workmen from the Exchange, who would visit the school once a week, and see that the boys were being taught on proper lines. In this matter the Building Exchange was too apathetic, and he urged them to direct their energies in the direction he had indicated.

The sale of the first portion of the valuable collection of books and manuscripts formed by the late William Morris, of the Kelmscott Press, was commenced on Monday at Messrs. Sothely, Wilkinson, and Hodge's rooms in Wellington-street, Strand, and has continued throughout the week. Excellent prices have been realised.



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## ILLUSTRATIONS.

YENI VALIDEH JAMI, STAMBUL.—OAK LECTERN IN ST. BRELADE'S CHURCH, JERSEY.—"BOSLOE," NEAR FALMOUTH.—HOUGHTON GRANGE, NEAR HUNTINGDON.—ST. MARYLEBONE WORKHOUSE.—THIRD PREMIATED DESIGN FOR THE SOUTHERN HOSPITAL, CARSHALTON.

## Our Illustrations.

YENI VALIDEH JAMI, STAMBUL: OWEN JONES TRAVELLING STUDENTSHIP.

LAST Friday Mr. A. E. Henderson read a paper on "Santa Sophia, Constantinople," before the Discussion Section of the Architectural Association. We illustrated his drawing of that grand church in the BUILDING NEWS for September 16 last. To-day we supplement our previous illustrations from Stambul by giving a companion picture of the Yeni Valideh Jami, also from Mr. Henderson's pencil when he was travelling in Asia Minor as Owen Jones Student last year.

OAK LECTERN, ST. BRELADE'S CHURCH, JERSEY.

THIS lectern forms part of the new furniture at the above church, which is now being restored. The panel is treated in low relief, and represents St. Brelade shipwrecked on the island. Mr. Knox, of Upper Kennington-lane, is carrying out the joinery and carving; Messrs. Rogers, Bone, and Coles, of Westminster, are the architects. The drawing (reproduced) is from this year's Royal Academy Exhibition.

"BOSLOE," NEAR FALMOUTH.

THIS house has lately been built on a site overlooking the Helford river, amongst trees and undulating hills. The design has been kept quite plain, and depends almost entirely on the colour of the local limestone and granite for its interest. It is roofed with small green-grey slates. The illustration shows a part of the garden front. A large panelled room behind the verandah connects the drawing and dining-rooms, and is entered from the entrance and staircase halls by separate doors. The halls are panelled and paved with circular granite stools (used in the neighbourhood for supporting hay ricks) set in red cement. The work has been thoroughly well done by Mr. Arthur Carkeek, of Redruth. Messrs. Rogers, Bone, and Coles are the architects. The illustration was taken from their Royal Academy drawing this year.

HOUGHTON GRANGE, HUNTINGDON.

HOUGHTON Grange, now in course of completion for Mr. Harold Coote, is situated upon Houghton Hill, a few miles from Huntingdon, and commands an extensive view of the surrounding country. It is approached from the main road by a long straight avenue of limes on the north side, while to the south are the terraces, gardens, and lawn, leading down to the River Ouse. The house stands upon a roughly hammer-dressed base of Weldon stone, and has mullions and dressings of the same material, of which the carving has been executed by Mr. Henry Price, of Kensington. The walls are of red brick, and

the roof hung with old green tiles. The plan is a plain parallelogram, whose only excrescences are the bay windows and chimneys, and, in addition to the accommodation shown, there are four bedrooms and a box-room on the second floor. The hall and drawing-room are panelled in oak, the former having above the panelling a frieze of red brickwork and an oak-framed ceiling. The rooms on the first floor are low, with the exception of the four principal bedrooms, which have barrel ceilings in the gables. A lodge has been built at the drive gates, and some of the old farm buildings are in process of conversion into stables. The drawing which we illustrate was shown at the Royal Academy this year. The architect is Mr. James Ransome, of London.

## ST. MARYLEBONE WORKHOUSE.

THESE buildings, now in course of erection, comprise two large double-ward blocks, connected on the ground floor and basement. Each block will be three stories in height, above the ground floor, with a fourth story over the centre part. The top and third floors will contain wards and day-rooms for infirm men too feeble to leave them. The roofs over the wings will, however, be flat, and available for such of these inmates as may be able to take advantage of them. The second floor will contain dormitories only, and the first dormitories and two large day-rooms. The outer wing of both blocks will contain on the ground floor accommodation respectively for male and female imbeciles and lunatics, the inner wings being divided into two large general day-rooms. The centre rooms between the blocks on this floor will be occupied as an overflow dormitory. The total accommodation will be 555 beds for old and infirm men, 11 male and 10 female imbeciles, and three male and three female lunatics. The basements are divided into a number of large rooms, the effective lighting and ventilating of which is insured by the wide areas, both back and front, and, in addition, the levels of the ceilings will be 4ft. above the general ground level. These rooms will be devoted to a complete set of workshops. The centre part of each block contains the general staircase, which will be lined throughout with white glazed bricks. Ample light and ventilation is provided by a large lantern and skylights. Adjoining these staircases on each floor are officers' rooms and small one-bed dormitories; the towers in the rear contain the bathrooms, lavatories, w.c.'s, &c. Airing yards, properly divided for classification, will be formed both at the back and front of the buildings. The walls of all dormitories will be finished with cement dadoes 4ft. 7in. high and plaster above. The day-rooms will have glazed brick dadoes. All bathrooms and lavatories will be lined with white glazed tile dadoes 7ft. high, and the w.c.'s, &c., will be faced their whole height with white glazed bricks. The front of the building and returns will be faced with hard faced red bricks relieved with stone bands and dressings; the ground-floor story will, however, be entirely in rusticated stone. The back elevation will be faced with white pressed bricks, relieved with red bands and arches to match the adjoining older buildings. The work is being carried out at a cost of £52,100 by Messrs. G. H. and A. Bywaters and Sons, from the designs of Mr. A. Saxon Snell, F.R.I.B.A., architect. The quantity surveyors are Messrs. Northcroft, Son, and Neighbour, and the clerk of works is Mr. Frederick W. Lee.

## THIRD PREMIATED DESIGN FOR THE SOUTHERN HOSPITAL, CARSHALTON.

In continuation of our illustrations last week we give further elevations, sections, and plans of this design for the Southern Hospital at Carshalton, which was submitted by Messrs. Newman and Newman.

Large furnishing and boot showrooms and stores have been built at Norwich on the site of the old Cattle Market Inn, near Orford Hill. The premises, which were opened last week, have a frontage of 65ft., and a depth of 26ft., and are three stories in height. Messrs. Morgan and Buckingham were the architects, and Mr. T. H. Yelf, of Station Yard, Norwich, was the builder.

At Saturday's meeting of the Metropolitan Asylums Board, at the County Hall, Spring Gardens, Mr. Rowland Plumble was appointed architect of the proposed homes for convalescent children at Rustington, at a commission at the rate of 5 per cent. on the cost of the work, except in the case of those buildings which are a repetition of others, and upon which the commission will be at the rate of 2½ per cent. only.

## COMPETITIONS.

BRISTOL.—There are no fewer than fifty competitors for the premiums offered by the Colston Hall Company for designs for the reinstatement of the large hall, which was destroyed by fire a few months since. Designs will be received up to ten o'clock to-morrow (Saturday) night, and they are to be exhibited in the assembly-room of the Grand Hotel, at Bristol, where the adjudicator, Mr. H. L. Florence, V.P.R.I.B.A., of London, will inspect them and make his awards, after which the sealed envelopes will be opened and the names of the competitors be disclosed. The hall is to accommodate 5,000 people.

GLASGOW ART GALLERIES STATUARY.—The Art Galleries and Museums Committee of Glasgow Corporation have adjudicated, along with Mr. Simpson and Mr. George Frampton, A.R.A., upon the models for the eight figures which are to be placed on the roof of the new art galleries. The committee agreed to recommend that the execution of four of the figures be intrusted to Mr. F. Derwent Wood, London, who was formerly of the Glasgow School of Art. Mr. Rhind, Edinburgh, is selected for one figure, Mr. Johann Keller, of Glasgow School of Art, for another, and two London sculptors, whose names have not yet transpired, have been selected for the remaining two figures.

SALTWOOD.—The trustees under the will of the late Mr. Robert Thompson, of Saltwood, recently held a limited competition for the purpose of receiving designs for a public hall, six almshouses, and a nurse's cottage, proposed to be erected at Saltwood, Hythe, Kent. Seven sets of designs were sent in, and the trustees have awarded the positions as follows:—(1) Mr. Henry J. Jeffery, M.S.A., of Ashford, Kent. (2) Mr. Knowles, of Folkestone. (3) Mr. R. Philip Day, of John-street, Adelphi. Mr. Jeffery has been intrusted with the work, and it is intended to proceed at once with the getting of estimates. Messrs. Mowll and Mowll, of Dover, Ashford, and Canterbury, are acting as legal advisers to the trustees.

## CHIPS.

At the last meeting of the building committee of the Rochdale Corporation plans for 106 cottage houses were passed. Many of these are to be built on the Deepdish estate; others are to be erected in Manchester-road, near the top of Sudden Brow.

Lord Tredegar opened the West Monmouthshire Secondary Schools at Pontypool on Friday. They were built out of funds from Jones's Charity, cost over £20,000, and are for boys.

The Board of Trade have recently confirmed an order authorising the construction of a light railway from Summerhill-road, St. George's, in the city of Bristol, to Hanham, in the parish of Kingswood, in the county of Gloucester.

A public inquiry was held by Colonel Smith, R.E., at Warminster, on Friday, on behalf of the Local Government Board, relative to the application by the Urban Council for a loan of £7,500, for a sewerage and sewage disposal scheme for the town.

The block of property known as the Central Exchange Buildings, Newcastle-on-Tyne, purchased a short time since by Mr. Robert Deuchar from Colonel Brooke and Mr. W. S. Pritchard, of London, has been disposed of by Mr. Deuchar to a syndicate of several leading citizens of the city. The property thus transferred includes the Art Gallery Restaurant, the Vaudeville Theatre, and Arts Club. The price paid is £337,000, which is at the rate of £100 a yard.

New board schools are being erected at Hollington, and special consideration has been given to the ventilation, which will be carried out on the Boyle system.

The Conservative Club, Rawtenstall, is being warmed and ventilated by means of Shorland's patent Manchester stoves and patent Manchester grates, the same being supplied by Messrs. E. H. Shorland and Brother, of Manchester.

An adjudication in bankruptcy is announced in the case of Saint Oswald Pennington, of Wolverhampton, architect and surveyor.

Above £3,000 has been promised towards a fund for restoring the parish church of Holy Trinity, Hull, one of the historical edifices of the County of York.

Damage estimated at from £1,000 to £1,500 was caused by a fire which occurred in the timber-yard of Mr. E. Cave, Corporation-street, Sheffield, on Friday. The fire broke out in a large shed, in which a great deal of timber was stored. The cause of the outbreak is unknown.

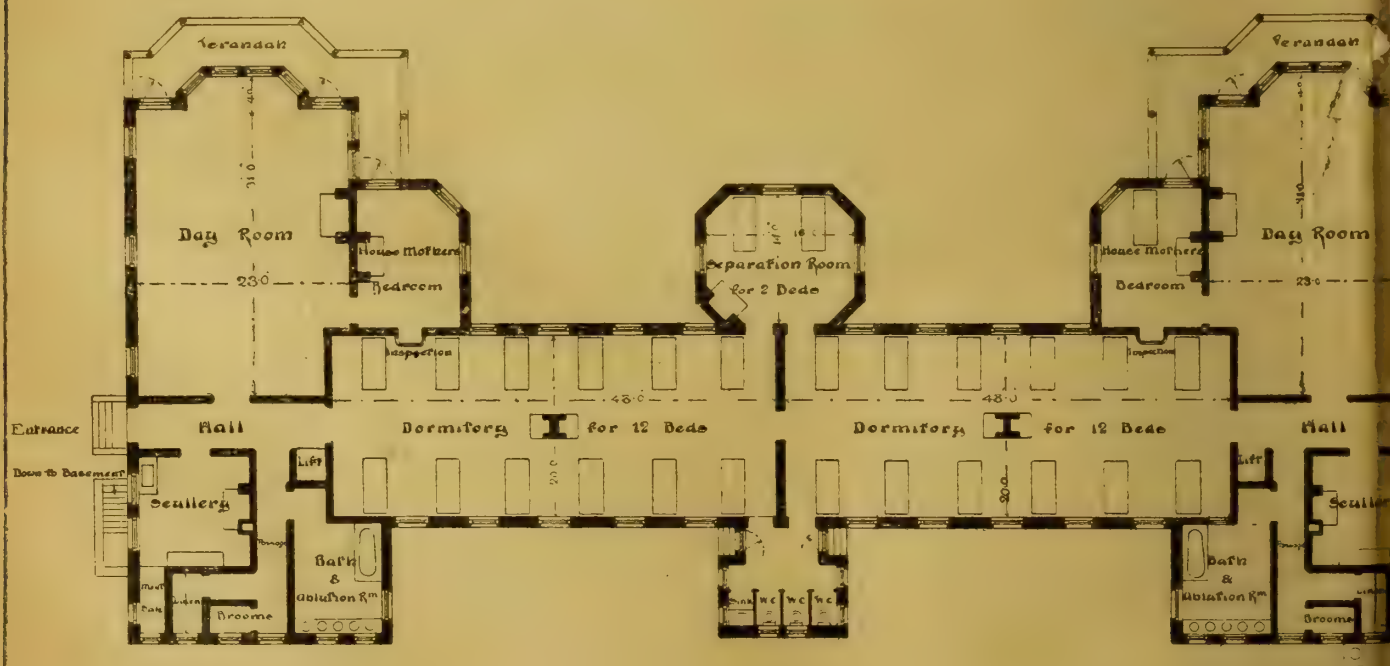




— EAST ELEVATION —



— WEST ELEVATION — DOUBLE C



— GROUND FLOOR PLAN —

SCALE 1/4" = 1'





— SECTION ON LINE —

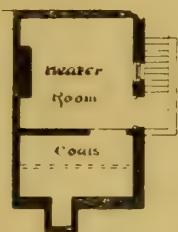


— NORTH ELEVATION —

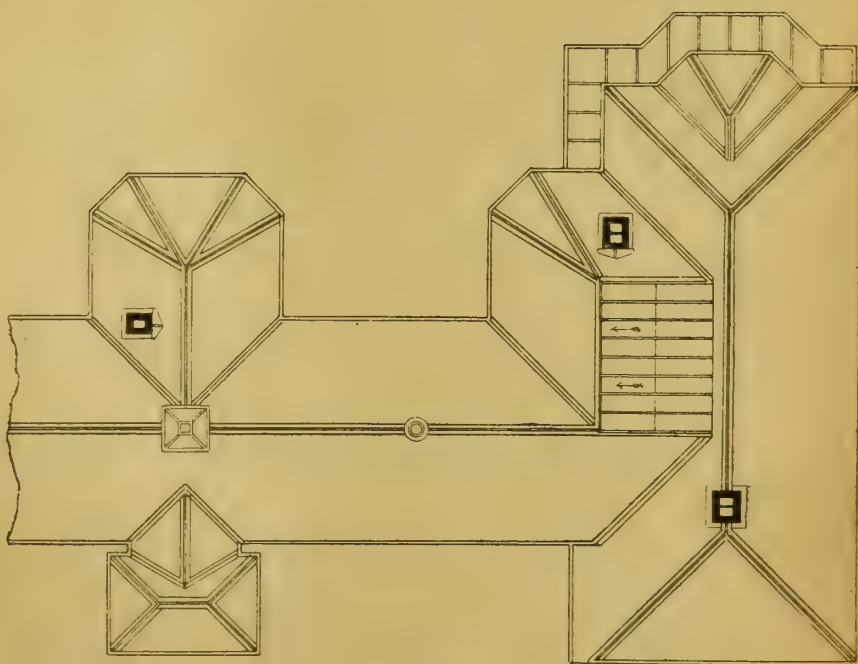


— LONG SECTION —

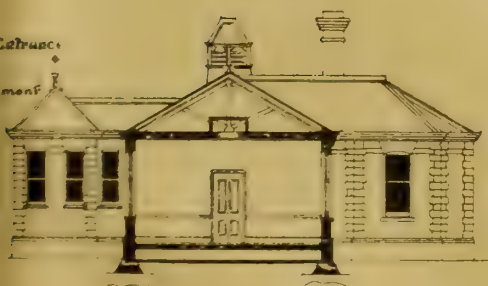
TAGES



— BASEMENT —  
— PLAN —



PART  
— ROOF PLAN —



— CROSS SECTION —

OF FEET



## Correspondence.

## VENTILATION.

To the Editor of the BUILDING NEWS.

SIR,—Ventilation is of the utmost importance, and yet it is much neglected everywhere, or at least it is not well carried out on any well-defined principle—frequently no principle at all. Air will circulate, blend, ascend, or descend, to supply a want, without the aid of a fan or artificial force if allowed fair play—if, in arranging the air flues, natural laws are conformed to, not perverted.

When ventilation is neglected in dwelling-houses, in sleeping apartments (where it is so necessary), in places of worship and lecture-halls, there need be no surprise that it is neglected in main sewers. On the 3rd inst. two men were overpowered and suffocated by the foul gases in a main sewer in Manchester. The disaster might have been much more serious, as several brave fellow-workmen very nearly lost their lives in trying to rescue their mates. It is evident that there is danger to life in entering unventilated main sewers in certain conditions of the atmosphere. This danger ought not to lie; it is a matter of some importance which the Manchester Corporation will have to deal with.

A few years ago at Llandudno the only ventilation to the sewers were grids at the street level, mostly in the back streets. One of these grids was fixed at the back of the Hydropathic, Neville-crescent. A few days after that I was there on business, and found the foul air escaping freely from the grid, that point being at a higher level than at some other parts of the town. No time was lost in calling upon the surveyor to complain of the dangerous nuisance. He said, "Well, what can be done?" I answered, if he would come with me, I would show him what could be done, and what must be done at once. The sewer was ventilated into the steam-boiler chimney. This plan has been carried out in other parts of the town, to the great advantage of the healthiness of Llandudno. There is no difficulty whatever in ventilating main sewers, if carried out on a correct basis. In cases where it is necessary to provide a furnace at the bottom of the ventilating shaft, the air from the sewer may be either burnt or disinfected.—I am, &c.,

J. CONSTANTINE, Sen.

23, Oxford-street, Manchester.

At Friday's meeting of the Middlesbrough School Board it was agreed to appoint a committee to consider the advisability of establishing a higher-grade board school similar to that at Leeds; and further, to advertise for competitive designs for proposed new schools in the Ayresome district to accommodate 1,500 scholars, the schools to be built on the central hall plan.

A technical school is at present being erected at Dunfermline in juxtaposition to the existing High School, the cost of building and equipment, which is estimated at at least £10,000, being met by Mr. Andrew Carnegie.

The music-hall at Inverness was burned down on Sunday morning, and two shops underneath it, occupied by a wine merchant, shared the same fate. The damage is estimated at from £10,000 to £15,000.

Mr. F. H. Tulloch, a Local Government Board inspector, has held an inquiry at Birmingham into an application of the city council to borrow £10,000 for the erection of dwellings for the labouring classes.

Mr. J. Partridge Jenkins, of Beanham Manor, Daventry, has been elected borough surveyor of Penryn, in succession to Mr. Powell, resigned.

Messrs. Shellabear and Son, contractors, of Plymouth, have obtained another Government contract for the erection of several houses for the officials connected with H.M. convict prison at Princetown. They have appointed Mr. J. Gordon as clerk of works. The undertaking has been commenced.

The Earl of Selborne will open on Monday week, December 19, the block of new buildings which has been erected in Reading for the Wellington Conservative and Constitutional Club.

Two new social clubs in Newcastle-on-Tyne, one in Grafton-street and the other in Brinkburn-street, were opened on Saturday. The former building was formerly used as a temperance hall, and afterwards as a Salvation Army barracks. It has been altered for its new purpose by Mr. Walter Easton, of Newcastle, from plans by Mr. A. B. Plummer, of the same city, and the same architect and contractor carried out the works at the second club.

## Intercommunication.

## QUESTIONS.

[12116].—**Photo. Printing Apparatus.**—I should be glad of information as to how to make an up-to-date frame (double-elephant size). Is it necessary to have plate-glass for the front? In a recent article by "H. C. S." he names clear glass, but does not say whether plate or sheet. Details as to dimensions of stuff, and method of obtaining uniform pressure, will be much appreciated. Is there any mechanical method (of practical use) of obtaining duplicates of a drawing made on thick opaque Whatman paper, without first tracing the same?—DRAUGHTSMAN.

[12117].—**Law of Contract.**—A lets a contract to B, and, when almost completed, he lets on the same building, verbally, another contract to B. He afterwards withdraws, and lets it to C, with the result that C has to take down part of B's work to carry out the contract. Can he legally do so?—A CONSTANT READER.

[12118].—**Fibrous Plaster Decoration.**—Will someone practically acquainted with slab decoration give me any advice as to fixing the slabs to walls and ceilings—whether any "backing" is necessary for a cove?—A NOVICE.

[12119].—**Hydraulic Tables and Discharge of Circular Pipes.**—I shall be glad if any reader will inform me whether any tables can be had showing the velocity and discharge of drains?—LEARNER.

[12120].—**Cast-Iron Soil-Pipes.**—I want to know if it would be better to use a cast-iron soil-pipe to a building five stories in height than one of lead, and the mode of making the joints and connections? Or can anyone refer me to any buildings where cast-iron pipes are used?—A.

[12121].—**Problem.**—Will any readers give me a geometrical solution of this problem? Given a circle, and two points outside it, find a point on the circle which is such that the straight lines joining it to the given points make equal angles with the tangent at the point?—W. O. H.

[12122].—**Calorifer.**—I am interested in the erection of a large building to be used for offices, and shall be glad to learn from any reader of "Ours" who has had experience in the matter if it would be practicable to warm and ventilate this building by means of a calorifer? If it would be more economical than a separate fire in each room, and generally any information on the subject, especially how to set about it, and what to get and build?—J. A. F.

[12123].—**Commercial Values of Iron Ores.**—Can any of your correspondents kindly give information on the following questions? What is the usual practice adopted in determining the commercial values of iron ores and the proportions of the various elements (or their chemical combinations) contained in the standard ore quoted on the ore market? For example, if Spanish Rubio ore is quoted at 15s. 8 per ton for ore containing 50 per cent. metallic iron and 8 per cent. silica, what is the value per unit of silica? And what are the proportions of lime, magnesia, sulphur, phosphorus, manganese, alumina, titanium, nickel, or other elements, or their chemical combinations, contained in this standard ore, and what are the money values or proportions of the total quoted value (15s.) to be added or deducted for each unit or fraction of a unit of these elements or chemical combinations over or under their standard proportions? What proportions of lime or lime and magnesia are required to form a flux with a given quantity of silica contained in the ore? Which is the best, "up-to-date," concise, and practical book of reference on the above subject?—MAX.

[12124].—**Chemical Fire Extincteur.**—What is the best proportion of bicarbonate of soda and sulph. acid per gallon of water, and do any of your readers know of a better mixture for fire extincteurs?—H. HARPER.

[12125].—**Dissolving Limestone.**—Is it possible to dissolve limestone without evolution of the carbonic acid in the form of bubbles? I want a solvent which will combine with the CO<sub>2</sub> by some double decomposition, and acting rapidly, without application of heat, if possible.—A. S.

[12126].—**Heating Power of Quicklime.**—When quicklime is sprinkled with water it becomes hot. Can anyone give a reference to any tables as to the amount of heat given out by a specified quantity of quicklime, or as to the number of degrees rise in temperature? If the data can be given with reference to qualities of lime, so much the better.—R. H. D.

[12127].—**Origin of the Coronation Stone.**—In a pamphlet called "Britain's Imperial Destiny," giving a number of reasons for believing the British Nation to be identical, not with Jews, but with the lost ten tribes of Israel, the following passage occurs respecting the "Coronation Stone":—"Canon Tristram, in his book on 'The Land of Moab,' states that no similar rocks are found within the United Kingdom, but have been found near to Livy, where Jacob found his stony pillow." Can any geologist give the proper name of the rock of which this stone is composed, and say if Canon Tristram's statement is correct?—GLATTON.

## REPLIES.

[12112].—**Fumigating-Room.**—When I built my present studios in 1881, from the designs of Mr. R. Medley Fulford, F.R.I.B.A., of this city (now the Rev. R. Medley Fulford, the parish priest of Bovey Tracey, Devon), a fumigating-room was included on the plan. It is simply a dark chamber, square, and large enough to take the longest length of stalls, and high enough for its ceiling to clear the tallest spiral font cover. With no windows, it is almost as dark and dreary as are those awful dungeons in the Steen, which lie underneath the water-line of the sluggish Scheldt, at Antwerp. The door is, of course, perfectly airtight, fastened by a latch from the outside, and without an unnecessary key-hole. That is all that

is required: a compartment perfectly free from light and air. Whether fumigating oak is a judicious process is altogether quite another question. Personally, I never fumigate willingly, and generally not without mild protest. My own candid opinion is that the fumes of the chemical used injures the lasting powers of the oak. These premises, as mentioned above, were built about 17 years ago. My own private offices, from Mr. Medley Fulford's designs, were fitted up somewhat expensively (at a net cost of many hundreds of pounds) in wainscot oak; but everything was left from the tool. Nothing was either dull, wax-polished, or fumigated. To-day the whole of the oak-panelled dados, book-shelves, cornices, furniture, and other fittings have toned down to a lovely, mellowed dark brown, it does the eye good to rest upon in moments of strain or fatigue. It has gradually assumed this tint quite naturally, and is now the same colour as is the dark teak used for the window-frames and sashes, for, of course, for expediency sake, no one cares to use always somewhat treacherous oak for windows when teak is obtainable.—HARRY HEWES.

[12113].—**Private Drain or Public Sewer.**—The word "drain" is defined in the Public Health Act, 1875, to mean any drain "of and used for the drainage of one building only, or premises within the same curtilage, and made merely for the purpose of communicating with a cesspool, or with a sewer into which the drainage of two or more buildings or premises occupied by different persons is conveyed," the word "sewer" meaning and including sewers of every description except drains interpreted as aforesaid. Drains are used by private individuals, sewers by public authorities; but the definition is not so clear as it ought to be. I do not think it necessary that the two or more buildings should belong to two or more different owners, so long as the conduits are constructed in the first place by private individuals. Section 74 empowers a vestry or board to order that a group or block of houses be drained by a combined operation, if it appear that such a block of houses may be drained more economically in combination than separately.—G. H. G.

[12113].—**Private Drain or Public Sewer.**—The distinction is not very clearly defined. A "drain" is considered to be a construction or culvert made by a private individual for his own premises or block of houses; a "sewer" is a culvert constructed by a public authority. I am of opinion that the culvert could not be a public sewer if it drained two or more buildings belonging to oneowner.—T. O. S.

[12114].—**"Keen's" or "Keene's" Cement.**—The query of "Stickler for Accuracy" is worth attention. I have read many treatises and trade books where the name is spelt without the final *e*. The right spelling is undoubtedly the latter, as I find most authoritative textbooks spell the name with the *e*.—CORRECT SPELLING.

## CHIPS.

On Monday the town improvement committee of the Newcastle-on-Tyne City Council had under consideration plans of a building scheme on the Wingrove Estate, Fenham. It comprises some 600 self-contained houses.

Last week Mr. W. T. Haydon delivered a lecture on "Gothic Architecture" before the members of the Liverpool Ruskin Society, in the lecture-room of the Free Library, William Brown-street, Liverpool.

The reopening of Allington Church, which has been redecorated and restored, took place on Wednesday, when the Archbishop of Canterbury performed the dedication ceremony.

At the last meeting of the Edinburgh Architectural Society, Mr. Wm. N. Cumming, A.R.I.B.A., in the chair, Mr. R. S. Lorimer, A.R.I.B.A., read a lecture on "Old Scottish Gardens and their Relation to the House." The lecture was illustrated by a number of fine limelight views of old Scottish gardens, showing details of their various interesting features, which the lecturer explained.

The Soremerton Estate, adjoining the sea-shore at Berwick-on-Tweed, and extending from the railway station northwards towards the Spittal boundary, is about to be laid out and developed as a building estate.

Mr. Charles M'Bride, Edinburgh, who was entrusted with the commission for a statue of the late Sir William Mackinnon, has just completed the figure in clay. It will be cast in bronzes forthwith. The committee has yet to decide where the statue will be placed, but it is understood that its destination will probably be Mombasa, the capital of the East African possessions of the Crown. The figure, which is 9ft. high, will stand on a circular red granite pedestal 12ft. high.

An extension of the Penrhos Wesleyan College for Girls at Colwyn Bay, added to the older buildings at a cost of £4,000, was opened last week.

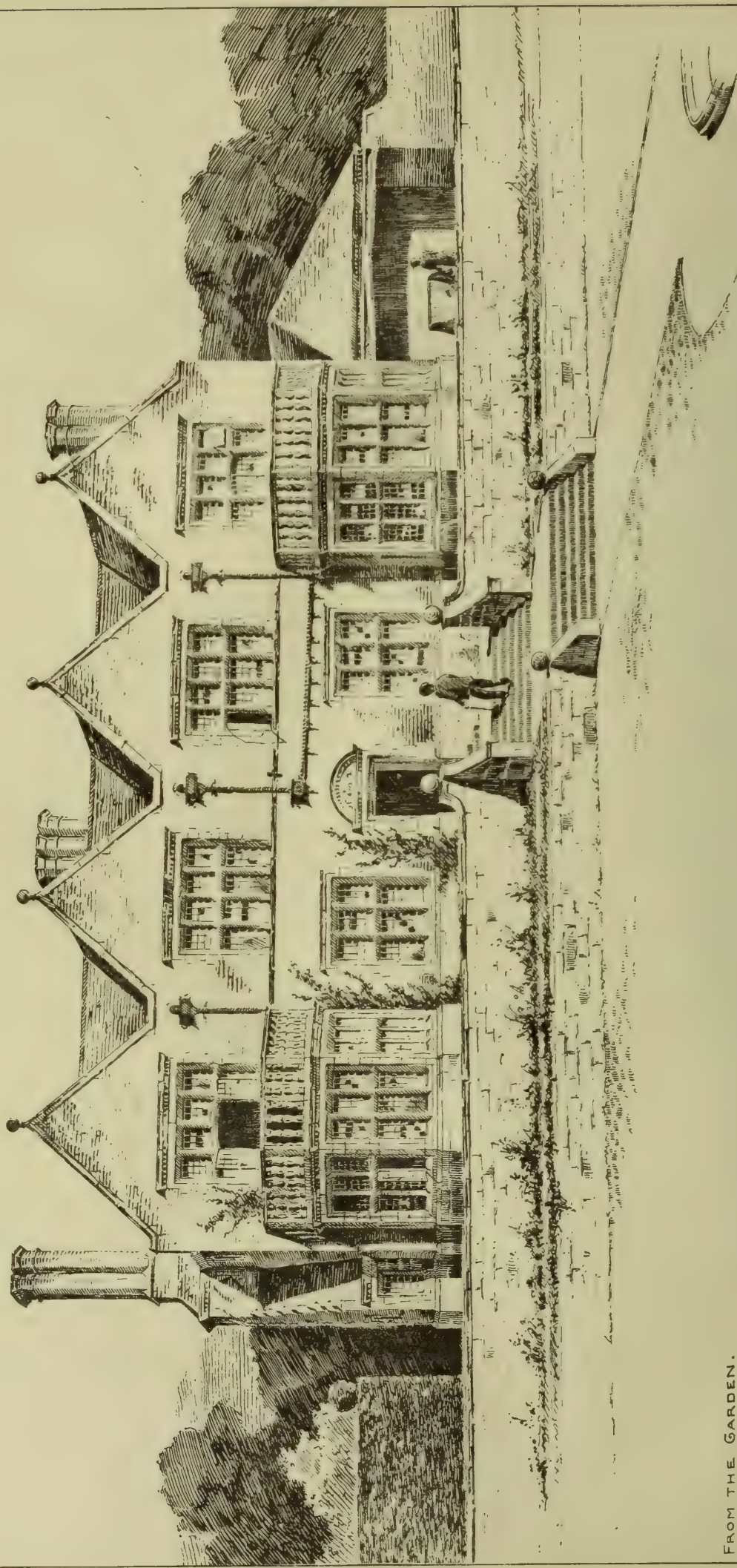
Alterations and additions are to be made to Saltford schools in Somersetshire. Plans are being prepared by Mr. George P. Allen, architect, of Adelphi Chambers, London.

The Mayor of Plymouth (Alderman J. Pethick) formally opened on Monday the first block of workmen's dwellings erected by the corporation in Vauxhall-street. The block comprises seven houses to be let at a weekly rental of 5s., seven at 4s. 6d., and seven at 4s. The total cost of erection has been £5,847, and the price of the land was £760 10s. They have been built from plans by Mr. J. Paton, borough surveyor, the contractors being Messrs. Wakeham Brothers.

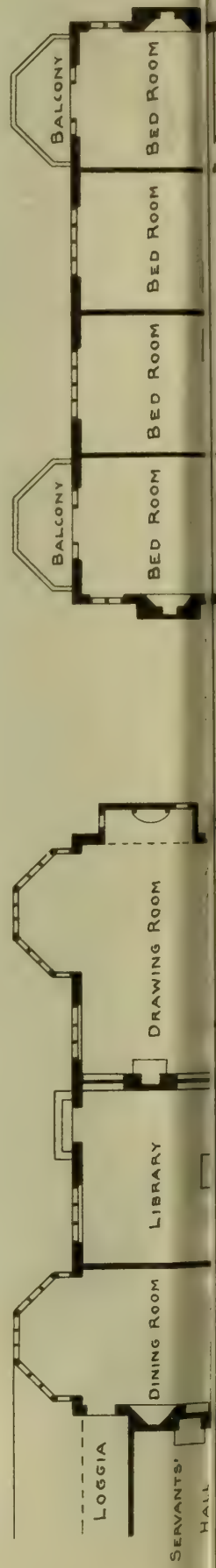




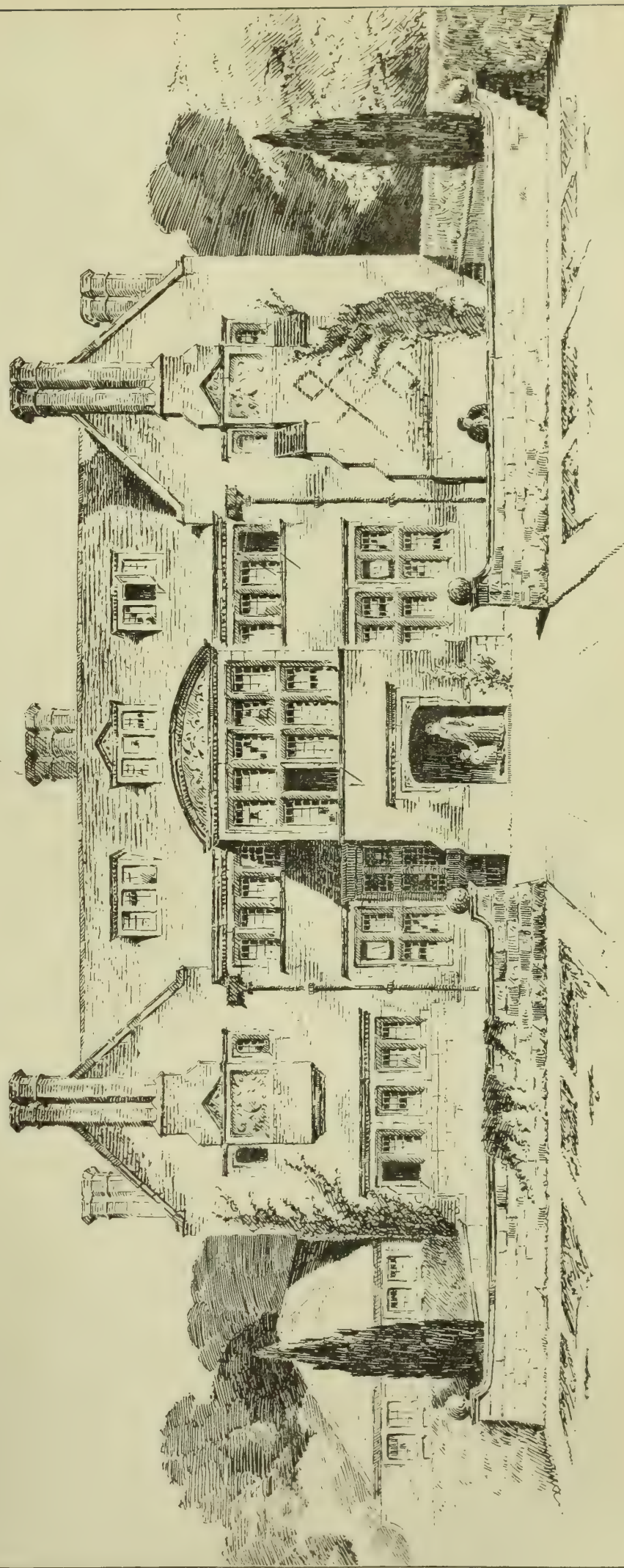
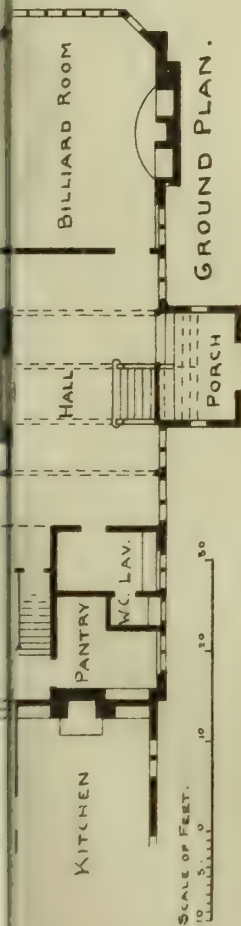
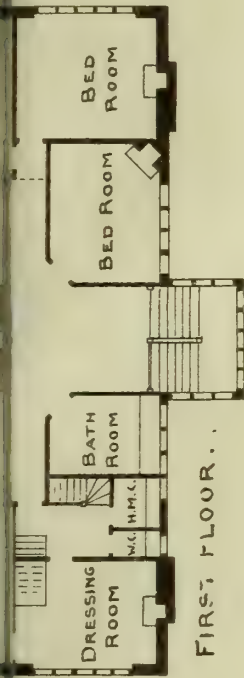




FROM THE GARDEN.







FROM THE DRIVE.

'HOUGHTON GRANGE' NEAR HUNTINGDON, FOR HAROLD COOTE ESQ<sup>RE</sup>.

Photo. Lithographic & Engraving by Messrs. J. & J. Harrison, 15, Abchurch Lane, London, E.C. 4.

















YENI VALIDEH JAMI STAMBUL



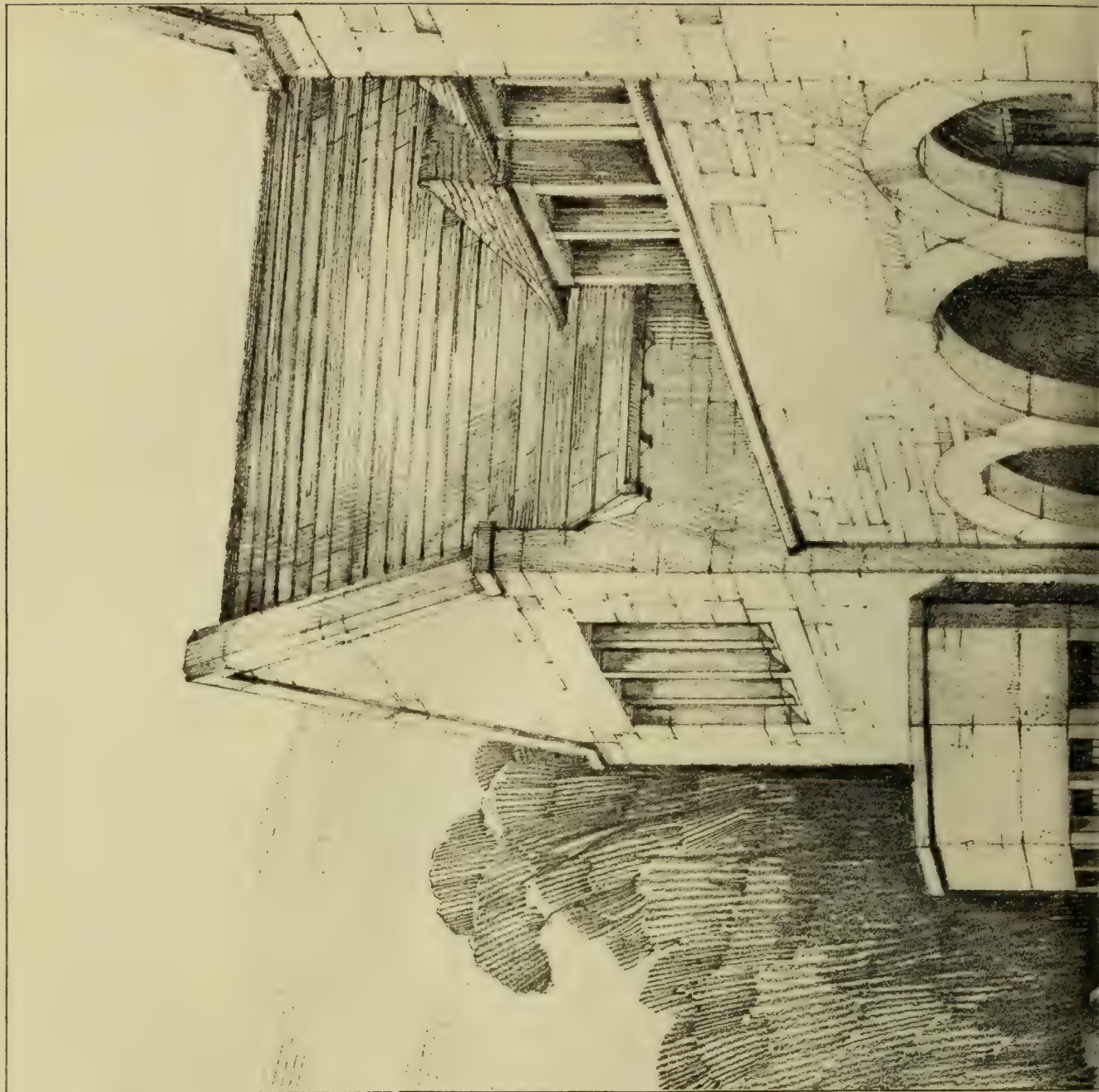
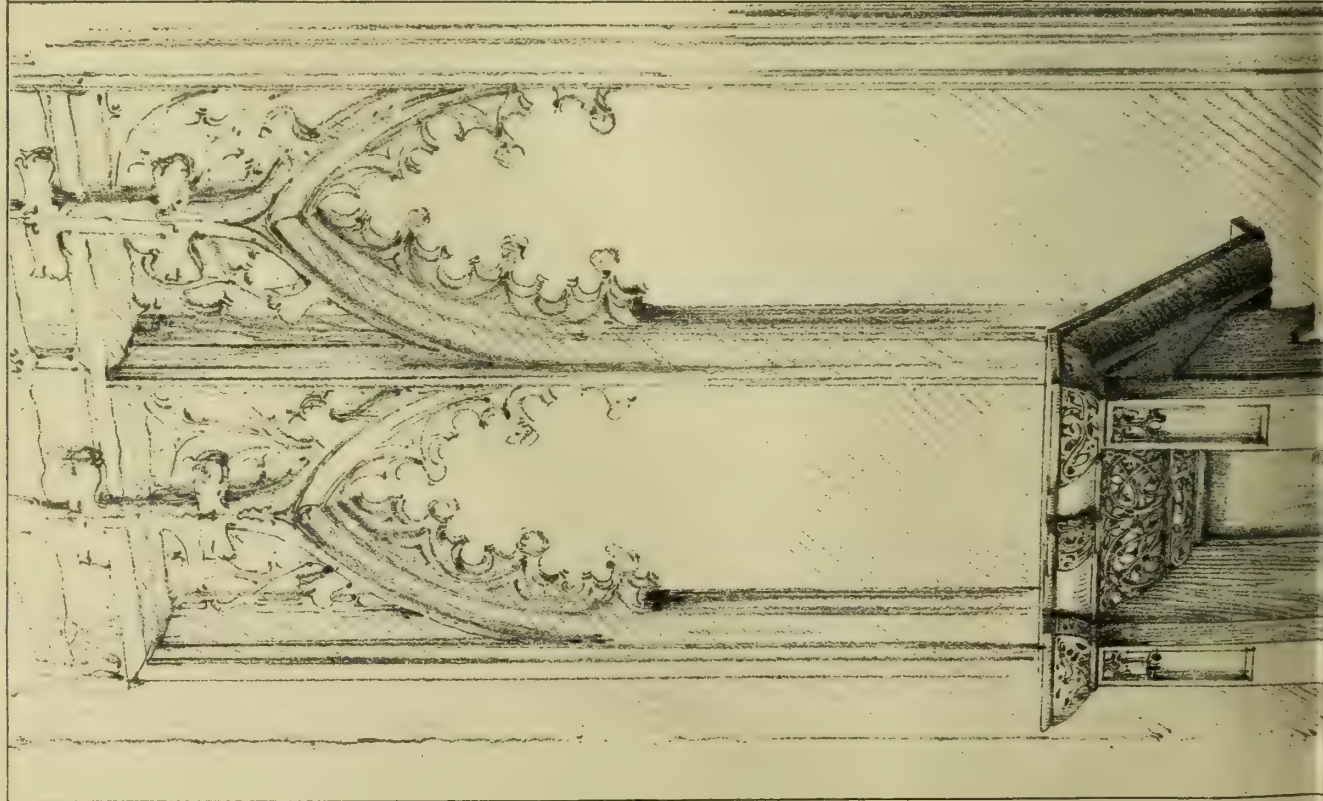




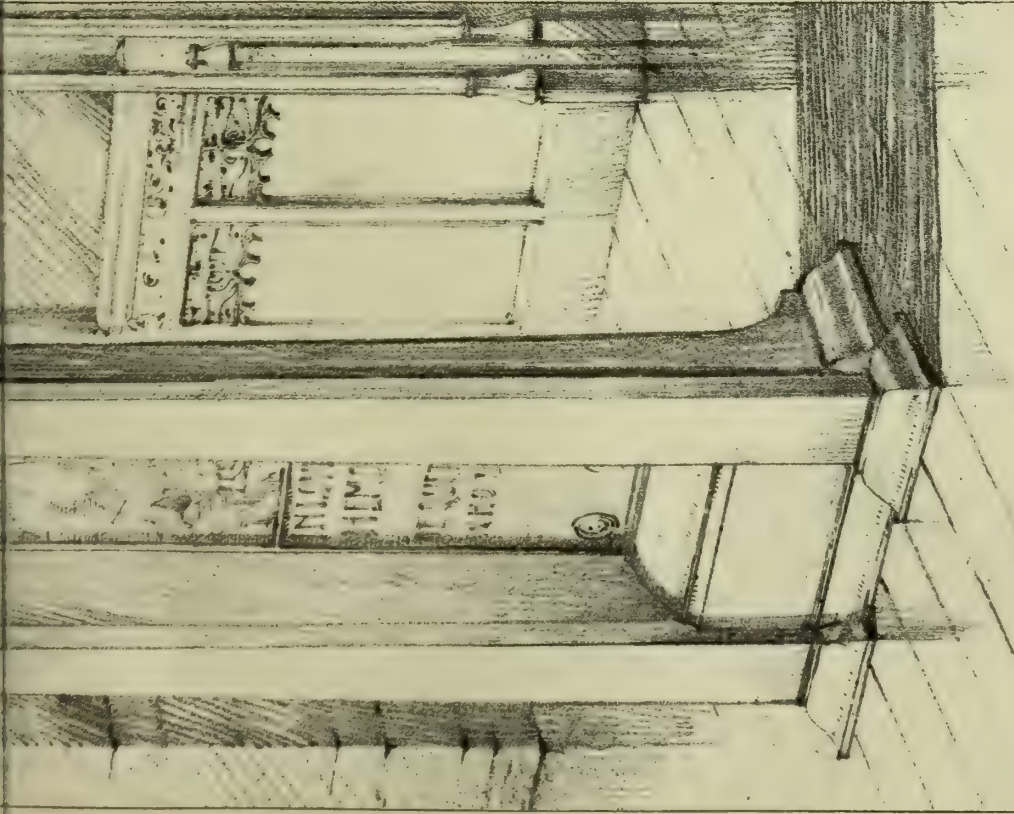




THE BUILDING PEWS, DEC. 9, 1898.

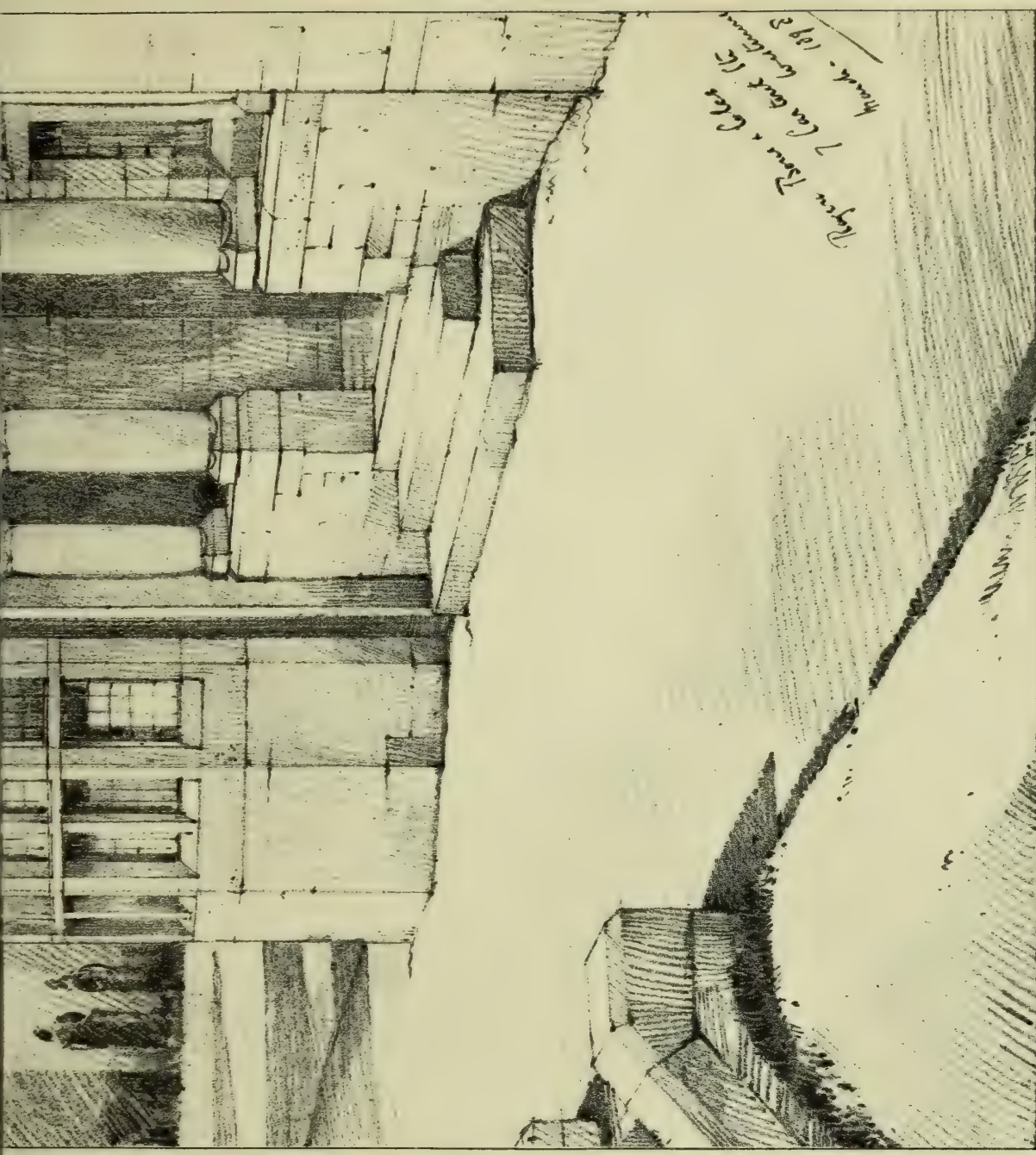






ST BRÉLADE'S CHURCH • JERSEY.

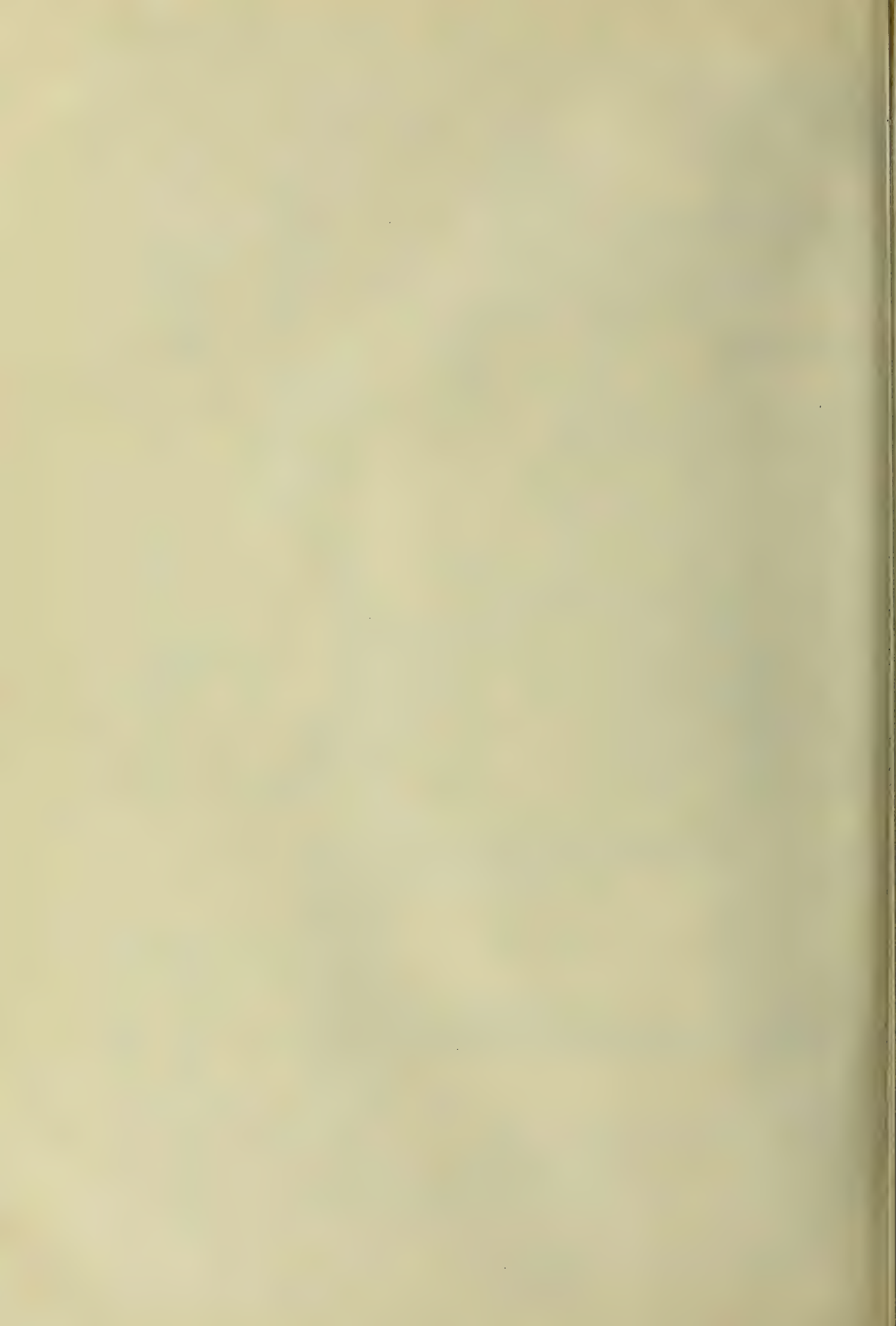
OAK LECTERN WITH COPPER PANEL.



'BOYLOR'S' • NEAR FALMOUTH • FOR • W. W. WARD ESQ. RE

Wagon Room & Cider  
House. 1893  
7 Can Rack 112

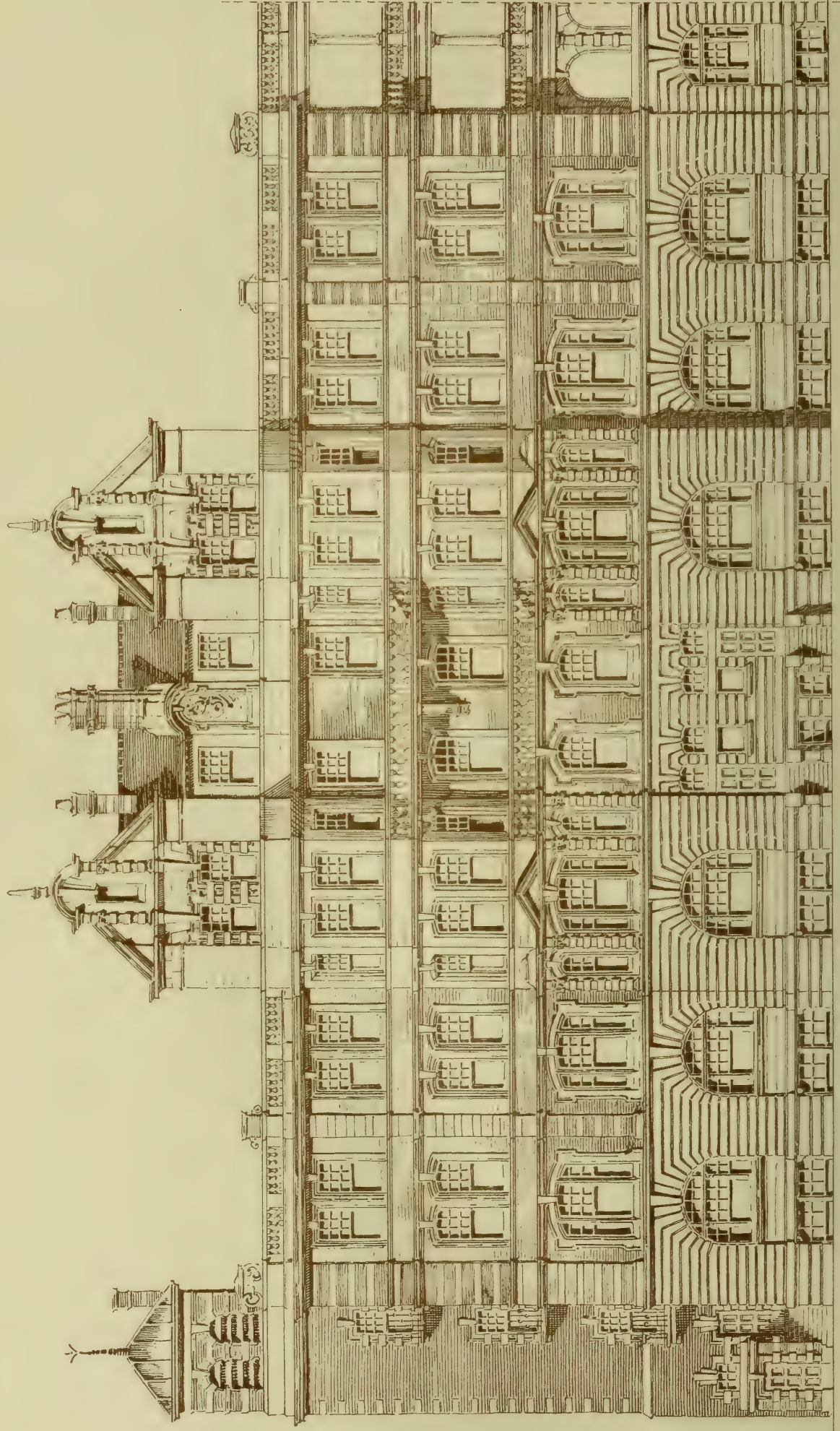








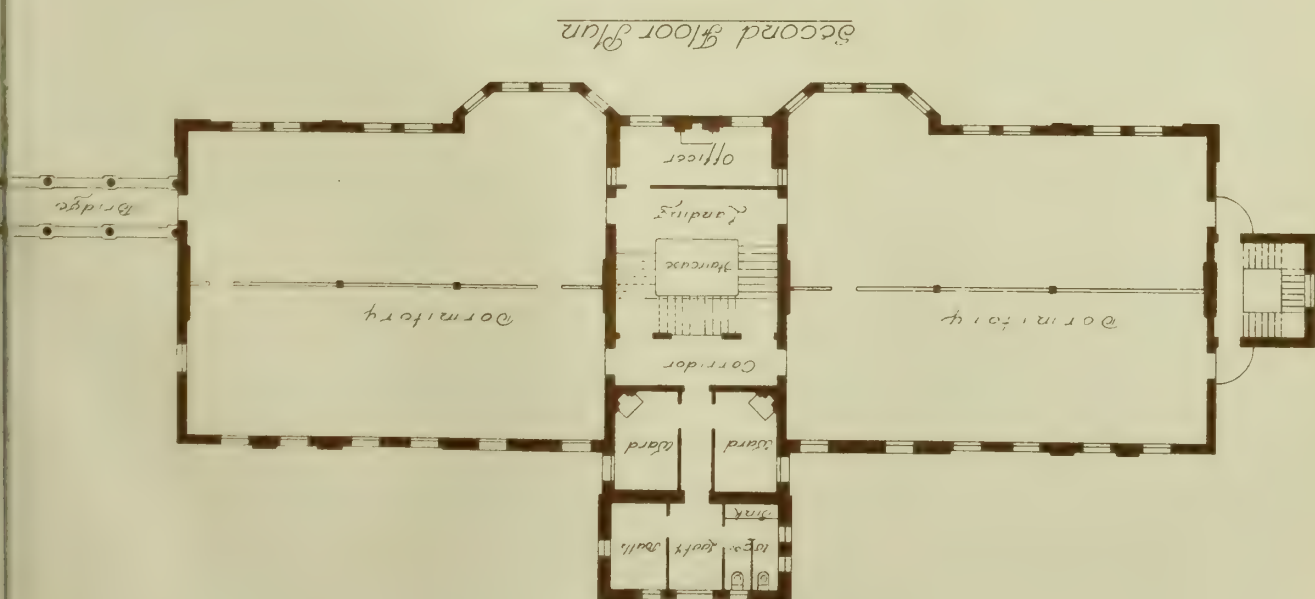
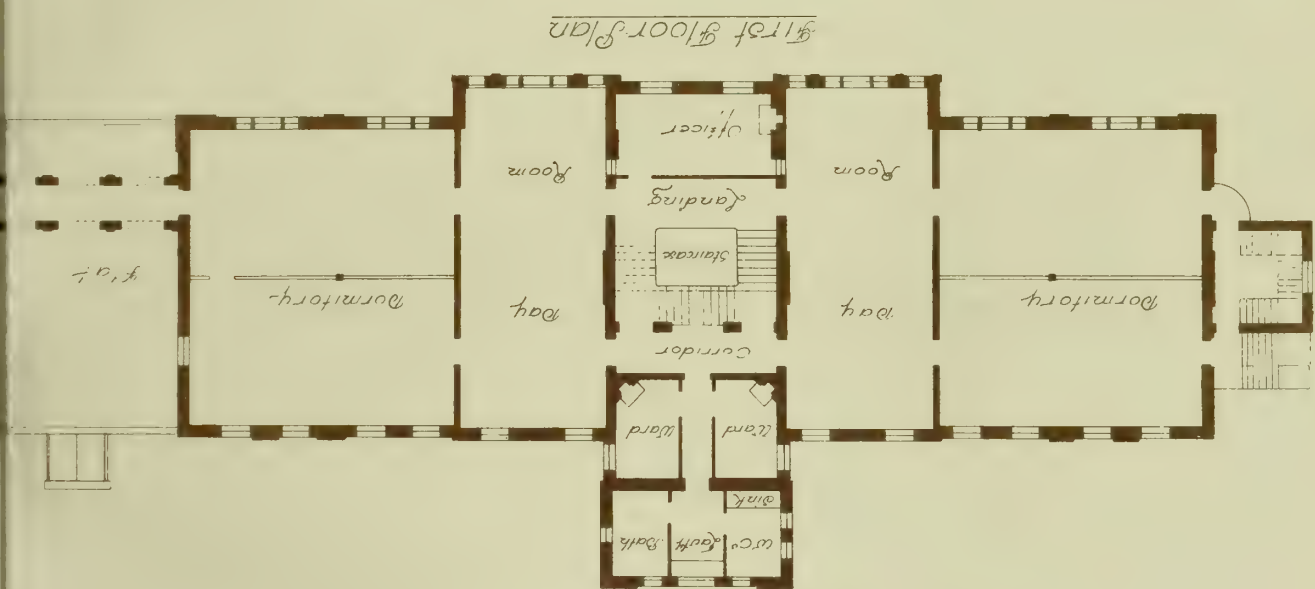
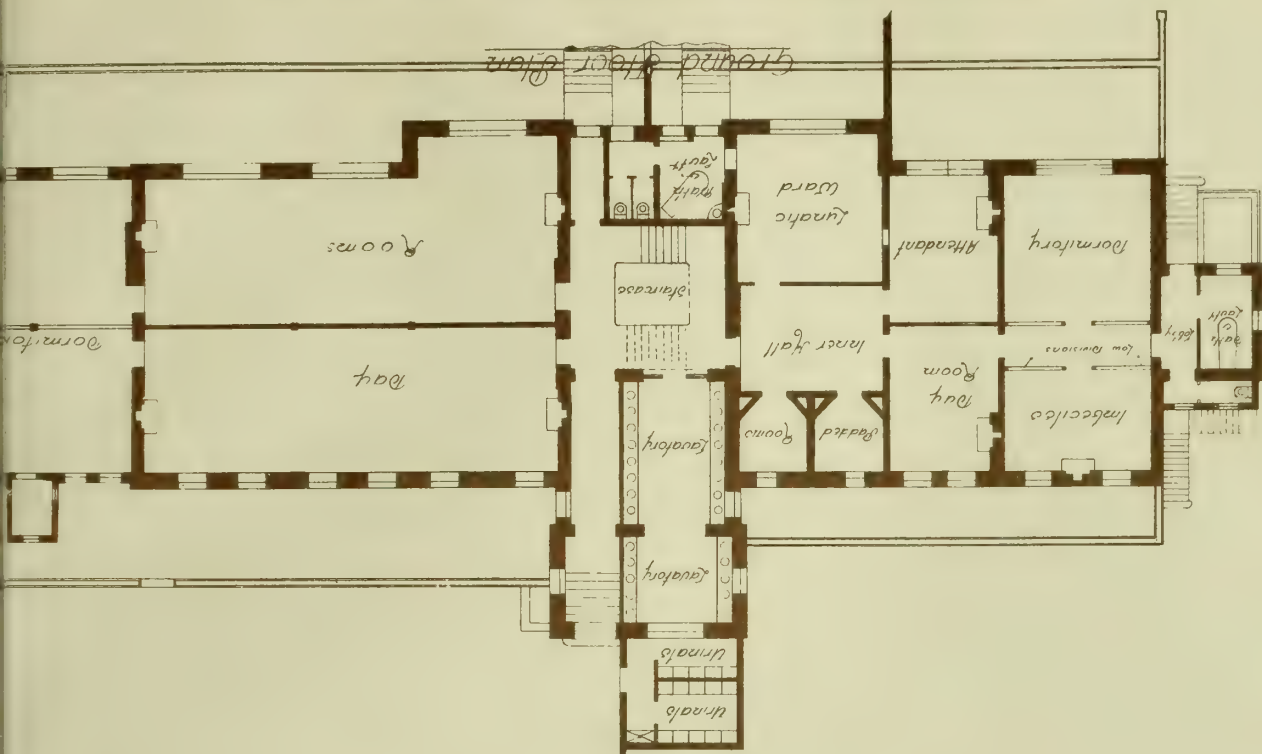




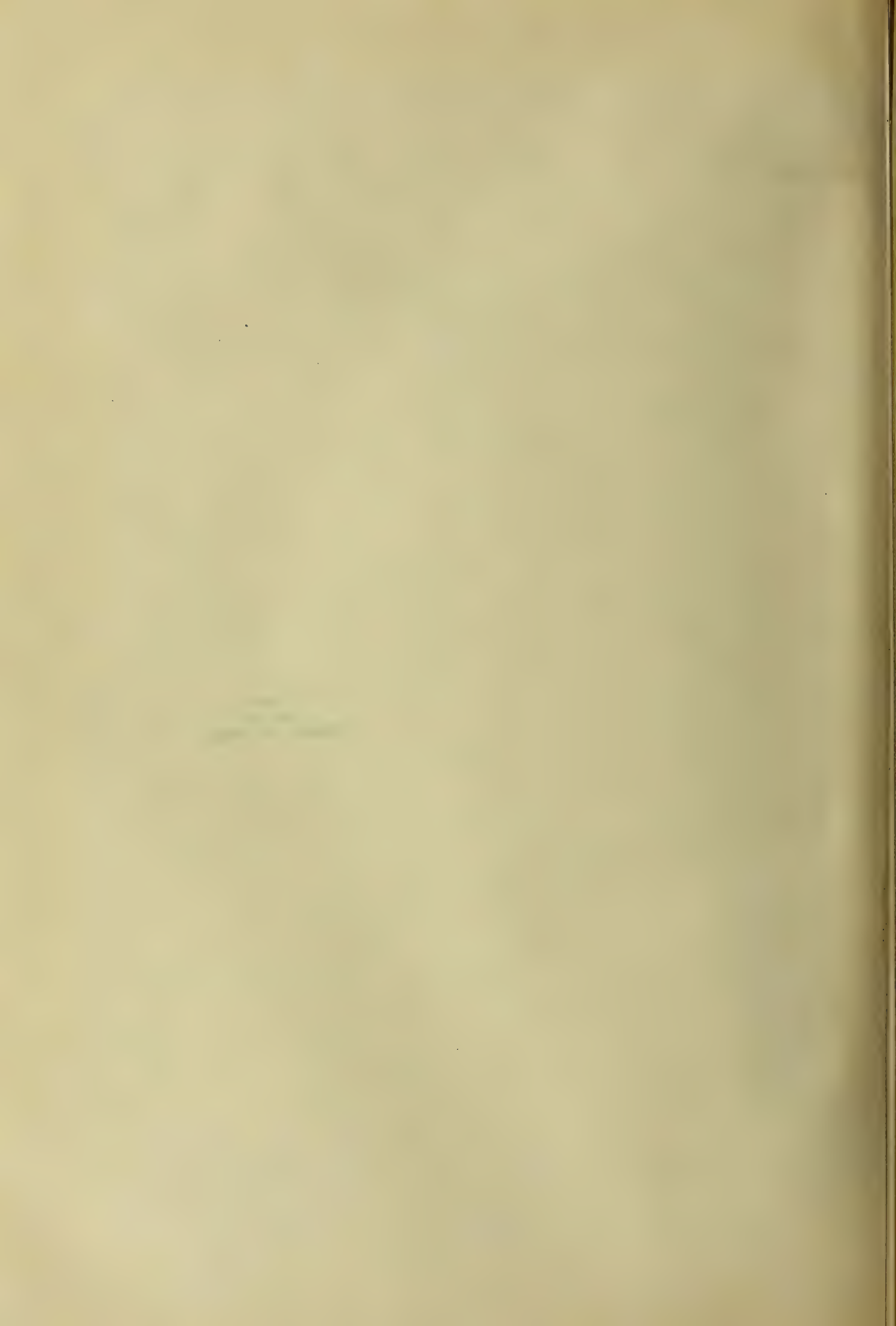
ST. MARYLEBONE WORKHOUSE. MARYLEBONE R<sup>D</sup>. FRONT WARD BLOCKS.



1" = 10' - 0"









## LEGAL INTELLIGENCE.

**MALVERN.**—LINK GASWORKS: ARBITRATOR'S AWARD.—The arbitrator has made his award in the proceedings for the acquirement by the Malvern District Council of the Link Gasworks. The amount the council will have to pay, if the arbitration stands, is £22,100, to which must be added the whole legal costs in connection with the arbitration. The council have decided to appeal on a point of law. The company claimed £27,090, and the council's estimate of the value was £18,000 odd.

**WORKMEN'S COMPENSATION.**—At Southwark County-court, on Monday, before Judge Addison, Q.C., a bricklayer's labourer named Ewington claimed compensation under the Workmen's Compensation Act from a builder named Goodall, of Stoke Newington, in respect of injuries sustained whilst the plaintiff was at work on a building in course of erection at Magdalen-street, Bermondsey. His Honour found for the respondent on the ground that the building was not 30ft. high from the basement level when the accident happened, and proceeded to comment on the mischief which had been done in Parliament by inserting in the Act an appeal clause, which was oppressive to the rich as well as to the poor. Judgment was entered for the respondent, but no costs were asked for, and Mr. Mallison intimated that his client was willing to give the man work.

**A BRISTOL ARBITRATION.**—Mr. Frank Wills sat at the Grand Hotel, Bristol, on Friday, as arbitrator in a case in which Messrs. R. Wilkins and Sons, builders, of Surrey-street, Bristol, were the plaintiffs, and the Western Counties Agricultural Co-operative Association, Ltd., Plymouth, were the defendants. The total amount claimed was £1,426, being damages for delays which occurred during the erection of a warehouse for the defendants on Redcliff Back, Bristol, under a contract for £10,949. The warehouse in question had to be constructed on the river Avon, just below Bristol Bridge, the front facing the river and the back being towards Redcliff-street. Prior to the date of the contract the defendants entered into an agreement with the corporation to take a lease of the site, and under that agreement the corporation reserved to themselves the right to run a railway along the edge of the bank of the river, thus necessitating the first floor of the defendants' warehouse being of concrete, supported by iron bressumers stretching from the river front of the wall, and raised on stanchions. The contract also contained an agreement by the corporation to deepen the river in front of the new warehouse, in order that vessels of a larger draught might be able to come up and anchor there, and discharge their cargoes into the warehouse, and also to erect a wharf wall where the new warehouse abutted on the river, and towards the erection of that wharf wall the defendants contributed £700. The corporation entered into a contract with Messrs. Durnford and Sons for the erection of the wharf wall, and the defendants entered into a contract with the plaintiffs for the erection of the building. Under the contract with the corporation, their contractor was entitled to occupy for 14 weeks the bank immediately abutting on the river to the width of the building and that to a depth inwards towards Redcliff-street of 20ft. for the purpose of setting up his plant and machinery. The defendants gave possession of the premises to the plaintiffs on September 24, 1896, as to part, and as to the remainder on the 29th, and on October 5 Messrs. Durnford and Sons came there for the purpose of commencing the wharf wall. Before rendering their estimate either to the defendants in respect of their warehouse or to the corporation in respect to the wharf wall, certain borings were made under the direction of the docks engineer, and a plan was prepared showing the result of the borings and the strata upon which the warehouse and the wall were to be set up. The plaintiffs alleged that they were unable to carry out their contract in consequence of a series of delays. The defendants alleged that all the delays which occurred were a series of accidents over which they had no control, and that accordingly they were not liable. The arbitrator reserved his decision.

**IN RE L. N. DAVISON, GRIMSBY.**—The public examination of Levi Nail Davison, late builder and contractor, of Winttingham-road, took place before the Grimsby Bankruptcy Court on the 1st inst. The statement of affairs showed that debtor owed £3,049 14s. 4d. The free assets amounted to £992 15s. 4d., and the deficiency to £2,056 19s. Debtor was asked if this statement was correct, and he replied that it was not, because some of the contracts had not been finished, and the profits which would have resulted from them would, of course, have reduced the liabilities. He stated that he commenced five years ago with a capital of £98, and paid away at once £15. He was asked what books he had destroyed, and promptly replied that he had not destroyed any. The Official Receiver asked why he had told his agent at the preliminary examination that about three months ago he had destroyed two day books, three ledgers, and two cash books. Debtor denied that he had ever made

such a statement. Debtor stated that he owed Mrs. Young, plumber and glazier, of Grimsby, some £130, and that five days prior to the Receiving Order, she came down like a lot of other creditors and began weeping. He let her have four horses, four sets of harness, and four carts to secure her. It appeared also that Mr. Young, her husband, and an undischarged bankrupt, was a friend of debtor's, and Mr. Davison said that while he was away from Grimsby a few days prior to the receiving order being made, some of his workmen took to Mr. Young's premises a large number of articles, in order to do him (debtor) a good turn, and that the amount of stock, &c., placed in possession of Mr. Young amounted to about £400 in value. He didn't know the names of his workmen at the time. The examination was adjourned to January 5th.

**A PLUMBER CHARGED WITH WRECKING AND REMOVING HOUSES.**—George Henry Richards, 46, plumber, of Paignton-road, was charged at North London Police-court, on Tuesday, with demolishing two houses, 27 and 28, Clapton-square, and taking away the materials, valued at £400, the property of Charles Matthews, stone merchant, of Albany-street. Mr. C. V. Young prosecuted, and said that the prosecutor purchased the two houses in August last. On Nov. 15 he went to Clapton-square to see them, and was surprised to find that they had been razed to the ground, and that the whole of the materials had disappeared. Detective-sergeant Nursery said that that afternoon he went with the prosecutor to a public-house in St. Mary Axe, and saw the prisoner. He admitted that he had demolished the houses, but said he had permission from Mr. Matthews. He was surprised to hear that witness's companion was Mr. Matthews. He was then given into custody. The prisoner now made no denial, and Mr. Fordham remanded him in custody.

**RE EDWARD FRANK BARROW, OF SOUTHAMPTON.**—This debtor, now residing at Arlington Lodge, Bassett, and carrying on business in Atherley-road, Hill, Southampton, as a builder, came up for public examination at Southampton on the 2nd inst., under an order for summary administration. The gross liabilities were put down at £3,235 6s. 8d., £574 3s. 2d. being due to unsecured creditors (13 over £10 and 10 under £10), £1,876 due to fully-secured creditors, this being the estimated value of securities, and £785 due to one creditor partly secured; but as this was less estimated value of security £703 16s. 6d., it was reduced to £81 3s. 6d., so that there was expected to rank £655 6s. 8d. The estimated assets were £50 15s. 9d., leaving a deficiency of £604 10s. 11d. The cause of failure was stated to be want of capital and losses on contracts. In the course of examination by the Official Receiver, the debtor said he commenced business about three years ago in Hillside-road, Bitterne Park, with a capital of about £100, and at that time he was living in Oxford-avenue. He had then no books, and never commenced book-keeping till about a twelvemonth ago, when he began to keep a ledger and cashbook. The deficiency account showed a deficit of £335, but he found that he had made a mistake. He found when he left Bitterne Park he was about £100 to the bad; but when he got into Atherley-road he put all in altogether, and £185 was made up from Atherley-road. He had sold houses which realised £1,320, but were fully mortgaged for that amount. He had not been in business on his own account before, and not until now had he been in financial difficulties. The Official Receiver asked for a cash account for the past twelvemonth. It seemed that out of £3,600 only £2,700 was paid into the bank, according to the passbook. He therefore applied for an adjournment for the purpose of the rendering of the cash account. The debtor would have to furnish a cash account within the next fortnight, and would have to come up on the 30th of December for his further examination.

**ANCIENT LIGHTS TO GREENHOUSES.**—In the Chancery Division of the High Court, Mr. Justice Kekewich gave judgment on Wednesday in an action brought by Mr. R. Clifford, the lessee and occupier of Manor Lodge, St. John's Wood, against Messrs. Holt and Son, builders, and the trustees of the Marylebone Cricket Club, to restrain them from obstructing the plaintiff's ancient lights, and particularly the light to his greenhouse, by the new tennis and racquet court now being erected on Lord's Cricket Ground. The defendants' contention was that the light obstructed was only a northern light, and that the obstruction was trifling and unimportant. His Lordship granted a mandatory injunction to restrain the interference with access of light to the greenhouse, which would be suspended for three weeks to enable the defendants to appeal. He also gave the plaintiff costs.

**IMPORTANT DECISION UNDER THE BUILDING ACT.**—At the Greenwich Police-court, on the 30th ult., the South Metropolitan Gas Company appeared to an adjourned summons at the instance of the London County Council for failing to comply with a notice served under the provisions of the London Building Act, 1894, to set back a building the prescribed distance from the centre of the roadway of Rotherhithe-street. Mr. Daldy, instructed by Mr.

Chilvers from the Solicitors' Department of the Council, prosecuted, and Lord Robert Cecil, instructed by Messrs. Blythe, Dutton, Huntley, and Co., appeared for the gas company. Mr. Daldy, in opening the case, explained that the building complained of was a coal-store erected in the company's yard at Rotherhithe-street, the external walls of which were not 20ft. from the centre of the roadway, as required by section 13 of the London Building Act, 1894, and he contended that the company were liable, exactly in the same way as a private owner, to comply with the Council's notice, and, by not doing so, they had rendered themselves liable to the penalty prescribed by the Act. A plan of the building was put in evidence, and a witness was called, who gave its dimensions, and stated it was only 15ft. from the centre of the roadway. For the defence, Mr. Jones, the gas company's engineer, and their manager, were called and stated the building was necessary for the purpose of carrying on the company's business. Lord Robert Cecil then contended that the company had power under their special Act of Parliament to erect any buildings on land acquired under that Act for the purpose of their undertaking, and that the company were, therefore, within their rights in erecting the building at less than the prescribed distance, as section 205 of the London Building Act, 1894, preserved any rights or privileges the company had under their own Act, and he referred to several cases in support of his contention. Mr. Kennedy, having taken time to consider his decision, said he had gone carefully into the matter, and had come to the conclusion that the gas company could not claim exemption from the Building Act, either by virtue of their special Act, or because the land on which the building was erected was their curtilage, and he imposed a penalty of £2, and allowed the Council £15 15s. for costs. On the application of the defendant's solicitor, the magistrate consented to state a special case.

## CHIPS.

A highly satisfactory amount of business was carried through at Tokenhouse-yard last week, the aggregate realisation, as registered at the Estate Exchange, amounting to no less than £216,989, the highest total recorded for any week since the Autumn recess.

The Beckenham Urban District Council have decided to build a technical institute and construct public baths at an estimated cost of nearly £20,000.

Complaint having been made of the injurious effect upon the picturesque scenery of the Thames above Molesey Lock by a red-brick wall, 12ft. high and over half a mile long, which the Lambeth Water Company have just erected alongside the river in extending their reservoirs, the East Molesey Urban District Council have written to the company asking them to screen the wall by planting ornamental trees along the river bank.

The Parks Committee of the Glasgow Corporation have approved of plans for the Winter Garden to be erected in Springburn Park. The estimates come within the amount of £10,000 which was given for the purpose by an anonymous donor.

The memorial-stones of the new church of St. Peter, South Tottenham, were laid on Saturday. The church will be Early English in style, will be built of red bricks with stone dressings, and will cost £8,000, the seating accommodation being for 800 persons. Mr. J. S. Alder is the architect.

The ceremony of unveiling a memorial portrait of the late Archbishop Plunket took place on Wednesday, in the Palace, Stephen's Green, in the presence of a large number of clergymen. The portrait, which is the work of Mr. Walter Osborne, R.H.A., was unveiled by the Provost of Trinity College.

The persons responsible for the new Pennsylvania Capitol at Harrisburg, to replace the building destroyed by fire last year, have lost no time since the decision of the courts in their favour, and the building has the roof already on. There is, however, no provision as yet for heating or plumbing apparatus. The walls, also, are of rough brick, without any sign of the marble casing which it is proposed to add when the State appropriates more money for the purpose, and it is a question whether to whitewash them, for the sake of improving their appearance, or leave them as they are.

At St. Pancras Cemetery, on Thursday last week, a memorial was unveiled in memory of Mathilde Blind. The monument to the poetess is the conception and work of Mr. E. Lanteri, and is a Greek stèle of white marble. A medallion portrait is carved in bold relief near the top of the slab, and beneath it are figures of Poetry and Philosophy. They bend over a grating of green bronze, behind which rests a bronze urn containing the funeral urn of majolica. On the base is the legend, "Death is the mercy of eternity." The slab, which is 9ft. high and 4ft. wide, stands close to the footpath at the head of a narrow, grave-like space, inclosed in marble.



## STAINED GLASS.

ST. GILES' CATHEDRAL, EDINBURGH.—One of the large windows on the south side of the nave has been completed in stained glass, with subjects, according to the general scheme of the St. Giles' Board, illustrative of the life of Joseph. The window is about 20ft. in height, subdivided by the stonework into eight compartments and tracery. Separate subjects fill the four spaces of the lower tier, and the corresponding panels of the upper tier contain a larger group, representing Joseph presenting Jacob, his father, before Pharaoh. The flowing tracery has centrepieces applicable to the story of the window. Messrs. A. Ballantine and Gardiner, of Edinburgh, are the artists.

## WATER SUPPLY AND SANITARY MATTERS.

THE BACTERIAL TREATMENT OF SEWAGE.—At a meeting of the Society of Engineers, held at the Royal United Service Institution, Whitehall, on Monday evening, Mr. W. Worby Beaumont, president, in the chair, a paper was read by Mr. George Thudichum, F.R.S., entitled "The Bacterial Treatment of Sewage." The author observed that he did not enter into any theoretical considerations, taking it as a fact that the majority of those concerned accepted the general doctrine of bacterial treatment. The paper dealt with practical applications only. After describing the special uses of different processes under varying local conditions of fall, nature of soil and sewage, the author gave in detail the method adopted at Worcester Park, where the Cheam and Cuddington Sewage is received, to convert a process of precipitation and irrigation into one of bacteria bed treatment and irrigation when desired, showing how the necessary beds were constructed by excavation, and filled with burnt ballast produced from the farm, at a total cost of about £325, the quantity of sewage to be dealt with amounting to 80,000 gallons daily in dry weather. The conversion of the Sutton sewage works was alluded to, the cost there having been something less than £2,000 for a daily flow of half a million gallons of sewage, whilst the saving in working expenses was £500 per annum. The author then discussed the general questions of the interception of road detritus; the catching by screens or otherwise of pieces of rag and any large floating matter, and the dealing with night sewage by the provision of a special bed for its reception, with siphons for the automatic emptying of the bed in case of storms. The author next dealt with the problem of sewage treatment as applied to hospitals, schools, and country houses, and other small communities. Alternative methods were described, and some particulars were given concerning a recent installation at a large public school. In conclusion, the author pointed out that all the statements made on the occasion of his paper read in 1896 before the Society of Engineers still remained good; that knowledge had greatly increased during the past two years, but without altering, only extending, the ideas entertained at the date of his paper, as a result principally of the Barking experiments; and that the correctness of the particular method of working by alternate filling and emptying had been confirmed by all later experiments.

The Marchioness of Lorne (Princess Louise) opened on Wednesday two wards of the new wing of the West London Hospital at Hammersmith. The extension has cost £18,000, and increases the number of beds in the hospital from 101 to 250. It is intended to carry out a larger scheme at a total estimated cost, including the wing just opened, of £75,000.

Messrs. Cowlin and Son, of Bristol, have just completed the restoration of the tower and cupola of All Saints Church in that city. The scaffolding was removed last week. The defects were chiefly found in the cupola and the columns supporting it, and with regard to the tower itself, the work chiefly consisted in replacing some of the facing stone in parts where it decayed. The cost of the restoration has been over £1,200.

A public hall at Pitlessie, Fife, was opened on Friday as a memorial of Sir David Wilkie, the painter, who was born at Cultra Manse, close to the old-fashioned village of Pitlessie.

Chas. Edwin Smith, builder, Spencer-place, Roundhay-road, was fined £3 and costs at Leeds Police-court on the 1st inst. for breaches of the building by-laws of the corporation. A fine of the same amount was imposed upon Thomas Lawrence, builder, Horsforth, for a similar offence. Mr. John Harrison, town clerk, prosecuted.

The sale of a portion of the celebrated collection of Indian, Persian, Turkish, and other embroideries of the late Mr. Alfred Morrison has taken place at Messrs. Christie, Manson, and Woods' rooms in King-street, St. James's-square. The total amount realised by the 143 lots was £4,850 5s.

## Our Office Table.

THE members of the London County Council resumed on Tuesday the debate on the recommendation of the Housing of the Working Classes Committee that the Council approve of action being taken under Part III. of the Act of 1890 with a view to the purchase of land and the erection of dwellings thereon for the purpose of supplying housing accommodation—in other words, that, apart from the re-housing of the working classes required in connection with clearance or improvement schemes, the Council should purchase land and erect dwellings for the purpose of supplying housing accommodation. It was opposed by various members, who contended that this step would stop enterprise, check philanthropic work, and throw upon the rates some of the cost of providing dwellings for the poor. An amendment had been moved by Sir Arthur Arnold that the recommendation be referred back to the committee. After a long discussion, the amendment was rejected by 78 to 36 votes, and the recommendation was ultimately adopted. A recommendation approving plans for dwellings on the Millbank Prison site afforded Mr. Costelloe, Mr. McDougall, and others an opportunity to express the belief that, if its new housing policy is to be successful, the Council must relax in some degree its present stringent structural conditions.

THE General Purposes Committee reported to the Council that they had invited applications for the appointment of a superintending architect in the place of Mr. Blashill (about to retire) at a salary of £1,500 a year. Twenty-seven applications had been received, and they regretted to say that, after seeing nine of the applicants, they could not see their way to recommend the Council to appoint any of them. They were now considering what course should be adopted under the circumstances.

It was agreed, on the recommendation of the Improvements Committee, "That the Parliamentary Committee be instructed to make provision in the Improvements Bill for the next session of Parliament for the acquisition, in connection with the rehousing of persons to be displaced by the formation of the new street from Holborn to the Strand, of land (1) in St. Pancras, bounded on the east and north-east by Packerham-street, on the west by Arthur-street, and on the south by Well-street, comprising the premises occupied by the London Improved Cab Company; (2) in Holborn, bounded on the north by Holsworthy-square, on the south and east by Little Gray's Inn-lane, and on the west by Gray's Inn-road, comprising the premises of the Holborn Union Workhouse; and (3) in Lambeth, on the north side of Palmer-street, between Cornwall-road and St. Andrew's Church, and on the east side of Cornwall-road, between Palmer-street and the passage known as Peer's Cooperage." Mr. Shaw-Lefevre explained that in regard to the Lambeth site fifty people would have to be displaced, but they could easily obtain accommodation in adjacent houses.

At Toynbee Hall, on Saturday night, Mr. Frederic Harrison delivered an address on "The Ideal London," in which he stated that such a capital would be about one third its present size, and the number of its inhabitants would not exceed two millions. It would be happier, indeed, if these did not exceed one million. Life in this ideal city would be accommodated to the physical conditions of the people; green fields would be easily accessible, and the voice of the lark would cease to be a strange sound to the Londoner's ear. The change from present conditions was possible and practicable. No limit could be assigned to the possibilities of transformation in its physical aspect which could be wrought by scientific methods. Flat life was unavoidable, unless the city was to grow to enormous proportions, but ideal London would have to give its inhabitants spacious, airy tenements, with good kitchens, sculleries, drawing-rooms, libraries, common rooms, and so on. The present conditions of London life were transitory. In the good time coming the Thames would be as charming at London Bridge as now it was at Henley; steam launches and all steam traffic would be abolished, the river would be used in London for exercise by the people. There would be a good, plentiful, and constant supply of pure water, for which its consumers should pay no more than they do now

for the air of Hyde Park, and free baths and washhouses would adorn every leading thoroughfare. The dead would be cremated, and beautiful mausoleums abound, and the death-rate would sink almost to insignificance.

At the meeting of the Society of Antiquaries, held at Burlington House on Thursday evening in last week, a paper was read by the Rev. J. Charles Cox, on the "So-called Chair of St. Augustine, from Bishops Stanford, Herefordshire." The chair was exhibited, together with the supposed chair of the Venerable Bede from Jarrow. The chair which formed the subject of Dr. Cox's paper used formerly to stand in the chancel of Bishops Stanford Church. Sixty years or so ago it was removed from the chancel because of its decrepit condition, and placed in the tower. Then came the restoring architect, who bundled it out of the building, and it would have been converted into firewood had not the parish clerk rescued it. It subsequently passed into the collection of the late Mr. James Johnston, a well-known medical man of Birmingham, and now belongs to Mr. E. Cocks Johnston, of Cheltenham. The relic is called locally Austin's or Augustine's Chair, and Mr. Johnston contends that it is the identical seat which St. Augustine occupied when he held the synod or interview with the British bishops in A.D. 602, as described by Bede. Neither the Bishops Stanford chair nor the reputed chair of Bede from Jarrow exhibit any mouldings or decorative features which would enable an expert to fix their dates.

THE annual report of the School Board for London presented to that body at its meeting yesterday (Thursday) states that during the past year the Works Committee of the Board agreed to purchase various interests in 40 sites at a cost of £84,361. The total cost of all the sites purchased up to the end of the financial year—March, 1898—has been £3,300,165, and the costs in connection with them £446,931. The average cost per head of 352 school buildings and furniture, the accounts for which were completed prior to Lady-Day last, is set down at £14 7s. 10d., the average cost per child of the sites being £6 16s. 1d. During the year £509,338 was expended in the purchase of sites, the erection and enlargement of schools, and the provision of furniture and fittings out of money borrowed from the London County Council, and a sum of £34,863 also for buildings and furniture was paid out of current account.

MR. HARRY HEMS celebrated on Saturday evening the 32nd anniversary of his first arrival at Exeter, and the finding of the lucky horseshoe, in the customary manner, by a feast given to his employés in the studios of the firm in Fairpark-street, Exeter. Nearly a hundred guests sat down to a well-appointed hot supper, the senior of the firm occupying the chair, and Mr. Greville C. Hems, the vice-chair. After dinner the family punch bowls and churchwarden pipes were produced. After the toast of the "Queen," the loving cup went round. This silver trophy was gained at the Yorkshire Volunteer Athletic Sports, held at Sheffield on the 10th of May, 1886, being the first prize for one mile race, won by Corporal Harry Hems, 1st W. York Engineer Volunteers. A large number of the staff, now engaged in the sculpture work of the Roman Catholic Cathedral at Omagh, enjoyed simultaneously a feast provided at Magee's Restaurant, Omagh, on the same lines as the one at home, Mr. H. Turner Hems, the junior member of the firm, presiding, and Mr. Frank Dyer, the senior craftsman, of thirty-one years' continuous service, the vice. Telegrams of greeting passed to and fro between those at either festival. At the Exeter gathering, the toast, by the chairman, of "Our Noble Selves," was responded to by Mr. George Woolcott, the senior member of the staff present (twenty-eight years). That of the evening, "Health and Continued Prosperity to Harry Hems and his Sons," was given by Mr. William Elliott, the next senior artist (twenty-seven years in the same employ). Both the chairman and vice-chairman responded in felicitous terms, and a merry musical evening was afterwards spent.

AN address on "A National Photographic Record" was given in the Imperial Institute on Monday by Sir Benjamin Stone, M.P., the president. Captain W. de W. Abney, director of the Science and Art Department, occupied the chair. Sir B. Stone explained that the Association was aiming at a collection of photographic records of objects and scenes of interest throughout the British Isles. These records would be deposited



in the British Museum, where they would be stored and be accessible to the public under proper regulations. Such a collection would not only possess a great interest for the public, but it would be almost invaluable for the historian. There must be in many parts of the country customs and habits and observances of which they possessed no pictorial representation whatever, and if these were photographed they would form most important material for, and it might be, throw curious sidelights upon, the social history of the people. Then, too, there were buildings, rooms, and other places of high historical and literary interest and importance. Of many of these there were pictures in the possession of someone; but he knew from experience that pictures faded and perished; but now, thanks to the remarkable improvements in photography, they were able to produce records by processes of an absolutely permanent character. The formation of a national photographic collection had, indeed, become almost an imperative duty.

At the meeting, on Monday, of the Royal Society of Edinburgh, Mr. R. G. Alford M.Inst.C.E., in the course of a paper on "Crane Scaffoldings—their Mathematical Calculation and Probable Theoretical Deficiencies," referred to the accident at the Waverley Station in that city in March last, when a scaffolding over 60ft. in height was overturned by the wind. Another one of similar height stood at the Royal Infirmary, and it remained uninjured. Mr. Alford had measured the latter erection, and had obtained photographs of both. Views of these were thrown on the screen, and a comparative inquiry instituted into the varying construction of the two to show why one remained stable and the other was overturned. Certain rules of construction were then deduced, which the mathematical conditions seemed to imply as necessary to safety, with a view to aiding contractors in the calculation of future examples and to the prevention of accidents.

A DECISION was rendered a few days ago by the Appellate Division of the New York Supreme Court, in a case involving the custom of architects in the United States. The New York Steam Company, intending to erect a new power-plant, accepted a proposition of Mr. L. K. Davis to design and supervise the work, for three per cent. on the total cost, "payments to be made on monthly estimates"; adding a proviso, which was accepted by Mr. Davis, that the agreement should terminate in twenty-four months. When the plans and specifications were done, Mr. Davis called for payment of two per cent. on the estimated cost of the work. This was refused, and he entered a mechanic's lien against the property. Suit was brought to enforce the lien, and his claim was rejected; and, on appeal, the decision of the Court below was affirmed. The ground of this decision was, in general, that the claim was not made in accordance with the contract. This provided that payments should be made on monthly estimates, and the plaintiff gave no evidence of any such monthly estimates, or of any fact entitling him to payment on the obvious construction of the contract; but, instead of this, brought his action on the entirely different theory that he was entitled to a payment of 2 per cent. on the completion of the plans and specifications. This claim was supported by evidence of a custom of architects entitling them to a payment of 2 per cent. under such circumstances; but the Court held that this evidence should not have been admitted, as it was in direct conflict with the written agreement of the parties, and the latter must evidently govern. The counsel for the plaintiff argued that the agreement for monthly payments referred only to supervision, and not to the preparation of the plans and specifications; but the Court thought that there was nothing to show that the parties contemplated anything of the kind.

At a recent meeting of the Society of Antiquaries, Mr. P. Norman read an account of the discovery at Millfield, Kent, of a shallow, circular pit containing nearly a thousand chips, flakes, and cores of flint. The site had evidently been a factory of neolithic implements, as the fragments of flint were such as would have resulted from the manufacture of chipped implements. Mr. Norman drew attention to the fact that a very large proportion of the well-shaped flakes had lost their pointed end, consisting of about one-fourth or one-third part of the entire flake. This had evidently been broken off purposely, and as none of the points was found among

the débris, while many butt-ends remained, it seemed probable that the flakes were produced for the sake of their points. These were broken off and used as arrow-heads, or for some purpose requiring sharp angular points, and thus dispersed about the surface of the surrounding country. A number of cores from which the flakes had been struck, and some large pebbles which had apparently served as hammers for detaching the flakes therefrom, were found lying among the fragments of flint on what must have been the floor of a neolithic workshop. The hut in which this ancient industry was carried on was about 14ft. in diameter, and its site was found under an accumulation of earth about 2ft. thick. Evidence was given that the Millfield pit formed one of the remarkable group of neolithic hut circles on Hayes Common, some of which had been excavated and described ten years ago by Mr. George Clinch.

THE Maryland State Geological Survey has just received from France a machine for testing the wearing power of various kinds of rock and stone, which has been in use for some time by the French Government. It is composed of duplicate revolving cylinders, and is worked in a unique manner. The cylinders are hollow, and allow a good-sized piece of stone to be placed inside of each. The rod of the machine is attached to the motor, and the cylinders revolve rapidly a number of thousand times. They are opened then, and the fine material that has been ground off is gathered up after the stones have been washed, and is weighed. In this way the experience of years can be gathered in a few hours. Calculations can be made from the result to just what extent the stones experimented with would wear if placed in a roadbed, or used to build a highway or public building. Professor William Bullock Clark, State Geologist, has superintended the erection of the machine.

It is publicly notified that in the ensuing session of Parliament power will be sought to incorporate a company to construct a ferry to be worked by electricity or other power on submerged rails across the river Thames, with roadways and approaches thereto for the passage of vehicles, foot passengers, animals, and general traffic, as also with generating station and electrical or other machinery and appliances. The ferry, as proposed, will run from a point at or near the site of Brewhouse-lane, one chain or thereabouts to the west of the Ship Hotel, terminating in the parish of All Saints, Poplar, at or near the western boundary of the Island Gardens.

New board schools in Johnston-terrace, Devonport, were formally opened by the Naval Commander-in-Chief, Admiral the Hon. Sir E. R. Freemantle, on the 29th ult. The schools accommodate 346 girls and 350 infants, and a department for 650 boys is about to be built close by. The cost has been £10,638. Messrs. Hine and Odgers, of Plymouth, were the architects, and Messrs. A. R. Debnam and Co. were the contractors.

The Northwich Urban Council have agreed to amalgamate with the Northwich Rural Council in the carrying out of a sewerage scheme for the Castle portion of the urban and the Winnington portion of the rural districts. The cost of the work, which is estimated to be about £30,000, will be apportioned upon the areas actually drained.

Appledore Congregational Church was reopened on Wednesday week, after having undergone extensive alterations and renovation. The chapel has been re-seated with pitch-pine seats, a new floor and new windows have been put in, the gallery has been altered, the ceiling renovated, and the outside walls replastered. The work was carried out by Mr. J. Tambllyn, builder, of Appledore; Mr. Sanders, of Barnstaple, being the architect.

The new Roman Catholic Church of the Sacred Heart, at Omagh, is rapidly approaching completion. It is being built from plans by Mr. William Hague, of Dublin. The carving and sculpture are being executed by workmen in the employ of Messrs. Harry Hems and Sons, of Exeter, and under the direct supervision of Mr. H. Turner Hems.

The second annual dinner in connection with the Bristol district of the Amalgamated Society of Carpenters and Joiners was held at the Crown and Dove Hotel, Bridewell-street, in the city on Saturday night. Mr. Frank N. Cowlin presided over a company numbering about 70, the vice-chair being occupied by Mr. W. Kidwell. The toast of the society was submitted from the chair, and in replying Mr. W. Pope mentioned that they numbered 53,000 members throughout the country, the Bristol proportion being between 700 and 800.

## MEETINGS FOR THE ENSUING WEEK.

MONDAY.—Surveyors' Institution. "The London Building Act, 1894, and the Official Supervision of Buildings," by William Weaver, F.S.I. 8 p.m.

Society of Arts. "Acetylene," Cantor Lecture No. 4, by Professor Vivian B. Lewes. 8 p.m.

TUESDAY.—Institution of Civil Engineers. Discussion on "The Ventilation of Tunnels and Buildings." 8 p.m.

WEDNESDAY.—Society of Arts. "Commercial Education," by Sir Albert Rollitt, M.P. 8 p.m. Edinburgh Architectural Association. "The School of Applied Art Student-ship," by Edwin Forbes. 8 p.m. Northern Architectural Association. Paper by G. E. R. McAdam, of Berwick. 7.30 p.m.

THURSDAY.—Society of Architects. "Ely Cathedral," illustrated by lantern slides from photographs by members. St. James' Hall, Piccadilly, W. 8 p.m.

FRIDAY.—Glasgow Architectural Craftsman's Society. "Decay in Timber," by John Bowman; and "Conversion of Timber," by Thomas Brownlie. 8 p.m.

Institution of Civil Engineers. "The Kentish Town Widening, Midland Railway," by Walter Daniel, Stud.Inst.C.E. 8 p.m.

## The Society of Architects.

Founded 1884. Incorporated 1893.

THE SECOND ORDINARY MEETING of the Society of Architects for the Session 1898-99 will be held at the Rooms of the Society, at St. James' Hall, Piccadilly, W., on THURSDAY, December 15th, 1898, at Eight o'clock p.m., when a description of the Society's VISIT TO ELY, illustrated by lantern slides from photos, taken by members will be given; to be followed by a DISCUSSION on some subject of interest to Architects in general, and members of this Society in particular. At this meeting smoking will be permitted.

ELLIS MARSLAND, Hon. Sec.  
C. MCARTHUR BUTLER, Sec.

## CHIPS.

Messrs. Bullard and Sons, Ltd., have just added to the plant of the Anchor Brewery at Norwich a mash tun of the capacity of close upon 10,000 gallons. Some six months have been occupied in its construction by Messrs. Homer and Shercliff, of Burton-on-Trent, and on Wednesday week it was brought into use for the first time.

The city council of Exeter have received a letter from the Local Government Board sanctioning the borrowing of the sums of £6,500 and £34,800 for purposes of sewerage and sewage disposal.

At Bodmin a new house for the Wesleyan circuit minister was opened on Wednesday week; it cost over £700. Mr. W. J. Jenkins, of Bodmin, was the architect; and the chief contractors were Messrs. Brown and Son, for masonry, and Mr. E. J. Goodfellow, for carpentry.

The Local Government Board has sanctioned the borrowing of £9,500 for the laying out of a cemetery at North Bierley.

Extensive additions are about to be made to Cardigan Lodge, Newmarket, for Mr. H. McCalmont. Messrs. Trollope and Sons are the builders.

The sanitary (executive) committee of Newcastle-under-Lyme have decided to proceed at once with the scheme of replacing the present isolation hospital with a permanent structure for the treatment of infectious diseases on the same site. Messrs. J. Lewis, of Newcastle, and F. Emery, of Stoke-on-Trent, were appointed joint architects, and will prepare plans.

The French Academy of Fine Arts has elected Sir Edward Poynter, President of the Royal Academy, as a corresponding member for the Section of Painting, in succession to the late Sir E. Burne-Jones.

In the case of William Henry Gillett, of Southend, late of Cross-terrace, Church End, Finchley, N., builder, the discharge from bankruptcy has been suspended for two years, ending Nov. 7, 1900.

A draft order of the Light Railway Commissioners has been issued authorising the construction of a light railway from Trowse, Norwich, to Beccles, East Suffolk.

A Local Government Board inquiry into the application of the Rochdale Corporation to borrow £30,000 for purposes of electric lighting in the borough was held on Wednesday at the town-hall. The Provisional Order was obtained last summer.

The Dean of Ripon, on Saturday, unveiled, in the Chapel Royal, Savoy, a brass tablet erected to the memory of the late Right Hon. Hugh C. E. Childers, who held the positions of First Lord of the Admiralty, Secretary of State for War, Chancellor of the Exchequer, and Home Secretary in Mr. Gladstone's first three governments. The tablet is placed in the west-end of the chapel, opposite the pulpit, and was executed by Mr. J. M. Comper.



## Trade News.

### WAGES MOVEMENTS.

**BOLTON.**—The stonemasons have given notice for an advance of 1d., bringing the wages up to 10d. per hour.

**EDINBURGH.**—A largely-attended meeting of the Edinburgh and Leith Master Builders' Association, held in the Building Trades' Exchange, Shandwick-place, on Friday night, had under discussion circulars received from various quarrymasters, intimating a rise in the price of stone, amounting in some cases to 20 per cent. The meeting considered the matter of such importance that they agreed that it should be brought before the Scottish Building Trades' Federation. At a general meeting of the Edinburgh and Leith Master Painters' Association, held on Friday night in the Building Trades' Exchange, it was unanimously decided to grant an advance of 3d. per hour on the standard rate of wages of workmen on and after April 1 next.

**LEICESTER.**—The builders' labourers have given notice, which is to expire at the end of April, of their intention to ask for an advance of 3d. per hour—namely, from 6d. to 7d.

**NEWPORT, MON.**—A dispute has arisen in the Newport building trade. One point has reference to the hours of work; and another seems to be a determination on the men's part to make non-unionist workmen join the recently-formed federation.

### CHIPS.

Mr. George H. Small, borough surveyor for Penzance for nearly a quarter of a century, has received an important appointment at Port Elizabeth, South Africa.

On Advent Sunday at Rollesby parish church, East Suffolk, a new stained-glass window was unveiled and dedicated. The two main lights consist of representations of our Saviour as "The Good Shepherd" and "The Light of the World." There are angels in the upper lights. The work was designed and executed by Messrs. Cox, Son, and Buckley, of London.

A cottage hospital for Eltham and Mottingham was opened on Saturday. The hospital is built on the pavilion system. The two principal wards will accommodate ten patients, and there are two private wards, bathroom, and spacious corridors. Mr. A. B. Hutchings, of Victoria-street, Westminster, is the architect.

At Selby a new bacon factory has just been opened. It has been built from designs by Messrs. Douglas and Sons, of Farringdon-road, E.C., who also supplied the machinery.

Land in Coppice-road, Nottingham, is to be offered for disposal by public auction on leasehold terms on Tuesday next, for a site for artisans' dwellings in conformity with the Nottingham Improvement Act, 1897, is laid out in fourteen lots, of an average area of about 600 square yards each, planned to accommodate 100 houses in all. These dwellings have to be erected in accordance with conditions approved of by the Local Government Board, and relate to the accommodation necessary to be provided for each dwelling.

The urban district council of Ottery St. Mary, after a long discussion as to what reply should be sent to the letter from the Devonshire County Council asking what the council were going to do in order to comply with the requirements of the Rivers Pollution Act, decided to advertise for sewerage schemes, to be submitted by engineers before the end of January.

At the Northern City Hospital, Liverpool, a new wing at the corner of Great Howard-street and Leeds-street has been erected as a nurses' home, and was formally opened on Monday. The block, which has been built from the designs of Messrs. Pennington and Son and Mr. C. W. Harvey, as joint architects, contains 60 bedrooms, five sitting-rooms, lavatories, and bath-rooms, with kitchen, scullery, and larder in the basement for sick-cookery lessons.

Foundation-stones of a new Masonic hall were laid in Cross-street, Camborne, on Friday. The hall, which will be faced with granite and elvan stone, will cost about £850. Mr. Sampson Hill, of Redruth, is the architect, and Messrs. Frank Mitchell, of Crowan, and Barbary, of Camborne, are executing the contract.

The town council of Tamworth have issued an appeal for subscriptions on behalf of the purchase of Tamworth Castle, which has been acquired by the corporation from the Marquis Townshend for public use and benefit. The appeal states that the edifice was purchased for £3,000, and that a further sum of £1,000 will be needed for necessary repairs and to lay out the grounds. The castle will form a memorial of the Diamond Jubilee.

After being closed for six months, reopening services were commenced at the Congregational Chapel on Wednesday week, at Appledore, North Devon. Alterations have been carried out, the cost amounting to £300. The improvements consist of new pitch-pine seats, fresh floors, and bearings, and new windows, with amber-coloured glass. The lobby has been enlarged, and the floor tiled. Mr. J. Tamplin was the builder, the architect being Mr. Sander, of Barnstaple.

Sir W. B. Richmond, R.A., delivered an address on Monday night at 6, Onslow-gardens, W., on the means of enforcing the Clauses of the Public Health (London) Act relating to the smoke nuisance in the Metropolis. On the motion of the Earl of Meath (who presided) and Lady Fredrick Cavendish, a resolution was carried in favour of forming a society, and an influential committee was chosen to consider and report how best the vestries and other municipal bodies might be aided by public support to carry out the provisions of the Statute.

Some figures were recently published in the *Street Railroad Journal*, relating to the test of a Patton motor tramcar which was run on the Great Western Railway of the United States, a distance of 274.1 miles. The net running time was 16h. 45m. Taking the cost of gasoline at 2½d. per gallon, the cost of fuel amounted to 0.53d. per car mile, or 0.032d. per ton mile.

A novel method of moving a tank is described in a recent issue of the *Génie Civil*. The tank was used to hold petroleum, was 82ft. in diameter, 32.8ft. high, and weighed 140 tons. To remove it 131ft., a wall 2ft. high and 1ft. thick was built on the level surface of the porous sandy soil, so as to inclose the old and new masonry foundations, which stood a few inches above the surface of the ground. The tank was built with a flat bottom and curved top, from plates 0.16in. to 0.47in. thick. It was first filled with air at a pressure of 8in. of water; then water was pumped into the artificial pond inclosed between the temporary walls until it floated the tank from its foundations, the tank then drawing 8.2in. More water was pumped in to raise the tank 4½in., and it was then hauled by a windlass and rope to its new site. It was held against a semicircular row of piles driven around the new foundation until it sank in its permanent position as the water was slowly drawn out of the pond. The tank was uninjured, and its removal occupied a few minutes only.

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immediate use.

## LATEST PRICES.

### IRON, &c.

	Per ton.	Per ton.
Rolled-Iron Joists, Belgian.....	£8 0 0	to £8 10 0
Rolled-Steel Joists, English.....	6 10 0	" 7 0 0
Wrought-Iron Girder Plates.....	5 15 0	" 6 10 0
Bar Iron, good Staffs.....	7 5 0	" 8 5 0
Do., Lowmoor, Flat, Round, or Square.....	17 0 0	" 17 5 0
Do., Welsh.....	5 15 0	" 6 17 8
Boiler Plates, Iron—		
South Staffs.....	7 17 6	" 8 5 0
Best Sledshill.....	10 0 0	" 10 10 0
Angles 10s., Tees 20s. per ton extra.		
Builders' Hoop Iron, for bonding, &c., £6 15s.		
Builders' Hoop Iron, galvanised, £15 10s. 0d. per ton.		
Galvanised Corrugated Sheet Iron—		

	No. 18 to 20.	No. 22 to 24.
6ft. to 8ft. long, inclusive	Per ton.	Per ton.
gauge.....	£10 15 0	£11 0 0
Best ditto.....	11 5 0	11 10 0

	Per ton.	Per ton.
Cast-Iron Columns.....	£8 5 0	to £8 15 0
Cast-Iron Stanchions.....	7 5 0	" 8 15 0
Rolled-Iron Fencing Wire.....	7 5 0	" 8 5 0
Rolled-Steel Fencing Wire.....	7 5 0	" 7 15 0
Cast-Iron Sash Weights.....	10 10 0	" 11 10 0
Cut Clasp Nails, Sin. to 6in.....	4 2 6	" 4 5 0
Cut Floor Brads.....	9 0 0	" 10 0 0
Wire Nails (Pointe de Paris).....	8 15 0	" 9 15 0

	0 to 7.	8 to 9.	10 to 11.	12 to 13.	14 to 15.	16 to 17.	18 to 19.	B.W.G.
Cast-Iron Socket Pipes—								per cwt.
Sin. diameter.....	£5 10 0	to	£5 15 0					
4in. to 6in.....	5 5 0	"	5 10 0					
7in. to 24in. (all sizes).....	4 15 0	"	5 0 0					

[Coated with composition, 2s. 6d. per ton extra; turned and bored joints, 5s. per ton extra.]

	Per ton.
Pig Iron—	
Cold Blast, Lilleshall.....	105s. to 110s.
Hot Blast, ditto.....	57s. 6d. to 62s. 6d.

Wrought-Iron Tubes and Fittings—Discount off Standard  
Lists f.o.b. :—

	Gas-Tubes.	Water-Tubes.	Steam-Tubes.	Galvanised Gas-Tubes.	Galvanised Water-Tubes.	Galvanised Steam-Tubes.
10cwt. casks.	75p.c.	70	62½	80	55	45

	Per ton.	Per ton.
Zinc, English.....	£26 10 0	to £27 0 0
Do., Vieille Montagne.....	27 15 0	" 28 0 0
Sheet Lead, 8lb. per sq. ft. super.....	15 10 0	" 16 10 0
Pig Lead, in lwt. pigs.....	14 15 0	" 15 15 0
Lead Shot, in 28lb. bags.....	18 7 6	" 19 7 6
Copper Sheets, sheathing and rods.....	65 0 0	" 66 0 0
Copper, British Cake and Ingots.....	55 10 0	" 56 0 0
Tin, Straits.....	82 12 6	" 83 12 6
Do., English Ingots.....	85 5 0	" 86 5 0
Spelter, Silesian.....	21 0 0	" 22 0 0

### TIMBER.

	per load	£13 0 0	to	£15 10 0
Teak, Burmah.....				
" Bangkok.....		10 10 0	"	14 10 0
Quebec Pine, yellow.....		4 2 6	"	6 0 0
" Oak.....		4 2 6	"	6 0 0
" Birch.....		3 10 0	"	5 10 0
" Elm.....		4 10 0	"	5 10 0
" Ash.....		3 15 0	"	5 0 0

	per load	£13 0 0	to	£15 10 0
Danteic and Memel Oak.....		2 2 6	"	4 2 6
Fir.....		2 15 0	"	4 15 0
Wainscot, Riga p. log.....		4 15 0	"	6 5 0
Lath, Danteic, p.f.....		4 10 0	"	5 10 0
St. Petersburg.....		4 0 0	"	6 10 0
Greenheart.....		8 0 0	"	8 10 0
Box.....		4 5 0	"	15 0 0

	per cube foot	0 1 8	to	0 1 10
Sequoia, U.S.A.....				
Mahogany, Cuba, per super foot				
lin. thick.....		0 0 5	"	0 0 6
" Honduras.....		0 0 4	"	0 0 5
" Mexican.....		0 0 4	"	0 0 5
Cedar, Cuba.....		0 0 4	"	0 0 4
" Honduras.....		0 0 3	"	0 0 4
Satinwood.....		0 0 9	"	0 1 6
Walnut, Italian.....		0 0 8	"	0 0 7

	per St. Petersburg Standard, 120-12ft. by 1½in.	by 1½in. :—
Quebec, Pine, 1st.....	£18 0 0	to £24 10 0
" 2nd.....	13 0 0	" 16 10 0
" 3rd.....	6 0 0	" 9 10 0
Canada Spruce, 1st.....	8 10 0	" 10 10 0
" 2nd and 3rd.....	7 0 0	" 8 10 0
New Brunswick.....	7 0 0	" 8 0 0
Riga.....	7 15 0	" 8 15 0
St. Petersburg.....	9 5 0	" 13 15 0
Swedish.....	9 5 0	" 16 5 0
Finland.....	9 5 0	" 9 15 0
White Sea.....	10 5 0	" 17 10 0
Battens, all sorts.....	5 0 0	" 16 0 0

	per square of lin.	—
Flooring Boards.....		
1st prepared.....	£0 9 9	to £0 16 3
2nd ditto.....	0 8 3	" 0 12 3
Other qualities.....	0 8 6	" 0 7 0

Satinwood.....	0 0 9	0 1
Walnut, Italian.....	0 0 8	0 0
Deals, per St. Petersburg Standard, 120—12ft. by 1½in. by 11in. :—		

### OILS.

	per ton.	£16 2 6	to	£16 12 6
Linseed.....				
Rapeseed, English pale.....		22 15 0	"	23 0 0
Do., brown.....		21 10 0	"	22 0 0
Cottonseed, refined.....		13 17 6	"	14 5 0
Olive, Spanish.....		23 15 0	"	24 0 0
Seal, pale.....		21 5 0	"	21 10 0
Cocoonut, Cochin.....		30 0 0	"	30 10 0
Do., Ceylon.....		25 15 0	"	26 0 0
Palm, Lagos.....		22 0 0	"	22 5 0
Oleum.....		13 15 0	"	13 15 0

	per gal.	0 6 8	to	0 7 6
Lubricating U.S.....				
Petroleum, refined.....		0 0 0	"	0 0 6
Tar, Stockholm.....		0 12 6	"	0 15 0
Do., Archangel.....		23 15 0	"	24 0 0
Turpentine, American.....		23 15 0	"	24 0 0



# THE BUILDING NEWS

## AND ENGINEERING JOURNAL.

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FRIDAY, DECEMBER 16, 1898.

### TAKING STOCK.

IN the performance of his daily duties the architect has to take stock of a large and ever-increasing number of patents and materials that are immediately connected with building, and he has to bring to this task a considerable amount of knowledge, and to exercise tact and judgment. A mere perfunctory acceptance of a system of construction, or selection of goods and methods from a trade catalogue, is not sufficient. The examination ought to be accompanied by patient investigation and inquiry of the intention and object of the inventor, by a discovery, if possible, of the principles that have guided him, and by certain tests conducted on proper lines, always having in view the building for which it is to be used. Neglect of these definite aims has led to all sorts of disappointments. What may be good for one building or position is not always good for another, as in many materials, patented and otherwise, which can be used economically in large town buildings for which the local materials are not adapted, but which for country buildings and sheds would be expensive and not so good as local materials easily worked. The fireproof system that would be suitable for a large city warehouse stored with inflammable goods, and exposed to fanning currents of air through lifts and staircases, would not be desirable in a large two-storied country warehouse. It is very rare that the professional man has time or opportunity for the examination or verification of advantages claimed by inventors or manufacturers. Systems and goods are thrust upon his notice by circular or otherwise; they have been used before on certain buildings, and have been certified or recommended by architects who have employed them, though not in every case from practical experience. Second-hand opinions are often given. It is the new and untried that he has to be particular about: the long-established and reputed speak for themselves. "Good wine needs no bush."

To take one of many subjects that concern the architect very closely: the construction of fireproof buildings—a hackneyed question certainly, but one that is forced upon the profession by many recent and serious fires. Few building questions have enlisted more the ingenuity and inventive skill of engineers, architects, and manufacturers throughout the world, and the patented inventions would fill several volumes, many of them mere modifications of the same system. The paper by Mr. R. W. Gibson, of New York, read at the Institute the other day, and reported in our last issue, deals chiefly with one kind of floor—the terracotta arch of hollow blocks supported on steel girders, and is of interest, as showing how the most efficient system has been developed slowly out of many failures. The first efforts, as the author says, has been disappointing through lack of perception of the difference between incombustible and fireproof materials. Every engineer and manufacturer jumped to what seemed a natural conclusion: that by employing incombustible materials like iron, or stone reinforced by iron, the building so constructed would resist fire. It was only necessary to combine these materials in a certain way, and the object would be attained. Many rude awakenings convinced the profession of the mistake, and demonstrated that exposed iron systems were full of danger, especially in the presence of com-

bustible materials. To take a marble or stone staircase with metal strings—how quickly it is reduced to a calcined mass between the fire and torrents of cold water! But protect these materials; cover the iron with fire-resisting terracotta, metal lath and plaster, and the problem is solved. If it is said these protecting coverings give no security in some cases, we can only answer, there has been some defect in their application. Again, the development of fireproof construction from the old supporting thick walls and superimposed columns carrying floors and roofs, to the so-called "cage" or skeleton construction now used in New York and Chicago (where the heights exceed 12 stories), in which rigid riveted posts, girders and beams, braces and struts, combine to transmit all loads to the foundation, the walls becoming mere panels of inclosure—is very instructive. The latter is a cage of steel in every sense of the word. Mr. Gibson goes on to show how the span of the flat terracotta floor arch determined the distance apart of floor beams, and the distance from girder to girder. A span of 4½ ft. to 5 ft. was found to combine the required strength with economy of working conditions. He then describes the fireproofing or casing of hollow terracotta slabs or tiles which cover the iron posts and columns and girders, and observes that the interior steel frame is sufficiently protected by 2 in. of terracotta furring over its exposed inner surface and 4 in. externally, the latter being the minimum allowed by the New York law.

So, in fact, every detail of fireproof construction as we see it under the most developed conditions has been evolved, so to speak, out of the experiences of the steel skeleton builder; and it is to this that we have to attribute much of our defective work. We take a fire-resisting system patented by So-and-So, and try to fit it to some building or plan that is ill-suited to the unit of arch span or distance apart of beams. Instead of which, the floor-plan of arches and girders in the American system govern the position of internal columns, and to a large extent regulate the plan of structure.

A plethora of new materials and inventions give the architect but little time for inquiry and examination. Though more independent of design than a system of construction, they equally call for investigation. We have a number of artificial stones and concretes that are very valuable for building; many of them have stood long tests of time and wear, and have largely supplanted natural stones for staircases, landings, floors, window-sills, and lintels, copings, and other details. These the architect can implicitly accept; he knows how they are moulded, and what treatment is desirable without exceeding the limits of the material, though for some purposes, as those of floors and beams, he would like to know more, as, for example, the load a slab of the material will bear per foot superficial, and the safe load that a beam of certain length and section of the material will carry. Experiments have proved the strength and crushing resistance of cements, of concrete slabs with steel tension bond, as the "expanded metal," inserted in their lower side—of materials like the "Owen-stone," Granolithic, the "Victoria," and other compositions; but the same experience is not always obtainable at the right moment. No doubt the architectural and engineering societies are the right bodies to appoint committees of research in these matters. The Institute has made a few useful tests of brickwork piers, and the Society of Architects contemplates instituting a committee for registering tests so that the architect will only have to consult the published reports to find out what he wants to know. The British Fire Prevention Committee, of which Mr. Edwin O. Sachs is chairman, undertakes such independent investigations and tests of materials, methods,

and appliances as may be desirable for the protection of life and property from fire. Should not such services have been undertaken by the professional societies years ago? Many a building failure of materials might have been averted if there had been a bureau of experimental tests and records, under the official sanction of the local authority or County Council, to which all architects could apply before writing their specifications. Many specialties in sanitary ware as, for example, stoneware pipe-joints, traps, interceptors, closet-apparatus, ventilators, and cisterns, could be placed above suspicion or doubt, if they were tested and registered; and the same would apply to heating apparatus such as boilers and radiators, grates and ranges. The architect would be able to take stock of materials and goods in the market in ironmongery, artificial products for wall-lining and decoration, instead of being bewildered by a vast number of unreliable, and sometimes worthless, productions. A well organised system of tests under authority would not only avert danger and be helpful to the profession, but would assist in an appreciation of what was good. Inventor and manufacturer alike would be encouraged by a discriminative professional opinion on their production. In the strictly artistic and architectural domain, of materials and new applications, like wall hangings, embossed fabrics, metal-work, wall linings, the tests could not, of course, be so easily applied in relation to questions of taste or design. No bureau of experts could come to a unanimous decision as to the design of a piece of ceramic wall tiling, a wall-paper, or a piece of hammered metal-work. All they could judge would be the material and executive skill evinced, but every man of cultivated taste would quickly discern the good from the bad or commonplace, and award to the subject its rightful place.

### MODEL SPECIFICATIONS.—XLIII.

#### METAL LATHING—DECORATIVE PLASTERING.

WE now give a few clauses for ornamental plastering; many are derived from authoritative sources. Last week we noticed the uses of metal lathing for forming ceilings, and for doves and cornices. In addition to these uses, it is applied to encase iron joists and beams, and iron columns. The expanded metal has been employed for various details and uses as beam and column encasement, domes and internal decorations, such as the domed plaster ceiling of the Royal United Service Institution, Whitehall. We show how it can be made to form or protect ceiling beams, the hollow space being made useful for electric wires, gas-piping, or other purposes (see sketch).

Iron columns can be protected by the "expanded metal" lathing and plaster, leaving an air-space between the iron and the plastering. We refer the reader to the Expanded Metal Co.'s little book showing its application to many purposes, both as a protection against fire and as a means of forming internal features without ordinary wood "furring" or bracketing.

For superior plastering the architect has the choice of several patent cements or plasters which are quick-setting, and can be painted or papered almost immediately, already referred to. Selenitic cement acts quickly, and forms an excellent ground for Parian, Keene's or Martin's cements, and has a nice buff tint. It is easily worked to a smooth face; Keene's cement is quite white, and takes a fine polish; therefore is suitable for interior decoration, columns, pilasters, architraves. The "coarse" quality is very hard, and forms a good surface for paints or paper. For panelling to walls, pilasters, architraves, jambs and columns, dados, it is well suited. It can be mixed with stone



dust. "Adamant" is another patent cement, a very hard fine white plaster, and has the quality of incombustibility. For ceilings and walls it is well adapted; it has a slight elasticity, and can be painted, papered, or frescoed within three or four days. Adamant is made in three qualities—No. 1, 2, and "chromolith"—the last is a kind of Parian, but is less in cost. Martin's cement may be laid on walls in the coarse quality, and clean washed sand, 1 of cement to  $1\frac{1}{2}$  of sand, floated and set with Martin's fine cement,  $\frac{1}{2}$  in. thick. Trowelled stucco, two-thirds fine stuff and one-third of sand, worked upon perfectly dry surface, and rubbed down with hand-float makes a good hard surface.

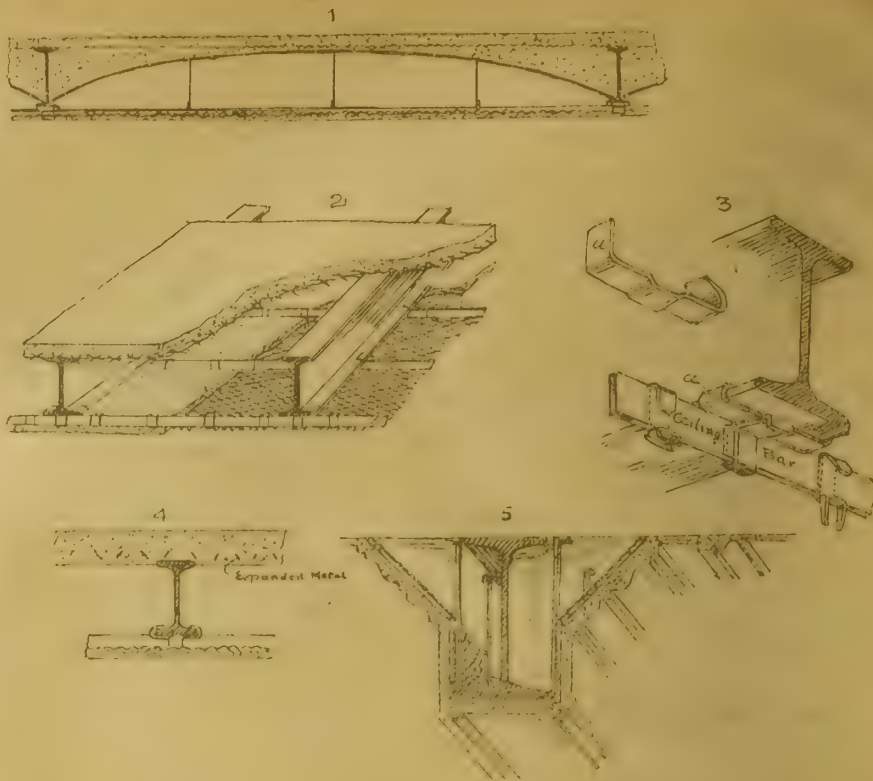
Fibrous plaster and other decorative materials which take the place of plaster ornament are much in use for ceilings and walls. Where painting and decorating are to follow quickly these products are invaluable. There are many kinds of fibrous plaster in the market. Some claim to be unflammable, being made of asbestos; in others wire is interwoven. These materials are supplied in slabs and other forms, such as the fibrous plaster slabs of Geo. Jackson and Sons, Rathbone-place, about  $\frac{1}{2}$  in. thick, which can be fixed with a smooth face outwards upon ceilings and walls; the United Asbestos Patent "Salamander" Decorations, an unflammable material made in high and low relief, which can be easily fixed by a strong paste to ceilings and walls. The material can be cut and trimmed easily and hung immediately, and has been very extensively used. A great variety of patterns in all styles are made. Some of the ceiling repeats are 21 in., 24 in., and 30 in. square; other patterns are made in widths of 21 in. Patent silicate cotton and plaster slabs and wire-laid slabs are also made, as those of Fredk. Jones and Co., Kentish Town, useful for casing ceilings, beams, and columns. The slabs can be fixed to grounds with brass screw or zinc nails. Decorative plaster-work ought to be studied in such works as those associated with the period of the Renaissance, with the Italian artists, and the Brothers Adam during the latter part of the 18th century, who introduced the better features of the French *setto cento* period.

Besides decorated ceilings and interiors, there are external modes of ornamentation in plaster. One of these is pargetting, an art once associated with our best Renaissance work. Very fine examples of unique design are seen at Ipswich, Oxford, Banbury, and other towns, a kind of ornamental plaster-work often introduced in panels, and in half-timberwork buildings. Sometimes the plasterer's trowel was used with admirable effect instead of the relief produced by wood or metal stamps. Another decorative kind of plaster-work is "sgraffito," or scratched decoration, in which a coloured *intaglio* or ornamental design in incised lines is produced; but of these processes we have little space to speak here.

Section 1 is one span of a concrete arch between steel joists of a fireproof floor, showing a suspended fire and sound-proof ceiling, constructed with the expanded metal lathing. The ceiling is carried by hanging rods at short distances apart. The upper ends of rods are fastened to the curved channel centring, and their lower ends clip the ceiling-bars. The ceiling is composed of metal lathing and plaster, the former giving a good key. The mesh of lathing may be  $\frac{3}{4}$  in., and the metal lathing and ceiling may be segmental if desired.

Sketch 2 shows an expanded metal ceiling of plaster, placed below ordinary steel joists. The ceiling bars are secured by clips *a* round lower flanges (sketch 3), and the lathing is also fixed by small clips round ceiling-bars as shown. We give a sketch of loose clip before fixing to joist by bending down end *a*.

Section 4 is a section of same floor with the suspended ceiling and a concrete floor



with expanded metal core. This floor forms a slab of concrete, in which expanded metal has been introduced in the lower surface, and this lathing increases considerably the strength of the slab.

Sketch 5 shows how a  $\Gamma$  girder beneath ceiling can be boxed so as to form a moulded cornice or beam of plaster by metal lathing bent round as indicated and suspended by bars.

26. *Coffered Ceiling*.—The coffered soffit of hall to be formed of expanded metal of No. 1 mesh  $\frac{3}{4}$  in., incasing iron girders and cross ribs on steel bar bracketing, leaving air space; moulded to form shown in section, and finished with plaster three-coat work.

27. *Columns or Stanchions*.—The cast-iron stanchions to be cased with expanded metal lathing, No. 1 mesh  $\frac{3}{4}$  in., bent to cylindrical shape and in a single width, and to be plastered, floated, and set; or the stanchions are to have metal furring strips fixed at intervals of 18 in. to separate the lathing and plaster from the iron stanchion or column, so as to give an air-space between the iron and the plaster covering. The metal lathing to be floated and set with Robinson's patent cement, or with "B" "Paragon" plaster, finished with No. 1 quality. Or—

The metal lathing to be finished in trowelled stucco, composed of two-thirds of fine stuff and one-third fine clean sand.

28. *Ceilings and Partitions*.—Lath, plaster, float and set all wood joist ceilings, soffits, beams, and partitions, and finish the latter in trowelled stucco.

29. *Cornices and Mouldings*.—All cornices and moulded work to be run clean and accurately to the sections supplied, and all the mitres and returns to be accurately made, and the enrichments and modelling to be approved by the architect. Or—

The cornices to be run in fibrous plaster, fitted and fixed with galvanised nails, and properly stopped and left perfect.

30. *Ornamental Cornices and Ceiling*.—The cornices in saloon (or drawing-room) to be run with gauged putty, consisting of one third plaster of Paris on brackets 18 in. or 24 in. girth, and fix the cast enrichments, as shown in design, trimmed and undercut. The soffits to have medallions or cast patterns, as shown, and the hollows and beadings to have dentils, leaf-enrichment, or oak and acorns, acanthus leaves, bead and roll, or other enrichments, modelled and cast from architect's design. The frieze to be modelled according to architect's design, 15 in. (or more) in depth in low relief, and to be put up in solid castings, trimmed and stopped with plaster. The ceiling to be formed into panels, as shown in detail, by plaster ribs, 7 in. or 12 in. girth made to mitre with

cornice, and the mitres and intersections to be true and neatly done, modelled by hand. The panels (or ribs if enriched) to have the folial pattern or "strap" pattern, to design cast in the solid, trimmed and stopped where necessary; (or fix plaster centre flower to the ceiling, 30 in. diameter, cast solid, according to pattern; or fix fibrous plaster or carton-pierre centre flower, give design, &c.)—

31. *Ornamental Ceiling*.—The ceiling of ball-room or saloon to be modelled and cast in plaster from the design and full-size details of the architect, and the cast enrichments to be submitted to him for his approval before being put up; or full-size drawings are to be made of all ribs, folial or other ornament bosses, floral devices, pendants, &c., for the use of modeller. The ceiling is to be plastered, with proper recesses, on wood grounds, or backings for the ornamental ribs and enrichments; and these are to be cast solid and fixed with plaster of Paris, and the heavy enrichments, patterns, or flowers are to be screwed with brass or galvanised screws to the woodwork or joists.

32. *Soffits and Friezes, &c.*—The soffits of beams and coffers and the wall friezes to be executed in plaster, floated and set in putty on lath. The grounds to fascias and coffers to be floated. Form raised margins to form panels as shown on lath, and truly form all mitres, stopped ends, &c. The bonds, enrichments, soffits, and friezes to have enrichments as to design. Or—

33. *Wall Decoration*.—Form panels, pilaster shafts, pedestals, dadoes, and friezes in fine (or coarse) quality Keene's cement to take a brilliant polish (or paint), and execute all enrichments to design, cast solid. (If on brickwork, specify Selenitic cement as a backing for the fine quality Keene's.)

34. *Beams*.—Lath and plaster ceiling beams to form panels of soffit; or fix battens  $1\frac{1}{2}$  in. by 1 in. to soffit and sides of beam to receive the laths, and form raised margins for panels to soffit, and run the margins and mouldings in plaster of Paris, neat Keene's, or Parian cement. (Carefully form all mitres, stopped ends, &c.) Or—

(The wood or iron beams to be covered by fibrous plaster or papier-mâché decoration, made in lengths, with cornices and soffit, and neatly stopped and joined at all mitres, &c.)

35. *Ceilings and Partitions*.—The ceilings and partitions of hall or music-room to be executed with "Adamant" cement, according to manufacturer's directions, or the walls to be plugged and the laths, machine-riven, not more than  $\frac{1}{2}$  in. apart. The cement to be mixed thin with clean water, adding enough material to work smoothly. For walls use No. 2 floating coat ruled off to a true face and set with "No. 1" adamant laid on thin with hand-float, then lay down with steel trowel to a firm face. The ceilings to have Adamant No. 2x, floating coat, and be allowed to set. Finish with "chromolith" or fine Parian face.



This is to be betrowelled to a fine face, and afterwards rubbed to produce a polished surface.

The cornices, according to detail, to be formed on cement backing, and 2in. deal brackets, 12in. apart, and to be finished with "chromolith."

36. *Fibrous Plaster Decoration*.—Fibrous plaster slabs, according to design or selected, of the best quality, to be fixed as frieze round buffet (or drawing-room) to 2in. by 1in. grounds 2ft. apart, with 1½in. galvanised iron screws. The grounds or fillets to be plugged to walls. The slabs to be neatly joined, stopped, and finished with one coat of setting stuff, and to be left perfect to architect's satisfaction.

Fix fibrous plaster slabs of (name maker) as ceiling, fixed with 1½in. galvanised iron screws to the joists. The slabs to be accurately joined, and to be stopped and finished with a thin coat of Parian cement, to the architect's satisfaction.

37. *Fibrous Plaster Ceiling*.—The joists to be "furred." Fix the ornamental fibrous plaster (or carton pierre) ceiling, according to design (or pattern approved) to the drawing and reception-rooms, with galvanised screws or zinc nails to proper backings or ground, and fill up joints and make perfect with plaster of Paris. Run round the fibrous plaster (or carton pierre) cornice, screwed to wood brackets 12in. apart and fillets plugged to wall. Fix the enrichment to cornice as shown, also the ornamental frieze in relief, and run frieze moulding below. Make good to all internal and external mitres in putty and plaster of Paris. Or—

Prepare the ceiling by "furring" for receiving the patent fibrous plaster in slabs (George Jackson and Sons), to be fixed according to directions of the firm, and put up all the enrichments as shown in design and approved, and leave the whole perfect to architect's satisfaction.

38. *Salamander Decoration*.—The ceiling friezes, dados, and fittings of reception-rooms to be formed of the asbestos patent "Salamander" in low relief to design selected by architect, and the decoration to be fixed or hung according to the directions of the United Asbestos Co., Ltd., Charing Cross-road. Or—

Prepare or float the plaster ceilings and walls to receive the "Salamander" decorations, which are to be carefully trimmed to the various surfaces and positions, and fixed with a strong paste with a small quantity of glue. Ease by damping the joints where necessary. No roller to be used, and leave same to the satisfaction of architect. The ceiling to have No. 1,076 pattern in 30in. squares, or No. 1,057 24in. square; the dado to have a pattern to match, or No. 1,048; and the wall fitting to have No. 1,022 (describing from catalogue).

39. *Skirtings*.—Ran ¾in. Portland cement skirting 7in. or 9in. high, with torus moulding, to kitchen and offices, trowelled to receive paint.

40. *Archways, &c.*—Finish the soffits and reveals of archways in basement in Portland or Keene's cement, with 6in. mouldings and 2in. returns to all angles; or the archways and soffits to be in Keene's cement on backings of coarse cement or Portland.

41. *Window Backs*.—Render and float behind all window backs, skirting, dados, ¾in. thick in Portland (or Keene's) cement. Float in Portland or Keene's cement, ¾in. grounds for wall or floor tiling.

42. *External Stucco*.—Compo the outer walls, and run all cornices, string-courses, mouldings, window-sills with blue lias lime of approved quality, mixed with clean sharp grit or river sand in the proportion of 2 parts sand to 1 part lime, and form and cut clean all arrises, mitres, mouldings, quirks, and provide and fix cast cement balusters or terminals.

Wightwick gives the following for lime stucco work:—

43. *Lime Stucco*.—Cover the whole of external surface of brick walls with a float of Aberthaw (or other lime), and a stucco of the same jointed to suitable ashlar.

44. *Stucco on Rubble*.—Cover the external rubble walls with a render and float of common lime and hair, and a stucco of Aberthaw lime and fine sharp clean sand, jointed or coloured.

Run in properly-prepared Aberthaw lime-cement (or Roman cement), all moulded capings, plinths, parapets, rail, balusters, and plinth of balustrade, cornice, mouldings, enrichments of frieze and architraves, strings, rusticated parts, sills of windows, &c. (Stucco for external work has now been superseded by new cements. Portland and Roman cement are generally used mixed with a good proportion of sand: as one of Portland to three of sand, and for Roman one of cement to one of sand. The clauses may run as follows:—

45. *Parapets and Basement*.—Render the inside of parapet walls and outside walls of basement with

¾in. (or 1in.) thick in Portland cement and sand, in proportion of one part cement to one of sand (or one part cement to two parts), or, if necessary, finish in neat Portland cement, with trowelled face, ¾in. thick.

46. *Walls*.—Rake out joints of brickwork, and back over surface to form a "key," and render and set in Portland cement, the setting coat to be mixed with sharp washed sand. Rub out in brick or tiles and cement any part of surface necessary to be brought out.

47. *Stucco between Studing*.—The surfaces or panels between timber studs to be battened with 1in. by 1in. battens 12in. apart, lathed with double laths, and plastered, floated, and set in lime or cement stucco, the setting to be mixed with washed sand, trowelled (or floated), and twice colour. Or—

Render and rough cast in lime stucco the panels between studs, and twice colour. Or—

Render and rough cast the panels or bays of timber gables in Portland cement stucco, and twice colour same. Or—

48. *Rough Cast and Pebble Dash*.—The bays between studs of half-timbered work to be battened and lathed with double laths, and "pricked up" with layer of coarse stuff and floated with lime or cement stucco, while wet, pebble-dash or rough-cast in a semi-fluid state to be thrown upon it; the pebbles to be ¾in. or 1in. diameter. Or—

The bays of timber framing to be battened with 1in. by 1in. battens, lathed with double laths, and render and rough cast in Portland cement stucco, finished with pebble-dash, &c.

## IRON CONSTRUCTION IN DRAINAGE WORK.—III.\*

By T. E. COLEMAN, F.S.I.

THE whole of the drains must be laid to good self-cleansing falls, and not larger than is considered absolutely necessary for the efficient removal of domestic sewage. They should have sufficient fall to insure a velocity of not less than 3ft. per second (or 180ft. per minute) when the normal quantity of sewage is passing.

The velocity and discharge of sewage through drain-pipes or channels may be ascertained by the use of one of the several standard formulæ, which have been constructed for convenience of application under the varying conditions which constantly occur in practice. All hydraulic formulæ are theoretically based on the natural law of gravitation; that is, upon the velocity acquired by a body falling freely from a state of rest. This velocity is usually expressed in the following terms—viz.:

$$v^2 = 2gh$$

$$v = \sqrt{2gh}$$

Where—

$v$  = velocity in feet per second acquired in falling through a given space.

$g$  = acceleration in feet per second due to gravitation

= 32.2ft. per second.

$h$  = height or space fallen through in feet.

In the practical application of this equation for the purpose of ascertaining the flow of water through channels or pipes, there are other important elements which must necessarily be considered. Thus the velocity of the flow will be dependent on the length and slope of the channel or pipe, sectional area and perimeter of the stream, nature of the surface of the channel or pipe over or through which the water flows, and the consequent amount of friction which takes place between the liquid and the inclosing sides.

From a careful consideration of these factors, the preceding equation becomes transformed into the well-known Chezy formulæ—viz.:

$$v = c\sqrt{rs}$$

Where—

$v$  = velocity in feet per second.

$c$  = coefficient ascertained from actual experiment. (This coefficient varies according to the nature of the friction at sides of channel.)

$r$  = hydraulic mean radius (or hydraulic mean depth).

= sectional area of stream in feet.

= wetted perimeter of stream in feet.

$s$  = slope or sine of inclination in feet.

= total fall in feet.

= total length of channel in feet.

It will be seen that a formulæ of such comparatively simple construction as that just mentioned necessitates the use of one factor which

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must be previously determined from the results of careful observations and experiments, so that the final issue is more or less empirical in character. Even with the most carefully constructed formulæ the ascertained results from calculations of this description can only be considered as approximately accurate when applied to any given length of drain or pipe, seeing that much depends upon the actual smoothness or otherwise of the surface of each pipe or component portion of the drain, and also on the manner in which they are severally laid and the joints made.

For practical drainage purposes the following expression of Eytelwein's formulæ is sufficiently simple and accurate for general application—viz.:

$$V = 55\sqrt{2rf}$$

Where—

$V$  = velocity in feet per minute.

$r$  = hydraulic mean radius in feet.

$f$  = fall in feet per mile.

The results thus obtained are slightly less than those indicated by some of the formulæ about to be mentioned; but they may be safely considered as showing the average discharge for house-drains as ordinarily laid. Where greater exactitude is required, a closer approximation respecting the velocity and discharge of drains and sewers may be gained by the substitution of one of the more complicated formulæ, in which varying values are given to the coefficients introduced therein, according to the nature and surface of the material employed in the construction of the drains.

Weisbach's formulæ is as follows—

$$v = \sqrt{\frac{2gh}{1 + c' + \frac{cl}{d}}}$$

Where—

$v$  = velocity in feet per second.

$g$  = acceleration due to gravity.

= 32.2ft.

$h$  = height or head of water in feet.

$c$  = coefficient of resistance for entrances of water into the pipe or drain.

$c'$  = coefficient for friction in pipe.

= .01439 +  $\frac{.016921}{\sqrt{v}}$

$l$  = length of pipe or drain in feet.

$d$  = diameter of pipe or drain in feet.

It will be observed that in this formulæ the value of the coefficient for friction in the pipe changes with every change in the velocity of the flow.

The formulæ introduced by Kutter is now given, viz—

$$v = \left\{ \frac{41.6 + \frac{1.811}{c} + \frac{.00281}{s}}{1 + \left( \frac{41.6 + \frac{.00281}{s}}{s} \right) \frac{c}{\sqrt{r}}} \right\} \sqrt{rs}$$

Where—

$v$  = velocity in feet per second.

$r$  = hydraulic mean radius in feet.

$s$  = sine of inclination in feet.

= length of channel in feet.

$c$  = coefficient varying according to the nature of the surface of the channel or pipe.

Another well-known formulæ is that constructed by Mons. D'Arcy—viz.,

$$v = \frac{\sqrt{2g}}{a \left( 1 + \frac{\beta}{r} \right)} \sqrt{rs}$$

Where—

$v$  = velocity in feet per second.

$g$  = acceleration due to gravity = 32.2ft.

$r$  = hydraulic mean radius in feet.

$s$  = sine of inclination in feet.

= fall in feet.

= length of channel in feet.

$a$  and  $\beta$  = coefficients having varying values according to the surface and material forming the pipe or channel.

Messrs. Santo Crimp and Bruges have recently compiled a formulæ with a view to providing a comparatively simple equation capable of general application to smooth brick and cast-iron channels or pipes. It is expressed in the following terms—viz.,

$$v = 124 \sqrt[3]{r^2 s}$$

Where—

$v$  = velocity in feet per second.

$r$  = hydraulic mean radius in feet.

$s$  = sine of inclination in feet.

= fall in feet.

= length of channel in feet.

The foregoing comprises a brief outline of some of the best-known hydraulic formulæ, which are



ordinarily used for the calculation of the discharge of drains and sewers.

As already stated, the "hydraulic mean radius" (or "hydraulic mean depth," as it is also called) of a stream flowing in a channel or pipe is found by dividing the sectional area of a given stream by its wetted perimeter—i.e.,

hydraulic mean depth =  $\frac{\text{sectional area of stream.}}{\text{wetted perimeter of stream.}}$

In other words, the "hydraulic mean depth" of any given stream flowing within a given pipe or channel is equivalent to that depth which would be actually found necessary for the formation of a similar stream flowing in a rectangular channel having the same sectional area as the given stream, and in which the bed or width of the rectangular channel has also a length exactly equal to that of the wetted perimeter of the given pipe or channel. For instance, assuming that a stream having a sectional area of 26sq.ft., and flowing through a pipe or channel of curved section, has a wetted perimeter of 13ft. Then a stream flowing through a rectangular channel, and having a similar sectional area of 26 super. feet, with a bed or width of 13ft., would require a depth of 2ft. Therefore, the "hydraulic mean depth" of the first-mentioned stream flowing through a pipe or channel of curved section is found to be 2ft.

The following example is given as an illustration of the method of ascertaining the velocity and discharge of sewage through pipes. A drain 4in. in diameter is laid to a gradient of 1 in 40, find the sewage discharge and velocity when flowing full.

By Eytelwein's formula—

$$V = 55 \sqrt{2 \cdot f}$$

The hydraulic mean depth of a 4in. drain flowing full is found to be .083ft., whilst a gradient of 1 in 40 is equivalent to a fall of 132ft. per mile. Therefore—

$$\begin{aligned} V &= 55 \sqrt{2 \times .083 \times 132} \\ &= 55 \sqrt{21.912} \\ &= 55 \times 4.68 \\ &= 257.4 \text{ft. per minute.} \end{aligned}$$

Having thus obtained the velocity of the flowing sewage in a 4in. pipe when the drain is running full, the volume of discharge is readily obtained from the following equation—viz—

$$D = V \times A$$

Where—D = discharge in cubic feet per minute.

V = velocity in feet per minute.

A = sectional area of flow in super. feet.

The sectional area of flow in a 4in. drain running full is .088sq.ft., and the ascertained velocity of the flow is 257.4ft. per minute. A cubic foot of liquid contains 6.25 gallons, therefore—

$$\begin{aligned} \text{Discharge in gallons} &= 6.25 \times 257.4 \times .088 \\ &= 141.6 \text{ gallons per minute.} \end{aligned}$$

The average velocity and discharge of sewage from ordinary drain-pipes flowing full (Eytelwein's formula) is as follows, viz.—

VELOCITY AND DISCHARGE OF SEWAGE (EYTELWEIN).

Diameter of Pipe.	Fall.	Velocity per Minute.	Discharge per Minute.
Inches.	Feet.	Feet.	Gallons.
4 .....	1 in 40	257	142
	1 in 50	231	126
	1 in 60	210	116
6 .....	1 in 60	258	316
	1 in 70	238	292
	1 in 80	223	274
9 .....	1 in 90	257	710
	1 in 100	244	674
	1 in 110	233	644
12 .....	1 in 120	258	1,266
	1 in 150	231	1,134
	1 in 200	200	982

#### ROYAL ACADEMY SCHOOLS PRIZE DISTRIBUTION.

ON Saturday evening last a considerable number of Members and Associates of the Royal Academy of Arts assembled in the Lecture Theatre at Burlington House, on the occasion of the annual prize-giving, when the students and their friends made up a goodly company. Sir Edward Poynter, the President, congratulated the prize winners on the all-round competitions for the various prizes, remarking specially on the excellent compositions contributed in the contest for the Creswick prize—"A Bridge over a Trout Stream." He expressed his satisfaction that this year a larger and better series of drawings from

the antique were contributed, because this formed a very important part of the student's course of study. Not being "Gold Medal Year," there was no formal address from the chair. With regard to the Architectural School's work exhibited, we are glad to notice a more worthy show of studies. The Railway Station for a country place, for which a prize of £25 has been given in the upper school to Mr. J. Stevens Lee, is certainly commendable, and some of the designs for a Game-keeper's Cottage, and one particularly for a brick-built Boathouse, deserve mention. There were only two designs sent in for the Travelling Studentship (£60), the subject being "A Town Church." This prize was won by Mr. William Hawke by a domed composition of passing merit, crisply delineated in black and white. The design, however, can hardly be described as a successful solution of the somewhat difficult problem thus attempted by the author, whose work for a building of a comparatively small scale is really too ambitious, and too disconnected in its parts, which in some respects are inconsequential and too stilted in their proportions. The two side chapels are not wanted in an Anglican church, and the position adopted for the font may be all very well in St. Paul's Cathedral, but in a parish church such as this would be most inconvenient. The "ambone" which balances the pulpit in the arrangement of the front of the choir is somewhat meaningless, unless it is intended for use as a lectern, and this is not so shown. The second design is in a Lombardic style, designed for brick, with overhanging eaves, quite out of accord with English church-building, and thus Mr. Hawke takes the prize without serious competition. There were no drawings submitted for the Royal Academy Silver Medal. The subject set was the Hall of the Middle Temple. Architectural interests, somehow or other, are sadly at fault at the Royal Academy, and this state of things has been going on for several years now. Surely it is quite time a serious effort was made to rectify this deficiency. It cannot be satisfactory to the authorities at Burlington house to see their prizes going begging, or at best but indifferently competed for.

The following is the official list of awards:—Landscape painting, "A Bridge over a Trout Stream," Creswick prize (£30), Fred Appleyard. Painting of a figure from the life (open to male students only), silver medal, first, George Murray; second, Edward Francis Wells. Painting of a head from the life, silver medal, first, Mary Towgood; second, Fred Appleyard. Painting of a draped figure (open to female students only), silver medal, first, Grace Elizabeth Page; second, not awarded. Cartoon of a draped figure, Calliope, silver medal and prize (£25), George Murray. Design in monochrome for a figure picture, Joseph presenting his father before Pharaoh—Gen. xlvii. 7; Armitage prizes, first (£30) and bronze medal, not awarded; second (£10), Frank Cadogan Cowper. Design for the decoration of a portion of a public building, the subject being Harvest, prize (£40), George Murray. Set of six drawings of a figure from the life (open to male students only), first prize (£50) and silver medal, George Murray; second (£25), Frank Shelley; third (£15), Christopher D. Williams; fourth (£10), not awarded. Drawing of a head from the life, silver medal, first prize, William Denis Eden; second, Annie Margaret Page. Drawing of a statue or group, silver medal, first, Fred Appleyard; second, Annie Margaret Page. Perspective drawing in outline (open to painters and sculptors only), the Summer House in Kensington Gardens, near the fountains, silver medal, no competition. Model of a design, Endymion, whilst asleep, is visited by Diana, first prize (£30), Stanley Nicholson Babb; second (£10), Alfred Bertie Pegram\*. Set of three models of a figure from the life (open to male students only), first prize (£50) and silver medal, Gilbert William Bayes; second (£20), Alfred Bertie Pegram\*. Model of a bust from the life (open to female students only), silver medal, first not awarded; second, Winifred Florence Hunt. Model of a design containing figure and ornament, Youths gathering Grapes, silver medal, Stanley Nicholson Babb. Model of a statue or group, silver medal, first, Frank Arnold Wright; second, Stanley Nicholson Babb. Design in architecture, a Town Church, Travelling Studentship (£60), William Hawke. Set of architectural drawings, the Hall of the Middle Temple, silver medal, first, no competition; second, no competition. Set of

architectural designs (upper school), prize (£25), John Stevens Lee. Set of drawings of an architectural design (lower school), prize (£10), Alfred Edward Corbett. Plan of a building, a Town Club-house, prize (£10), Arthur Campbell Martin. Original composition in ornament, silver medal, no competition. Perspective drawing in outline (open to architects only), the Interior View of the Library at Lambeth Palace, silver medal, no competition. The Landseer Scholarships, in painting, of £40 a year, tenable for two years, have been awarded to Frank Shelley, Arthur G. Ackermann, and Christopher D. Williams (extra). In sculpture, to Gilbert W. Bayes and Mortimer J. Brown (extra).

(\* Disqualified, owing to having received the same prize before.)

#### THE ROYAL INSTITUTE OF BRITISH ARCHITECTS AT BIRMINGHAM.

A NUMEROUS deputation from the Royal Institute of British Architects visited Birmingham on Friday last to hold a joint meeting with the Architectural Association of that city, followed by the Annual Dinner of the Institute. The President of the Institute, Professor George Aitchison, R.A., was unable to attend the meetings owing to ill-health; and at the afternoon conference, held in the rooms of the Royal Birmingham Society of Artists, the chair was taken by Mr. W. M. Fawcett, M.A., F.S.A., of Cambridge, Vice-President, the subject for discussion being

#### BUILDING BY-LAWS AND THEIR ADMINISTRATION.

Mr. C. E. BATEMAN explained that the subject had been selected by the Birmingham Architectural Association because the Birmingham City Council was about to frame new building by-laws, and had promised to submit the draft to the Association. They hoped to have the assistance of the Royal Institute in considering these by-laws, and also in an effort to obtain greater uniformity in the by-laws of Birmingham and the surrounding districts, from the want of which a great deal of difficulty and annoyance arose. A paper on the subject by Mr. W. HENMAN was read by the SECRETARY of the Institute (Mr. W. J. Locke). Mr. Henman explained that the paper was intended to indicate the widespread feeling that building by-laws and their administration throughout the country were in a most unsatisfactory condition. The writer was afraid that, unless the members of his profession could bring united pressure to bear upon the responsible authorities, the evils under which they had so long suffered might extend, and cause in the future still greater annoyance and irritation to architects, as well as injury and loss to the public. He excluded the Metropolis from consideration because the Building Act applying thereto had recently been revised, and because it was administered by district surveyors, an experienced body of men, who, he believed were generally architects, or had had architectural training, while there was power of appeal to the London County Council. In the provinces an entirely different state of affairs existed. Some latitude in a few special particulars to meet local requirements might be necessary and advisable; but when every district authority was allowed to make all sorts of petty variations confusion resulted, and architects were often caused the greatest annoyance and inconvenience by having plans disapproved in one district which would be passed without question in another. This frequently resulted from the interpretation different surveyors might put upon the same by-law or regulation. Some local authorities made regulations simply by resolution of the board, which they did not even print or circulate or submit to the Local Government Board. Architects as a body had not the slightest desire to evade or obstruct any by-law, or even any regulation, lawfully made with the object of securing safety and health, provided such by-law or regulation was uniformly and reasonably enforced. The so-called model by-laws of the Local Government Board were confused in their arrangement, and went too much into detail on matters of minor importance, or matters in which knowledge was as yet imperfect, and omitted reference to matters of structural importance, the neglect of which in some buildings might be a definite source of danger. Moreover, they were wrapped up in a vast amount of unnecessary legal jargon and excessive verbiage. The district by-laws were often set forth in a most confusing manner,



especially where local acts affected the reading of the by-laws, and the difficulties were increased by the uncertain methods of administration. Apart from the larger cities, provincial district surveyors were usually selected from a class of men trained to road-surveying and sewer-laying, and with little knowledge of building construction, and less of architectural propriety. They appeared to have imbibed the idea that architects were their natural enemies, and devised means for wasting their time and causing them trouble, quite regardless whether by so doing the safety or health of any individual might be secured. In populous districts the surveyors were assisted by building inspectors, with, as a rule, less knowledge and discretion. Dwellings for the working classes were still erected in the most flimsy fashion by the jerry builder, who generally went scot-free, while architects who desired to build scientifically and well were continually harassed by unreasonable restrictions and requirements. Too many members of district councils were interested directly or indirectly in building operations, and the surveyor could serve such in many ways, and in turn obtained their support. Inspectors were but mortal, and were generally underpaid. It was, therefore, not surprising that some of them came under the influence of the speculative builder, and little credit accrued to them by drawing attention to his irregularities; but *celat* was gained when an architect was reported as having contravened a by-law or regulation. Year by year authorities were grasping at greater powers of control, and by means of local Acts of Parliament, by-laws, and regulations, the rights of property were trampled upon, or the cost of building was seriously and unnecessarily enhanced. In order to counteract these evils, members of the architectural profession must act together and strive to obtain the co-operation of building proprietors by letting it be known, through the public Press, that action was being taken in the hope of regulating local authorities and their officials within reasonable limits. Pressure must also be brought to bear upon the Local Government Board so that building by-laws might be in all essentials uniform, and only such regulations might be sanctioned as were proved to be necessary to secure health and safety. In addition, courts of appeal, easily accessible, should be constituted. The author also drew attention to the employment of district surveyors in carrying out buildings of architectural character, such as infectious hospitals, baths, libraries, markets, and even town halls and council houses. Rarely had they received suitable training for such work, and by their doing it, the architects were deprived of legitimate employment. When a building was required, a surveyor often suggested that an architect's fees might be saved by employing the salaried servant. The surveyor then obtained the services of some architectural hack, who prepared the design. When the work was done the surveyor suggested that he should receive extra remuneration, which generally took the form of a rise in his salary, and often the temporary hack became a permanent addition to the staff, so that the ratepayers, instead of simply having to pay an architect the usual 5 per cent. on the cost of the work, were saddled with an annual charge which, in the aggregate, largely exceeded the legitimate fees for carrying out the work. In addition to that, it was a well-known fact the actual outlay on buildings carried out under the control of surveyors was generally far in excess of what it would be in the hands of a qualified architect. In some districts surveyors were permitted to undertake private work. They prepared designs in the public offices with the assistance of their staff. Necessarily these designs were passed without question, and the writer of the paper had even heard of difficulties being thrown in the way of building proprietors and architects, evidently for the purpose of diverting work into the hands of the surveyor. These were crying evils which it was to be hoped the Institute would exert itself to remedy.

In the discussion that followed, Mr. WILLIAM WOODWARD (of London) said that the difficulties Mr. Henman spoke of with regard to building by-laws and their interpretation were applicable equally to London. They had, however, a Tribunal of Appeal consisting of two architects and one solicitor or barrister.

Mr. T. NADEN (Birmingham) said that in that city their appeal was to a committee of the council. He had experienced no difficulty with surveyors. They had only to stroke the surveyor

the right way to get what they wanted, and the committee need only be appealed to when the surveyor considered that the by-laws were not sufficiently elastic to meet a special case, and could not take the responsibility upon himself.

Mr. NICOL (Birmingham) said that in his personal experience the surveyors were not so very bad to deal with. The architect, if he went about it the right way, generally got his own way in the end.

Mr. W. MILBURN said that in Sunderland they had had a set of unsuitable by-laws, framed by the corporation, and the architects got up an agitation, in which they obtained the assistance not only of the builders, but of the leaders of the workmen's societies. The result was that they got the by-laws amended.

Mr. J. COTTON (Birmingham) condemned some of the by-laws enforced in country towns as tending to destroy the picturesque irregularity which was one of the charms of such places. He suggested that the local association should call into consultation the architects from the surrounding districts. The late Birmingham surveyor was one of the best men they could have had in such an office, and he had found no difficulty in the present city surveyor's rulings when the matter was put to him in the right way. (Laughter, and a voice: "Which is the right way?") By-laws should vary to suit local conditions, as, for instance, those of stone districts; but in what was really one large town uniformity was desirable. For instance, they could do things in Handsworth which they were not allowed to do in Moseley.

Mr. P. GORDON SMITH (architect to the Local Government Board) said that, Birmingham having special powers under the Consolidation Act, the suburban districts could not exactly copy its by-laws. He thought, however, that it would be a very great advantage if all the local authorities in the neighbourhood would meet in Birmingham and form a committee to go into the whole subject, with the view of framing a code of by-laws. They might, perhaps, get the assistance of someone from the Local Government Board to point out to them what they could or could not do. He was sure that the representatives of such a conference would receive the utmost consideration from the Local Government Board. As to the "regulations" of which complaint had been made, a district council could make what regulations it liked, but it could not enforce them. There was no penalty. As for the model by-laws, the Local Government Board could not compel the adoption of any one of them. These by-laws had stood the tests of the courts very well, but if their phraseology were obscure there was no objection to the local authority printing explanations or illustrations with them. As for the surveyors, he had found them excellent officers, and very amenable to reason. In many of the large towns the surveyors were simply splendid men.

The CHAIRMAN said that it appeared to him that the Birmingham architects should take a leaf from the book of their Sunderland colleagues.

Mr. J. SMITH (Sheffield) said that in his town work to the amount of a million and a quarter was being done from the city surveyor's office.

Mr. A. E. SAWDAY (Leicester) thought they need not be thin-skinned on this question. It was taken up in Leicester, with the result that a resolution of the council was passed that for all work over a certain amount an outside architect should be engaged.

On the motion of the CHAIRMAN, the following resolution was unanimously adopted:—"That the Institute is in sympathy with the action that is being taken by the Birmingham Architectural Association as to the framing and administration of by-laws in Birmingham and the surrounding district, and will be very pleased to assist the local society by advice or suggestion in their action."

#### ANNUAL DINNER.

At the conclusion of the meeting, the visiting members of the Institute, with the members of the local association, dined together at the Grand Hotel. Mr. H. L. Florence, Vice-President, occupied the chair. He was supported by the Lord Mayor (Alderman Beale), Alderman Sir James Smith, Sir Benjamin Stone, M.P., Sir James Sawyer, Mr. G. H. Cartland (High Sheriff of Warwickshire), Mr. W. M. Fawcett (vice-President), Mr. Ernest George (Vice-President), Mr. E. A. Grüning (Vice-President), Mr. C. E. Bateman (President of the Birmingham Architectural Association), Mr. J. Powell Williams, M.P. (Financial Secretary to the

War Office), Alderman Kenrick, M.P., Councillor E. Parkes, M.P., the Revs. A. R. Vardy and E. F. M. MacCarthy, Dr. Heath (principal of Mason University College), Dr. Saundby and Messrs. J. T. Middlemore, J. T. Bunce, Aston Webb, R. I. Bennett (President of the Manchester Society of Architects), A. E. Sawday (President of the Leicester Society), W. Henman, H. Whitworth Wallis, W. J. Price, W. Hall, G. Corson (President of the Leeds and Yorkshire Society), T. E. Colclutt, P. Gordon Smith, E. W. Mountford, D. Barclay (President of the Glasgow Institute), J. J. Balems, Stockdale Harrison, W. Emerson (hon. secretary R.I.B.A.), C. Silk and A. E. McKewan (hon. secretaries Birmingham Architectural Association), W. J. Locke (secretary R.I.B.A.), G. H. Hunt, Oliver Essex, J. C. Nicol, H. R. Lloyd (vice-President Birmingham Association), W. H. Bidlake, Jonathan Pratt, J. Bowen, J. Collins, T. Naden, E. E. Taylor (headmaster of the Municipal School of Art), J. Goodman, E. J. Bigwood, H. T. Buckland, H. Ward, &c.

"The Houses of Parliament" was proposed by Sir JAMES SMITH, and responded to by Mr. J. POWELL WILLIAMS, M.P.

The CHAIRMAN, in proposing "The Corporation of Birmingham," said that no one could have failed to recognise the great progress that had been made within the last few years by all municipal institutions. Wherever they went they saw the superb buildings put up by the great provincial towns, greatly to the benefit of architects. At Birmingham, their new street, for instance, had been carried through in a straight line, without any of the awkward curves, the corners, and the unexpected divergences which they met with in recent improvements in London. This was a very great thing to carry out; but all such improvements had the disadvantage that when once begun they all expected more. With the increased power given to municipalities they expected more from them, and in the great improvements that were to come, whether in the shape of stately embankments and new streets, or public buildings or dwellings for the working-classes, they should have some element of art.

The LORD MAYOR, in reply, referred to the important work done by architects in the public buildings of Birmingham, and said that though they could not always be finding work for the leading members of the profession in the centre of the city, the extension of the suburbs afforded opportunities for the rank and file to do something in another direction. For the prosperity of an artistic profession there should be a public capable of appreciating art, and the corporation of Birmingham for some years had been giving special attention to the education of their young people, who were fast becoming able to realise the beauties of architectural design. They had had, too, a great variety of criticism, coming quite as much from the members of the architectural profession as from any other person. He could not assume that this criticism arose from professional jealousy, and he therefore concluded that there was a great variety of opinion among architects as to what was good, bad, or indifferent in architecture. If they were to criticise anybody, it should surely be the corporation he represented. Individually the members of the corporation were excellent men of business, but collectively they were apt to sacrifice their business instinct for what were regarded as matters of principle. He thought it would be wiser, as a rule, to discuss architectural questions in public matters in the same way as they would in their private undertakings, with the assistance of an architect, rather than blindly insist upon competition whatever the subject matter might be, as, for instance, with regard to the proposed extension of the Art Gallery.

Mr. J. T. BUNCE, in proposing "Architecture and the Kindred Arts," said that it was a hard confession for a Birmingham man to make, and yet in honesty it should be made, that not so very long ago Birmingham was an ugly town. Art was not unknown among them, but the community itself had done little for art in any form but that of music; and, excepting their famous Town Hall, they had no public building of distinction. Now, thanks to municipal spirit, to advancing education, and to the skill of their later architects, what a change had come over the town architecturally! Further, they had been trying, and were trying, with a large measure of success, to teach the people and particularly the artisan classes, principles and methods of true art, in their Museum and Art Gallery, which, thanks to



the stimulus of Mr. Middlemore's magnificent offer, would, he hoped, soon be adequately extended, and by their Municipal School of Art, with its 3,000 students, and its Architectural School, which was conducted at much self-sacrifice under the direction of Mr. Bidlake, and some of the students of which had obtained high distinction in the awards of the Royal Institute.

In responding, Mr. W. H. BIDLAKE said that if architecture were true to her traditions she would still embrace the ideas and ideals of all time. In Birmingham the commercial and municipal ideals were perhaps predominant. He believed it to be quite possible for architecture to express the commercial spirit as well as the ecclesiastical or monarchical spirit.

Mr. J. T. MIDDLEMORE responded also.

SIR BENJAMIN STONE, M.P., in proposing "The Royal Institute of British Architects," quoted the great monuments of architecture at home and abroad in support of his contention that architecture was the most ennobling of the arts, denouncing the vandalism which they met with every day as a scandal to modern society. Sir Benjamin pleaded strongly for protection for the ancient architecture of this country.

The CHAIRMAN, in responding, said that the Institute existed for several purposes, among which were the advancement of the art of architecture and the protection of architects. It had recently made great extensions in connection with allied societies in different parts of England, and even in Australia. He noticed that in the proposed university of Birmingham architecture was not included in the scheme, so that he was afraid that the public interest in architecture was not so sincere or so enthusiastic as the proposer of the toast would wish it to be. In London they had a superintendent architect advertised for in such a way as to place him in the same rank with or at the same salary as a tramway director; but he was happy to say that was not in Birmingham.

The toast of the "Birmingham Architectural Association and the Allied Societies" was proposed by Mr. W. M. FAWCETT, and responded to by Mr. C. E. BATEMAN (Birmingham) and Mr. R. I. BENNETT (Manchester).

That of "The Visitors" was given by Mr. ASTON WEBB, and acknowledged by the Rev. A. R. VARDY.

#### THE ARCHITECTURAL ASSOCIATION.

THE fifth ordinary meeting of the present session of the Association was held on Friday evening at 9, Conduit-street, W., the President, Mr. G. H. FELLOWES Prynne, F.R.I.B.A., in the chair. Mr. Milner having been elected as a Member, the PRESIDENT announced that a course of lectures on Drainage and Water Supply would be given in the new year by Mr. Max Clarke, the first to be delivered on Thursday, January 5.

Mr. E. T. HALL, F.R.I.B.A., then read a paper on

#### THE POSITION OF ARCHITECTURE AMONG THE FINE ARTS.

Fine art has, the author remarked, been defined as that power whose great end is to give pleasure, and the pleasure we have in contemplation is the higher or intellectual to the exclusion of the lower and sensual. The vehicles by which this higher pleasure is conveyed to us are, of course, the senses, so that we get sensuous and intellectual or reflective pleasure. By hearing and by seeing, fine art is appreciated, and the pleasure it affords is the greater in proportion to its permanent retention by the intellect, and in proportion to the tranquillity with which it is so conveyed. Fine art has been also defined as the representation of an intended idea, the expression of an idea in matter, while the ideal in art is the rejection of a rude and crude act to illustrate an emotion and the selection of a more subtle and poetic mode of depicting the idea. The definition of architecture varies almost with every writer on this subject, and one is sometimes appalled to hear the courage with which a young architect speaks, and, with the confidence begotten of enthusiasm, lauds this building as good architecture, and decries that as devoid of architecture. What is this art of architecture? Ruskin says in one place, "It is a science of feeling more than of rule," in another it is that which "taking up and admitting as conditions of its working the necessities and common uses of the building, impresses on its form certain characteristics visible

and beautiful, but otherwise unnecessary." So that in his view architecture is a gloss separate or separable from the building. Fergusson defines architecture as "the art of ornamental and ornamented construction." To emphasise this, he says that in a building it is the art of the engineer which consists "in selecting the best and most appropriate materials, and using them in a scientific way, and where the engineer leaves off the art of the architect begins." In other words, the planning and constructional design of the building are works anterior to the "architecture" of it, this being a superimposed ornament. Indeed, he gives us an illustration of a building, and shows how he adds architecture to it. M. Viollet-le-Duc takes a different view. He says "Architecture and construction must be taught together. Construction is the means, architecture the result. Architectural construction is the employment of materials according to their quality and their adaptability with the idea of satisfying a want by the most simple and solid means, giving to the constructed object the appearance of durability and proper proportion subject to certain rules imposed by the senses, reason, and human interest." Briefly, a building must be devised by one mind so using construction as to result in a work of architecture described as having specified æsthetic properties. Eidlitz's definition is less involved than that of M. Le-Duc, and carries the point further. He says, "Architecture is the art which models buildings, which teaches the development of structural forms," the word development comprehending the continuous evolution of architecture as distinguished from its crystallisation into styles. Hegel defines a work of art as the interpenetration of matter and thought. Viewed in this light, the matter in an architectural production is so relatively massive and intractable that to penetrate it with thought is the goal for which we must laboriously aim, and he who can subordinate the material to the mental in such a production is entitled to rank as an artist, and to rank higher than other artists in proportion to the difficulties of the material in which he has to express his ideas as compared with those in which they have to work. Having endeavoured shortly to put before you some conceptions of fine art and architecture, I will ask you to consider with me

#### THE RELATIONS OF FINE ARTS ONE TO ANOTHER

in their mode of expression, and from this to endeavour to find what is the best rule of life which will help us most to carry forward the banner of our own art. We shall speak of the arts of music, poetry, the drama, painting, sculpture, and architecture. Of these painting, sculpture, poetry, and the drama are imitative, music and architecture creative. As ideas in art must be expressed in language understood of the people, it is essential to convey the artist's meaning by depicting something in imitation of or based on principles observed in nature—that is, in real life. That this is done in painting, sculpture, and the drama is self-evident; but it is also the same in poetry. All the imitative arts may raise the subjects they depict from the commonplace to the ideal, and the abler the artist the greater his success in this direction. Music has nothing to imitate. It is a spontaneous creation, and it may convey to the mind suggestions of anything or everything in nature. Music portrays all emotions. But it differs from all other arts in that it is almost incapable of pandering to the lower passions. Poetry would appear to be of later origin than music, in that its aim had been to depict that which pre-existed in the human history, or prophetically to discourse of that which is to be. It is the adornment of expressed thought in any form. The influence of poetry on the race is diverse. It may exalt or elevate the soul, it may debase it. Poetry, being a form of speech, can be artistic while it panders to the lowest of our natural appetites. The drama is a form of poetry depicted by action. In historical sequence it was later than either music or poetry. Its influence is great, but it is evanescent. We now come to that art Architecture, which is primarily the subject of our consideration to-night, and as such we must consider it in greater detail than the other arts. I propose to consider it together with the sister arts of Painting and Sculpture, as they have been so intimately associated with it. When the necessity first arose for man to build in order to protect himself from the elements or his natural enemies, his buildings would take their form on strictly utilitarian lines, using the material readiest to hand. Thus in a

timbered district a conical hut of wattles covered with leaves would be the first form of shelter—suggested by the drooping branches of a tree—and in an arid or stone district the earliest form would be doubtless the excavation of a hole under a large flat surface slab, the sides of the excavation being lined with stones to support the edges of the large slab and prevent its tipping or causing the earth on which it rested to give way under its weight. Many such can be seen in Brittany to-day. As the family or clan increased, and with its increase the feeling of greater security obtained, the wattle hut would give way to the larger timber room, and the burrow would be replaced by the building up of stones above the earth to form a walled inclosure. The existence of large flat stones would suggest the formation inside the inclosure, against its outer walls, of a portion covered with flat slabs supported by pillars of stone on the inside, and this feature in principle is preserved to this day in the cloister or ambulatory or courtyards and ecclesiastical buildings in the West, as well as in the older buildings of the East. In Iceland a large native house is now but a series of detached wooden rooms joined together by a corridor. The high-pitched roof arose in countries of heavy snows, and a wise conservatism retains it in various climates. The accessible flat roof belongs essentially to the tropics or hot climates, its purpose being to afford opportunities for getting the greatest amount of air by day or by night.

#### ARCHITECTURE WAS BORN

when, in the contemplative mood of leisure, the man of the stone inclosure began to reflect that the pillars of his colonnade might be arranged not at the distances necessary to support the various sized stone slabs which came readiest to hand and were used as covers, but at regular intervals, selecting his cover stones to suit; and that he might reduce the rude outlines of his pillars to regular shapes; and the man of the timber house began to think that he might, instead of having a lot of detached rooms, put them together under one roof, and when they were so joined might remove the separating walls of some and place pillars in their stead. Gradually, with the progress of political and social education, which taught him and his neighbours to live in mutual dependence, would come the recognition of the necessity for order and organisation, and these, applied to the home, would develop the architectural faculty of convenient planning, and so on until the rude congeries of rooms would become an architectural entity, symmetrical and rhythmic, and thus would be evolved what Fergusson calls "the æsthetic form of the technic art."

#### A FURTHER DEVELOPMENT

would arise when assured of the stability of the Commonwealth. Man, in contemplating the grandeur of nature, the sublimity of its outlines, the mystery of its forests, the dignity of its rocky terraces, the massing of its lights and shades, would reflect on the mysterious powers which dwell in these, and on the laws which control the seasons and the storms, and a desire would arise in him to do honour to the Unseen Author of these mysteries by erecting a temple. In such a building the narrow limitations of domestic life would have no place, and the architect, attuning his mind to this great Author, and finding within himself a reflex of that Author—a creative power—would reverently set himself to produce a work which should, in however dim a fashion, reflect the emotions with which nature and his subject had impressed him. In such a structure there would be no place for the lighter moods of life. The predominant key would be dignity; its harmonies, repose, mystery, and symbolism; their combination appealing to mankind in its contemplative mood, conveying an expression, as Ruskin calls it, "often serious and sometimes melancholy—an equivalent for the sorrow, trouble, and mystery of human life." It is by gradual process we thus see the art of architecture vivifying the dry bones of construction, and making them live and speak. This spirit once aroused would permeate the world. The palace would come next, in which the oratorio would be replaced by the opera, expressive of the various phases of life. The broad outlines of the structure would be representative of the dignity of life as a whole. Subordinated to this, the various parts would appropriately express the lighter moods. In the temple the mysterious attributes of the Deity



would be symbolised and the phases of His worship expressed. In the palace the glory of the Man would be emphasised and enhanced, so that the stranger should be impressed with his majesty and importance. The inclosure would mark that the King's abode was set apart. Through its stately portals, as through a frame, the eye would be led to contemplate the picture within, and a visitor, conducted for the first time through its courtyards and vestibules, its colonnades and halls furnished with the pomp of armed guards, the peopled bustling of a busy place, would be emotionally affected, his senses impressed, and his mind prepared by the time he reached the hall of audience to render homage to the master mind. From the palace the spirit of architecture would, through the ages, percolate downwards, its steps growing slower and its form attenuated as it receded from the centre of wealth and leisure, of culture and refinement, until it would evaporate at the abodes of grinding poverty, at the factory where Mammon alone was worshipped. And here parenthetically I would dare to

#### DISSENT ENTIRELY FROM RUSKIN

where, in the "Seven Lamps," he inveighs against the external artistic treatment of trade premises. He says you must not mix architectural ornament with business, but should only use it for places where you rest. I venture to affirm, on the contrary, that in the refinement of the tradesman's surroundings there is most hope for raising the artistic standard of his wares and fabrics, and indirectly of his customers. It seems to me that the external treatment of every building is a matter of the deepest concern to the man in the street; indeed, every building owner in a city should be encouraged to recognise his responsibility in the architectural treatment of his building as part of the whole street, just as in his moral conduct he has a responsibility to the community. Architectural ornament is to building as the leaves and blossoms are to the structure of a tree—an artistic development of the skeleton evidencing life—a perfecting. But, like the leaves, it should be characteristic of, and in harmony with, the structure within. The relative position of architecture among the associated arts of painting and sculpture may be likened to the relation of trees and flowers. The trees are more stately, the broad features which give dignity and masses of subdued tone to a landscape; the flowers the decorative colour and brightness. The tree in its perfection is, so to speak, a part of the landscape. Painting and sculpture are more like the flowers of the earth, bright, poetical, refined. They must be examined near and in detail. They are the companions of leisure and of ease, while an architectural composition is for him who runs to read, for the virile man, the man of activity. So that for a monument to record a great victory or a national achievement, an architectural building is appropriately the medium almost universally chosen, while the sister arts are selected to record a pageant, an act in the great drama—in short, to depict the detail rather than the mass. Architecture seeks to

#### EXPRESS THE MORE PERMANENT IN NATURE;

sculpture and painting the more evanescent, the ever-changing. The picture, too, has a frame to inclose it, to remind the onlooker of its limits. A work of architecture has its own proper place under the vault of heaven, and calls out that it is part of the actual. Now, to be of any living and vitalising value we must bring home architecture to our daily life and surroundings. I ventured last autumn, in speaking to your President's address, to suggest a doubt as to the wisdom of teaching architectural history in the early stages of the Architectural Association curriculum, and proposed rather that the student's mind should be first trained to understand the principles of art and of design, not only by studio work, but by the study of buildings, the history coming later, when his trained mind would know better how to appreciate it. Shortly afterwards the Bishop of London, discoursing to teachers of the School Board on learning, said it was useless to start a child's education with the Witenagemote, and that it was better to teach him Constitutional history by starting with the actual around him—with the policeman whom he knew—and from the present to lead him back step by step, by which means, said the Bishop, he could learn to appreciate history and so get back to the cradle of our Constitution. I feel that is our best position. We should strive to learn

#### THE PRINCIPLES CONSTITUTING THE BASIS OF DESIGN,

and to apply the knowledge of construction we possess now—a knowledge wider far than any possessed by the ancients—to meet contemporary wants. Do not suppose I am belittling the study of history, or deprecating research. These are of immense value to an architect; but one may be learned in them and never be an architect. Nothing is more cramping or sterilising to the mind than, by becoming saturated with history, to become the slave of "style," be it Classic, or Gothic, or anything else. To design in a recognised "style" is to arrest all art progress; to always seek for and follow a precedent, be it for grouping or outline, for planning or moulding, is the negation of art. It is living in the dead past, in a world whose aspirations, whose moral life, whose callings have but little relation to those of our day. Fergusson tells us what are the "correct" proportions for a room, others what are the correct proportions of a column of an entablature, &c. As Eidlitz very properly remarks, "If rules of proportion existed, and a knowledge of them enabled men to produce great architectural monuments, architecture would become a trade, and not an art." My younger friends will say all this is true, but so true that it is unnecessary to speak of it. But I would ask them to look around, to study the buildings erected during the earlier years of this century, to read, when they have nothing better to do, the literature of the Battle of the Styles fifty years or so ago. Ruskin, in one place, says we are unwise to build in any other style than that of the pointed arch, "because it is the strongest in structure and a beautiful form, while the square head is both weak in structure and ugly in form." The Egyptians and Greeks did not think this. They certainly knew of the arch. We have recently heard of the discovery of a brick arch in the tomb at Denderah erected 4,000 or 5,000 years ago, and yet the architects built their great monuments in the trabeated style. The fact is, we are all inclined to worship the great achievements of the artists of the past, and to regard their work rather than the spirit and principles which underlay their work. Had our great Mediæval church builders been trammelled by precedent and style, how would their marvellous art achievements have been produced? We should never have had their masterpieces to glorify the land. That which places architecture above the sister arts is that while they, with few exceptions, of necessity record emotions and ideas of the past or present, architecture is, or should be, ever labouring to

#### BRING FORTH A NEW ORGANIC CREATION,

something in sympathy with the needs, the developments, the aspirations of the times. I want to emphasise this word "new," because the aim to be original is often spoken of as though it were a reproach. I am not defending wild and extravagant designs, though even they show life; but it is of the essence of vitality in art to depict that which has not been, to increase and multiply forms. In Viollet-le-Duc's "Habitations of Man," there are two principles represented by Doxious and Epergos. Doxious, who sees only in ancient architecture the *summum bonum* of art, and resents all change, who when he travels through the world for thousands of years is always, with a sigh, looking back to Egypt. This is the spirit of the rules of proportion, the worship of style, the negation of progress in science and art. Epergos, on the other hand, sees in the evolution and development and in the new offspring of architecture an evidence of godlike powers given to man, an evidence that life and not death is the keynote of the world, and he urges us on to strive, not stagnate.

#### PLANNING ARCHITECTURE.

If we approach an architectural design from the point of view of grasping the purposes for which the building is wanted, so planning it that its various parts adapt themselves to those purposes in such a way that all seems natural and harmonious; making the entrance-hall impressive and expressive with dignity, spaciousness, and hospitality; arranging our windows so that the light shall suit the purposes of the various apartments, aerating with sunshine the various cubes so that sweetness pervades everything, breaking our large floor areas by columns, forming little surprises by arched recesses or galleries affording views of any particular picturesque groupings, and making all to grow naturally from our con-

struction, we may produce that which will be both artistic and individualistic—an evidence of thoughtfulness and of the creative faculty. I suggest this in opposition to Ruskin's or Fergusson's theories about a building pre-existing with the architecture added. I suggest that a good plan, well thought out on the lines roughly sketched, is a work of architecture, although the exterior may be absolutely plain—nay, even uninteresting. If, however, the exterior is to be ornamental, this effect should not be attained by added ornament having no relation to the interior, but the decoration should harmonise with and suggest the interior and its occupants, just as in a work of sculpture the exterior of a figure suggests the internal framework—the well-developed muscles, the network of nerves, and, above all, the impulse which actuates them. To attempt a work of architecture by first settling the exterior, and then designing the plan and general interior to lead up to it, is fatal. As an illustration of

#### THE CORRECT PRINCIPLE OF DESIGN,

let us consider the idea of a town-hall. It is first the centre, the heart, of municipal life, whence all other parts of the municipality are governed. It should thus be placed in the centre of a town, in an open square or place. Its various departments—or, to use a conventional phrase, its cells—should be emphasised externally and internally. The emotions pertaining to each should be considered and depicted, or rather suggested; the relative importance of each to the other should be weighed in locating them; the prison cells, the Courts of Law, the offices, the entrance and assembly halls, the suite of reception-rooms, &c.; simplicity of plan and easy access to the departments being essentials. The physical proportions of each group should evolve from these considerations and, in the mind of the architect, the exterior should grow *pari passu* with them, and should express each group and the unity of the whole. The design of the exterior should also stamp with expression the mechanical functions of the several parts of the construction, and thus, as the various members of a human body are fitly joined together, the whole conception will convey to him who has eyes to see and mind to appreciate the idea sought to be expressed. In times not long past these principles were ignored, and the exterior was designed, or rather copied, from a Classic temple—from a building which externally expressed faithfully the one cell which it contained, the abode of the god. Such an exterior has no relation to complex buildings of to-day. Or, let us take at the other end of the scale the idea of a workman's small dwelling. Dr. Godfrey Sykes, a well-known Medical Officer of Health, remarked to me lately that the solution of the problem of housing the million should be regarded from the sanitary, social, and ethical standpoints. Now, the backbone and basis of our social polity in England is the home. The idea of a home is lost when a family is compelled to live in one room. What, then, is the idea of a home? Its central feature is the place of reunion of its various members—the living or common room—well lighted by windows and warmed by a stove or open fire. Where outlay must be restricted, we cannot waste money on passages, and there can be no objection to let the common room be a central hall, with bedrooms opening from it on two sides, the third side containing the scullery, water-closet, &c., disconnected by a ventilated lobby. Each bedroom should have a window and a ventilating flue, while the heat from the common-room stove will be sufficient to warm the bedrooms, and so save both the cost of fireplaces and of fuel. Such a humble dwelling will be a home, and a congeries of such homes may be placed side by side in the country, or one upon another in a town. In the latter case the staircase should, of course, be external to the houses. The æsthetic in such a dwelling as we have described can be expressed in simple ways, in little thoughtfulness of detail, in showing consideration for the housewife's wants and aspirations, making windows that will take flowers, in provisions for fostering modesty, &c. In considering

#### THE EXPRESSION OF CONSTRUCTION,

let us compare two types of buildings, and see the relation of construction to the design. Take a barrel-vaulted church. This vault, having an equal thrust at all parts of its bearing on the wall, demanded and received for its support a massive wall equal in thickness throughout its length, with relatively small openings. In such a case, buttresses



at any points would be out of place. By contrast, take a groined vault; here the weights and thrusts are concentrated on points, the wall between these points is but a screen, and can be light in treatment, and may be pierced with windows of any size. The points of support, however, require to be of large horizontal section, and buttresses become necessities evolved from the construction. Did time permit, we could trace how this groining and concentration of loads led to all the characteristic features of Gothic design. In Viollet-le-Duc's "Rational Building" we have the whole scheme worked out. It has a peculiar bearing on the subject of our paper, because it shows how practically a new art development was laboriously worked out from construction. It teaches us that "art is the result only of sober, cool, intelligent thought and technical knowledge, which is acquired by hard, persistent, and long-continued labour"; and further, that that labour evolved a result not otherwise to be attained. Le Duc shows that practically the Romanesque builders had before them the remains of Roman vaulted buildings in their country, and nothing else. They were not travelled men, they were too poor to import architects from abroad, and not having the command of unlimited labour and wealth like the Romans, they set their intellect to work to devise some means of getting similar results with home material and with home labour. Our author shows how, in the earlier part of the 11th century, they built barrel-vaulted churches and halls which half a century later fell down; how, profiting by their failures, they again set to work with renewed energy and experience, and gradually, by slow but certain steps, evolved the Gothic groined vault; how this in turn led to the plans of piers, how the capital became a corbel, instead of being, as it was in many Egyptian, Grecian, and Roman buildings, not a support but only an ornamental termination to a column. This may be seen at Edfu, where the abacus is of the same width as the diameter of the column, while the capital is projected far beyond it, or, in other examples, where, instead of abacus, there is a square shaft between the capital and the entablature; and, again, in the groined vaults of some of the Roman *thermæ*, where the plan of the vault abutment is a square of the same dimension as the diameter of the column supporting it; above the capital and below the vault-springing is placed the complete entablature of the Classic order. In some churches, both in Normandy and in England, capitals are dispensed with; but this appears to give weakness to the design. A mark of separation between the function of the arch and that of the pier is of great phonetic value, and as such the capital or impost moulding has commended itself in the great majority of our buildings. Reverting to the Gothic art-craftsmen, we note how they carried down their arch mouldings into shafts on the face of the reduced piers, and so step by step and line by line a new art development—a new architecture—grew out of, and was determined by, the construction which it boldly displayed. Gwilt says, "There is more constructive skill shown in Salisbury and others of our cathedrals than in all the works of the ancients put together." It is not out of place to note in this connection that, while the Gothic shaft grew downward from the moulded arch, the shafts or fillets on the angles of Egyptian pillars grew from below, and terminated in the non-functional capital. We hear of

#### TASTE IN ARCHITECTURE;

we hear of genius; but neither one nor the other could have dispensed with the more sterling and laborious qualities which evolved the new Gothic art. And here it is pertinent in parenthesis to remark on this much-misused word "Taste." It is often spoken of as an intuitive gift, and many who arrogate to themselves its possession, dogmatise on matters of art as though the appreciation and knowledge of art need no training whatever. Artists are not so easily made. Taste to be of any value or authority must be the outcome of wide observation of judicial power of comparison, and of education in its widest sense. And even then it is a variable standard which each sets up for himself, the result of his study or environment, and therefore in no way a standard of universal application. To a devotee of Classical architecture, the proportions of a Classic column are in the best taste, while those of a Gothic shaft are barbarous, and *vice versa*. Of genius in architecture we may say, as Froude says of the gifts

of strength, of wealth, of rank, of worldly power: "It is a splendid instrument if nobly used, but requiring qualities to use it nobler and better than itself." The architects and craftsmen of our most beautiful Mediæval cathedrals evolved their masterpieces, as we have seen, by laborious study of the materials they had to deal with, of the forces exercised by their material employed in different ways, and the constructive features arising therefrom became the motive on which their design was based. The various phases and incidents of Christian worship and ritual then led to the general planning of their building; the nave, the aisles, the transepts, the chapels, the choir, the chancel, the sanctuary—all were made subservient to, or rather based on, the cross, the great emblem of their faith—and, subsidiary to these, the chapter-house, the library, the offices, the cloisters, &c. In every part we see

#### PLAN AND CONSTRUCTION EMPHASISED

as integral parts of the art expression. In them there is no room for talk of the work of the engineer and builder first, and the clothing of architecture added to this. Architecture as a fine art is everywhere, and the art atmosphere pervades the building; not only in architecture, but in painted walls, windows, and roofs, in sculptured figures, traceries, and canopies, in music, in stately processions of men, in waving banners, in adoring congregations—the whole having its main aim in rendering glory to the invisible God. These were days when art permeated the masses, in dress, in pageantry, in village festivals, in guild processions. Be it remembered, I speak of the period of our history when the priesthood of the Christian Church were self-denying men, living in a chosen poverty, the teachers, the guides, the protectors of their flocks, drawing to them all that was good and great and generous in rich and poor alike; and before the great canker of worldliness, of wealth, of lust of power, of intrigue and immorality, had sapped their influence for good; before the Pope had in 1489 commissioned the Cardinal Archbishop Morton, his legate, to make inquisition into the charges made against the monasteries, resulting as it did in such a condemnation by the legate as justified beyond question the worst of the accusations.

#### THE DECLINE AND FALL OF GOTHIC ART.

In earlier times Gothic art was a power to raise men. In the first degenerate days in the early part of the 16th century it not only lost its power over men, but it came to stink in their nostrils as associated with the falsity of those who had been its leaders and patrons. And with this loss of faith in the Catholic Church, the cult of Gothic architecture as a living and growing art fell into a trance, and so remained for centuries. The moral shock not only brought about the reformation, it chastened the laity, hardened their natures, made them puritanical. The energy of the nation was diverted. It became the instrument of Spain's destruction, and in fulfilment of that mission the great men of the Elizabethan era became the pioneers of that colonial empire of which to-day we see the development. The lives of these men are most interesting studies. It was in such an atmosphere and with these heroic surroundings that Shakespeare found living models for the finest and noblest of his dramatic characters; so that if art in one of its phases was banished, it in another blossomed in a way that has never been surpassed. But while Shakespeare in immortal drama wrote of men and manners, of history and philosophy, architecture remained the history in stone of the past and passing ages; of the life of the nation from generation to generation. Take an old church, begun in the early centuries of our English civilisation, extended, varied; her gloomy interior of the earliest period opened up to light by large windows of a later period; modified in other respects from time to time; the rood screen, once the line of demarcation between the clerical and the lay, now deluded of its titular ornaments, often removed from its normal position to inclose a side mortuary chapel or a secular lord's pew. Such a church tells us of the evolution of our history and race—whether upwards or in decadence—of sacerdotalism, of puritanism, of the autocratic king or the revolutionary rabble. What so grand as the interior of such a historical work as Westminster Abbey! Her architecture, itself marking epochs in the nation's life, scarred but not marred with monumental records of her sons' self-sacrifice to duty; of their energy, their

learning, their great endeavour in all the paths of physical and mental activity. In what gallery of painting or of sculpture can such sublimity be found! Here the sculptor's art appears as handmaid to attend the sister art. Sculpture is most sublime when, as here, it seeks not his own glory but to minister to hers; when it adds the grave and chaste beauty, so peculiarly its own, to the solid qualities of her reposeful dignity. But while this is true, it is also true that

#### EACH OF THE ARTS HAS ITS SEPARATE IDENTITY,

a personality as distinct and as responsible as that of any member of a human family. Each must work out her own salvation, aim for her own ideals, and in such aim she may, and too often does, loosen the ties which bind her to her sister arts. Yet let us again insist that architecture is organic. Sculpture is a representation of the organic; painting is inorganic, illustrative only. In architecture sculpture may be used as an organic part of the structure, as figures in a Gothic doorway, or as the caryatides in a Classic temple; but in such relation it is an accessory to architecture—a blossom on the tree. In a somewhat different category we may cite the sculpture on the Parthenon. This is organic, and I particularly wish to refer to the frieze. It has often been conjectured how this frieze came to be placed in the shadow close up to the cornice of the cella within the peristyle. It seems to me this stately procession in such a position, viewed from a short distance, broken up as it is by the columns, appears unending, mysterious, and perhaps was intended to be symbolical of the march of conscious life through all the ages. Detached works of sculpture are best seen to advantage within or in juxtaposition to a building. Viewed with a natural background of foliage, dissociated from anything architectural, they appear lifeless; but on a background of man's architectural creation they become instinct with life; they are then like jewels of price on the neck of a fair woman, embellishing and embellished. A painted picture is different. It needs to be housed, owing to its relatively perishable nature; but for its appreciation as a picture, it demands exclusive attention, to be separated from its surroundings, the vision to be bounded by its frame, and the mind of the beholder to be detached from all else. It is true that painting sometimes elects the position of handmaid to architecture when it is employed decoratively—it may be in a series of historical records locally appropriate to and fitly forming part of the architectural monument it embellishes. In this case each picture had some harmony with its fellow pictures and with the sombre neutral hues of the stone. In such case painting becomes broader, more catholic. The same applies to painted windows. They form part of the architectural composition; they enrich and beautify it; their detail is there, inviting careful attention, but, like surface carving, they are primarily the mosaic incrustation giving brilliancy to the whole structure. Returning to our survey of Gothic architecture, we find that with the downfall of the monastic orders in England, and the revolt of the laity against the priesthood, Gothic church building ceased, and closely following on its cessation the army of Craft Freemasons was disbanded, or, rather, dissolved to atoms. The revolt was so complete that Gothic architecture in England was banned as associated with oppression and licentiousness—the virtue and self-abnegation of its artistic founders being forgotten. Meantime, the revival of the study of Greek literature disclosed to the student, as a new revelation, a people free, untrammelled, heroic, artistic, and god-like, the authors of pure and beautiful architecture, and cultured Europe turned to this fount for inspiration in all its art life.

#### THE RISE OF THE RENAISSANCE.

In Italy, a demand for architectural monuments based on classic lines found no school of architects at hand trained in the principles of their art, in the sense that the Gothic architects were trained. The sculptors and painters who were called to design the new Renaissance buildings were not hampered by preconceived theories of design, or, indeed, by technical knowledge of old buildings, and although they sought to create, they were more anxious to build palaces which they might decorate than works of architecture. They built, it is true, large buildings; but in few of them is the art a natural outcome of the construction. Many are frankly but backgrounds for painting. As an illustration, we may cite the Chapel of the



Arena at Padua, painted by Giotto. It is a plain, rectangular room, having a painted waggon-vaulted ceiling with windows on one side, and not a moulding on the surface of walls or ceiling. As a work of the painter's art, the interior of the building is acknowledged as of the greatest beauty. The Sistine Chapel at Rome, commenced 1473, finished 1541, is a building 140ft. in length internally, about 50ft. in breadth by 60ft. in height to the apex of the roof, and Fergusson, in order to show the difference between the arts south and north of the Alps, makes a comparison between it and King's College Chapel at Cambridge, built at the same time, 1479-1530. This is 290ft. long, 45ft. wide, and 78ft. high internally. The Roman Chapel externally was a barn, internally it was almost devoid of architectural mouldings or decorations. It has a barrel-vaulted ceiling, groined over the semicircular-headed windows at the sides. Its walls were covered with paintings by several artists. Its ceiling was painted by Michelangelo, and later the wall over the altar was filled with his great work "The Last Judgment." The Cambridge Chapel, on the other hand, externally has a rhythmic division and a rich architectural treatment, while internally it is a web of architectural detail, all growing out of and expressing the construction. It has its pictures, but they are transparencies in glass. The Sistine Chapel has been well and often described by able men, but if it has not already been noted I should venture to make a criticism in regard to its ceiling. This a plain surface, semicircular in section, divided into compartments by painted mouldings. As is well known, the central flat compartments from end to end are occupied with subjects ranging from the Creation to the Deluge, all illustrated with colossal figures. A spectator looking towards the altar sees the figures it is true, in their proper or intended position; but, seen from the altar end, they are upside-down and grotesque. Now, had all these compartments, instead of being flat, been constructed as shallow domes, either circular or square on plan, no such defect could have been possible; all figures that could be seen from either end or from the sides would have appeared natural in a partially upright position on the concave surfaces, and would not have looked as if they would fall. None could have been seen upside-down, and from the art side we should have had the idea that each of the subjects forming the decoration of the dome separately sent up its praise and adoration to the Most High. In St. Paul's Cathedral, Wren had evidently this aspiring idea in mind when he treated his ceilings with shallow domes throughout. In Sir W. B. Richmond's beautiful decorations of the choir we lose the painful impression of the Sistine Chapel, and do not feel that his figures will fall while each compartment raises its praise to heaven. In St. Peter's, at Rome, there are domes in the aisles, but the nave is a long plain vault. I do not propose to enter here into any comparison between

#### ST. PETER'S AND ST. PAUL'S,

except in so far as it relates to my subject; but in that relation I would remark that, if the Sistine Chapel ignores architecture, St. Peter's, on the other hand, misuses it. At least three designs were made for it, and the conception appears to have eventuated in the idea of obtaining a building with architectural features and details on a colossal scale; but, instead of the resulting effect being a beautiful monument, the immense dimensions of which could at once be grasped, the mark has been overshot. All scale has been lost. The Gothic cathedral architects kept their detail—their shafts and mouldings, and even their stones—small, and, judged by the scale of these, their buildings looked very large, while it is stated as a fact that some of the largest are but of the dimensions of an aisle of St. Peter's. In St. Paul's Wren avoided the error of colossal detail; his internal proportions became in consequence better, and there resulted a vista of imposing dimensions which the mind can grasp. The internal grouping, too, became more graceful. The double order, instead of the single one of St. Peter's, appears to lift up the roof. The domical compartments in the ceiling, already alluded to, added to this effect, and led up to the great transeptal lantern and dome, the whole a conception of aspiring lines leading the eye and the soul ever upwards. Externally in almost every part it appears to be superior in grace of proportion. Mr. Gilbert, R.A., recently spoke of Wren's cathedral as the work of a sculptor-architect, by which we understood him to mean

one who in designing in architecture had the aptitude of the sculptor in proportioning his parts, and modelling the whole building, as it were, out of a lump of clay, producing a result graceful and, so to speak, well poised from all points of view. In speaking of this modelling of a building, it seems not inappropriate to say a word as to

#### THE PICTURESQUE IN DESIGNING.

Some few years ago we heard a great deal of this, and it was by some advocated as an end to be attained. The picturesque in our Royal Courts of Justice is noticeable, but I doubt if it was sought for at all by its author. It was more likely to have arisen out of the natural expression of the constructive planning, and it certainly may be asserted that in most of our old domestic work it will be found to have had its origin in the planning, in additions from time to time to suit varying wants, in the opening up of prospects, or in other natural ways. Unless it has such a natural basis it is incongruous. To distort an interior or exterior, in order to get a picturesque effect, is inadmissible.

#### SYMMETRY IN A DESIGN,

especially of a public building, is an element of great art value. Externally it contributes to the ideas of dignity and repose, and to that impressiveness due to simplicity. Internally a symmetrical plan is easy to follow, and the appreciation of the building is much enhanced if there is no irritation created in preoccupied minds by difficulty in finding one's way about. Mr. Aston Webb, before this Association, recently spoke ably on this subject. But symmetry does not mean cast-iron uniformity, or that everything is designed and set out with geometrical precision. The contrary is the case. The general effect is "ordered," so to speak; but Ruskin notes the variations in the width of piers and arches in the façades of numerous buildings which to the casual inartistic observer appear rigidly symmetrical. I will cite but the example of the Car d'Oro Palace at Venice, where there is a battlement or cresting of varying height along the front. In the happiest way the architect has given the effect of symmetry, but on analysis it will be found that the effect is produced by an unsymmetrical outline. This is but one of the æsthetic refinements of architecture where the idea is expressed without demonstration. In like manner,

#### PROPORTION

is not the result of following ingenious scales of modules framed on Classic examples, nor of triangles based on Gothic structures, but should be the æsthetic expression of the ability of the various parts of a structure to perform the duty imposed on them, the lower parts being necessarily more massive than the upper. It was probably a recognition of this which led Vitruvius to lay down a law that in super-imposed orders the Tuscan or Roman Doric should be at the bottom, the Ionic next, and the Corinthian above that, because the first was the most massive, the last the lightest. But this arrangement gives us a cornice to the lowest story larger and heavier than to the highest, whereas the function of a cornice to a roofed building is to throw the rain off the building, and to do this the cornice at the eaves should be larger, with more projection than any other horizontal feature of the façade, and, æsthetically, this arrangement is, as a rule, by far the best. Proportion must, in any living architecture, vary with the material used, and with the size of the building. The single order of the elevation of St. Peter's at Rome may be correct by scale; but it is unreasonable in its actual position. Again, we do not quarrel with the proportion of an iron column or stanchion at the Crystal Palace. It is seen to be appropriate to the material. The Eiffel Tower was formally protested against before its erection by a large number of eminent artists in France and elsewhere; but when erected, these same artists recanted their former condemnation, admitting its grace and proportion, these being evolved from the perfect expression of the functions of the material employed. The fact is, we should concern ourselves less with the proportion of any detailed feature in a composition than with that of the

#### BROADER GROUPINGS

of the whole structure. Detail is interesting and important, and should be sedulously studied when we come to it; but it is not the be-all and end-

all. That which is seen of any monumental architectural work is the mass. Walter Crane says that a people without art are, collectively speaking, inarticulate. In other words, if I may venture to interpret him, they may be scientific; they may, like Faust, sound the depths of knowledge, or, like Newton, soar to map out the heavens; but unless they have minds to achieve and create, and the faculty to appreciate emotions and ideas, they are soulless—are of this earth and not a part of the immortal. Crane adds that the most vital art is the expression of

#### CHARACTER.

If that be so, and if the noblest and most enduring quality of a race is character, then architecture, among the arts, is the noblest and most enduring—that which expresses the virility of a nation. The formation of this quality of character is closely allied to religion. Accepting religion as a great agent, there can be no question that art is a potent influence in the teaching of religion. Science deals with demonstrable truth; art, with imagination. Science tells us—very often on insufficient data, and, therefore, erroneously tells us—what is; and often will not admit anything to be which it cannot demonstrate. Art tells us that to live is the effort to be what life as defined by science is not; that if science makes anatomical sections of a man, maps his every nerve, and plans the channels of his life's stream, she has not found, and cannot find the man, the living soul which art is ever disclosing in new forms. And as religion is the great exponent of the same message, she naturally draws to her this potent ally. From the earliest days this has been so, and hand in hand they have worked together. Architecture has raised the temple expressing the ideas which her co-workers expound. Among the arts there need be no rivalry. Architecture can mould itself in sympathy with the sculptor, and can adapt itself to the exigencies of the painter. The more massive art can accommodate herself to the less robust arts, and make provision for their display to the best advantage. So let it be. What, then, are

#### THE PRACTICAL CONCLUSIONS

to draw from our consideration of this most interesting subject? They are that the possibilities of our art are great, that the responsibilities of its exponents are greater. We have cause for much rejoicing that this wonderful century is closing with bright prospects for architecture. It is more zealously and lovingly studied and expounded. Its spirit is more appreciated, not only by its ministers, but by a growing number of the public. This should rouse our enthusiasm; but although enthusiasm is good, let it not carry us away to false ideals. Avoid the cant which suggests that it is beneath an artist-architect's dignity to pursue the humbler details of his studies, the scientific basis for his perfected work. Enthusiasm should spur us to labour and to study. In itself it will attain nothing. For us to carry the banner of our art still upward and onward needs a power to apprehend current needs, logical reasoning, much labour, courage, and technical study, as well as the environment of art works, of liberal thoughts, high ideals and aspirations, and sympathy. We must throw off the shackles of past civilisations, not ignoring but assimilating all that they can teach us, and steadily seek to create and express what is best and brightest for our own time. In this way the position of architecture among the arts will be a high and noble one, and with its sisters, sculpture and painting, it will beautify and ennoble the people's life, and so reverse the oft-repeated, but we would fain hope untrue, dictum that art flourishes best in the decadence of a nation.

A discussion followed the reading of the paper, in which Messrs. FRANK T. BAGGALLAY, THOMAS BLASHILL, B. FLIGHT FLETCHER, C. H. BRODIE, A. S. FLOWER, and the PRESIDENT took part, and a hearty vote of thanks was accorded to Mr. HALL, who suitably replied.

#### VENTILATION OF THE NEW HOSPITAL, NEWTON ABBOT.

THE New Hospital, Newton Abbot, was recently opened by the Right Honourable Charles Seale-Hayne, M.P., who, referring to the ventilation, which is on the Boyle natural system, said:—"I am a firm believer in what may be termed the philosophy of health; I also believe it would be an excellent thing if, in our primary schools, greater attention was paid to



instruction in hygiene. God has endowed us and blessed us with bodies that are wonderful machines; therefore it is our duty to take care that these machines are kept in proper working order. This hospital seems to be admirably designed and well constructed, reflecting credit on both architect and builder. In presence of the crowded and distinguished company which I have the honour of addressing, I need not say—because the temperature attests it—that the ventilation of this hospital is upon the best and most scientific principles. I said just now how important was the subject of hygiene, and in no respects is it more valuable or necessary than in the subject of securing for our public buildings the necessary amount of fresh air. But if a pure atmosphere be necessary for us who are in health by the blessing of Providence, how much more necessary is it that our afflicted fellow-creatures, stricken down by accidents or disease, and denied for the time the blessings of outdoor exercise, should have secured to them the healthiest possible surroundings. I am glad, therefore, as I say, that in this new hospital the committee of management, or the architect acting on its behalf, has selected and adopted what I believe to be absolutely the best system of airing a public building that is known to sanitary science."

#### THE LONDON BUILDING ACT, 1894, AND THE OFFICIAL SUPERVISION OF BUILDINGS.

UNDER the above title an interesting and valuable paper was read before the meeting of the Surveyors' Institution on Monday evening last by Mr. William Weaver (Fellow) who said he desired to draw attention to the working of the Act, and the manner in which it was carried out or enforced, with a view to considering the system prevailing under the Public Health Act as applicable to London as well as the provincial towns. Recent events had called attention to the working of the Building Act in London and to its alleged shortcomings, and although it had been necessary, since the passing of the Act, to call in the aid of the Law in some cases, the author considered that it would be a reflection on those prominent members of the Institution, who had done so much to improve the measure when it was in the form of a Bill, to admit that its provisions, if properly enforced, were not sufficient for the attainment of the end for which they were devised. The author was of opinion that the remedy for the defects in the present system of official supervision was to be sought not so much in amendment to the Act itself as in the system of supervision adopted in enforcing it. The district of Kensington, for which he had been for thirty-nine years responsible, had, during that time, developed from a parish of market gardens and fields into one of the most valuable residential neighbourhoods in London, and he had consequently had exceptional opportunities of studying the growth of a Metropolitan district as affected by the various Building Acts from time to time. The county of London was divided by the County Council into 64 districts, each under a district surveyor, but with a difference. Of the existing district surveyors 41 could take private practice, 12 could not take it in their own districts, and 11 were precluded from private practice altogether. The district surveyors were remunerated by fees, which, during the last year reported on, amounted to some £48,000. The Council had, however, power to substitute a fixed salary for the surveyor's fees. Prior to the passing of the order prohibiting private practice, the position of surveyor was, he thought, generally sought, not so much for the direct income attaching to the office as for the opportunity it afforded of increasing a private practice. At present a district surveyor acting in his own district as architect was required to give notice to the Council, who would appoint another surveyor (probably from a neighbouring district) to supervise the work. Then, after a short time, the positions were very possibly reversed, which he thought involved a rather faulty principle. It was somewhat curious to note how the restriction from private practice actually worked. When a new district surveyor was to be appointed, candidates were advertised for, their testimonials examined, and, provided he were duly qualified under the Rules of the R.I.B.A., the man who had shown most skill and ability in designing and planning buildings would probably be selected, and, when

appointed, would have to hide all his artistic talents and devote himself to mere details of construction. The training necessary to produce a good architect was, he thought, very different from that which would qualify a man for a competent surveyor, whose province it was to deal rather with strains and thrusts and foundations than with artistic details. As long ago as 1885, Mr. Weaver said, he had advocated the transfer to the local authorities of the duties now relegated to the district surveyors, the adoption of which suggestion would, he felt sure, result in public benefit and administrative economy. This policy of transfer had received the endorsement of the Metropolitan vestries, as was to be seen in the reports of meetings and conferences, which had been called from time to time, to consider the matter, and whose reports Mr. Weaver quoted. His own desire had been to protect the present district surveyors from any unjust treatment, and he had always been careful, when advocating the transfer of their duties, to emphasise the necessity of considering their interests. It was, of course, possible that some cases of hardship might occur; but he thought anyone acquainted with building work in London would agree that the duties of district surveyor and parish surveyor should be discharged by one official, corresponding to the borough engineer and surveyor in provincial towns. This point he strongly emphasised when reporting to the Kensington Vestry in December, 1893, merely in the interests of the public. He thought that members of the Institution would agree with him as to the advisability of some such change of administration. He was distinctly of opinion that a person proposing to erect a certain building should be able to ascertain at the town-hall of the district everything required by the public authorities relative to such a building. At the present time notices had to be given to the vestry with regard to some matters, and to the district surveyor with regard to others. Should anyone desire to develop building land he must apply to the County Council, forwarding duplicate plans, one of which they would send to the vestry for guidance as to their approval. Then for his sewers, he must send duplicate plans to the vestry, who forwarded one copy to the County Council for their sanction. Then when he proceeded to build, his sewer was under the vestry's supervision, as were the level and frontage-line of his foundations, while the district surveyor attended to such matters as concrete and footings and thickness of walls. When drainage was commenced, the vestry surveyor, after due notice, came in while the district surveyor was looking after the walls. In fact, the latter might be superintending a wall while the former was examining a drain which ran through it. Such overlapping supervision, and occasional clashing of authorities, could not be desirable, and in many other ways the double supervision was expensive and necessary, especially in cases of frontage lines and setting back, many instances being given by the author to show the difficulties and annoyances which arose from such a system. A serious difficulty also arose from the fact that the district surveyor had now no knowledge of, or responsibility for, the sewers. Plans for rebuilding might be approved by him, in entire ignorance of the fact that old sewers ran across the site, notwithstanding that it was illegal to erect in such a position. But unless the fact were discovered by the vestry within six months of completion, the buildings could not be demolished. The connection of the district surveyor with any new building ceased on its completion and the payment of his fees, there being no subsequent periodical inspection by which many infringements of the Act might be detected. This was notably the case as regarded the erection of sheds and the consequent decrease of air-space and increase of fire risk. If the whole supervision prior to, and subsequent to, erection of a building were in the hands of one authority, such anomalies would cease to exist. Mr. Weaver was of opinion that no fees should be charged in respect of new buildings or dangerous structures, the whole work of supervision in such matters being reasonably chargeable on the local authority, or, in other words, on the rates. He assured the members that in making these suggestions, he had no personal object to gain—he had nearly come to the term of his official tenure of office—but he simply gave in his paper the result of a life's working experience and the expression of his firm conviction that, if any new and useful measure were to be intro-

duced into Parliament, it should provide for the single, complete, systematic, and regular supervision of all buildings on the lines he had advocated in his paper.

Mr. T. Blashill, while differing very widely from some of Mr. Weaver's statements and propositions, still felt that the Institution owed him a debt of gratitude in bringing the matter forward. He could scarcely agree that the district surveyor could be qualified for his work unless he had had the training of an architect, which, if it were thorough, dealt not only with design, but also with the more substantial details of construction.

Mr. Alexander Payne, while thanking Mr. Weaver for opening up the subject for discussion by the members of the institution, disagreed with the arguments of the paper in nearly every particular.

Mr. W. Woodward, on the contrary, thought that Mr. Weaver had stated the case very fairly, and, except on the question of the remuneration of district surveyors, he entirely endorsed his arguments.

Mr. H. H. Collins agreed that Mr. Weaver had introduced a most interesting subject which merited further discussion, and on the motion of Mr. J. Douglass Mathews, the further discussion of Mr. Weaver's paper was adjourned to the meeting of January 9, 1899.

#### HOSPITAL SANITARY FITTINGS.

HOSPITAL construction is being brought to an advanced condition in the chief cities of the States, and some interesting particulars of the plan and plumbing in the Long Island State Hospital, about 40 miles from New York, are given in the *Engineering Record*. The hospital is isolated, and is to accommodate 900 patients, besides medical staff, &c. Seven of the light wards are in the form of cottages, some connected by corridors with the administrative buildings. These cottages are arranged in a semicircle of about 600ft. outside diameter, in the centre being a large ward. The walls are of red brick, with tile roofs of steep pitch. The interior walls are finished with hard white plaster, and the joinery is of yellow pine, oiled and varnished. The heating is by a separate and independent apparatus for each cottage, and the ventilation, water supply, plumbing, and sewerage are all separately arranged for each. From the central buildings and apparatus steam and water are delivered at pressures of about 50lb. and 40lb. respectively. An 8in. main supplies the buildings from a direct-pressure pumping-station with a capacity of one million gallons per day, operated at a pressure of 100lb. at the pumps. The 8in. main feeds 6in. cast-iron sub-mains that surround the connected cottages in the form of a double horseshoe, one line in front and one in the rear of buildings. The two lines are joined at both ends and form a continuous belt system, and are cross-connected and valved, so that any building may be supplied independently. The pipes are coated by the Angus-Smith process, and are laid 4½ft. deep in the ground. There are 24 4in. branches each serving an outdoor fire hydrant, and 3in. and 4in. branches for house connections. Referring to the sewer system, the *Record* states "that a system of separate collection and combined outlet sewers are constructed, and a large battery of steam boilers has been installed to furnish power for pumps and dynamos, and to provide steam for general domestic and heating purposes." The steam is distributed through an accessible subway some thousand of feet in length, principally under the main boulevard. In referring to details, it is stated the sewers are of 12in., 10in., 8in., and 6in. vitrified salt-glazed pipes connecting the house drains with public sewers, with all necessary flush-tanks, manholes, inlets, &c. The vitrified pipe was specified to be ¾in. for 6in. and 8in. pipes, 1in. for 10in. pipes, and 1½in. for 12in. pipes, the hubs to be 3in. deep, allowing ½in. annular space round spigots for cement. The bottom of trenches were accurately cut to grade and shape of invert pipe; the pipes were evenly bedded, being first placed and fitted together in line, and then lowered into place. In the joints an oakum gasket was inserted to keep pipe clear of mortar, and the annular space between hub and spigot was adjusted to be concentric and filled with cement mortar, 1 part Portland cement and 2 parts sand, mixed dry in wooden boxes, and pressed into joints. The outer edges of the joints



were bevelled off, and the mortar supported by sand packed against it. The manholes of brick are described. They are plastered inside and outside with Portland cement mortar, and fitted with locked cast-iron ventilating covers, and suspended pans; 250gal. flush tanks and 5in. automatic siphons are provided, supplied by 3in. pipes, galvanised, to the nearest buildings regulated by brass stop-cocks. Referring to the inside plumbing, hot and cold water supply, the underground draw and leader connection pipes are of cast iron, tested to 40lb. pressure, and of specified sizes and weights; all heated and dipped in hot coal-tar pitch; the soil-pipes are steel, asphalted, and have screw-jointed drainage fittings; waste and vents less than 4in. diam., and of galvanised wrought iron; the branch short waste pipes for closets, slop-sinks, kitchen pantry, and other sinks, are of heavy D-lead pipe. Other details receive equal attention; thus the exposed branch waste pipes, administrative building wash-basins, &c., are of polished drawn brass tinned pipe, and water-closet and urinal flush pipes are of seamless drawn brass. The mains for hot and cold, and circulation water supply, are of standard lap-welded, galvanised screwed wrought-iron pipes, tested to 300lb. The plumbing in the administrative building corresponds to that of a residence installation. All soil-pipes and sewers are branched outside the walls into two main sewer lines, and have traps and fresh-air inlets. Each building has a separate water-supply system, the distribution being made on the basement ceiling, each riser having a shut-off valve and emptying drip-valve above it. We have only described the leading points in these sanitary fittings, the details of which are to be found in the *Record*.

#### CHIPS.

At the meeting of the Perth Architectural Association, held on Tuesday evening last, Mr. Henry F. Kerr, A.R.I.B.A., Edinburgh, gave a lecture on "Elgin Cathedral," with limelight illustrations.

At the Norwich Consistory Court last week, faculties were granted for the erection of stained-glass windows at the churches of Broome, Suffolk, and St. Peter, Great Yarmouth, for reseating Hackingham Church, and erecting a carved oak reredos at St. Margaret's, Lynn.

At a meeting of the Dean Vaughan memorial committee held at Cardiff on Friday, it was resolved to give a commission to Mr. Goscombe John to prepare for submission to the committee a design for an effigy and tomb at a cost not exceeding £700. The committee agreed that the effigy should represent the late dean as he used to be seen in the cathedral—in the long old-fashioned surplice and a doctor's scarf and hood.

Architectural engineering is to be taught hereafter in a special course at the Massachusetts Institute of Technology. It is an option in the general architectural course, and begins with the second term of the third year. In place of academic design and some of the purely artistic courses, others have been substituted which deal with the principles of applied mechanics, the theory of structures, and the strength of building materials.

New vestries added to Buckley parish church, Flintshire, were opened last week. The cost has been about £450. The stonework was done by Mr. W. Clegg, mason, Chester, and the interior decorations by Mr. Vernon, contractor, Chester, the architect being Mr. Douglas, of Messrs. Douglas and Fordham, Chester.

The poll of the general body of trustees of the Manchester Royal Infirmary on the question which was submitted to the meeting on the 28th ult. has resulted in the acceptance of Sir William Houldsworth's amendment by a majority of 341. This amendment referred the report of the board of management (which was in favour of rebuilding upon the present site) back to them for reconsideration, and requested the board to reopen negotiations with the corporation "with a view to coming to some arrangement for the disposal of the infirmary site on terms which shall be advantageous to the institution, and which shall insure the retention of an accident and out-patients' department in the centre of the town."

The permanent collection of pictures in the Manchester Corporation Art Gallery has recently been enriched by the addition of the famous "Balacava," by Miss Elizabeth Thompson (Lady Butler). The picture was presented to the corporation by Mr. R. Whitehead. "The Remnants of an Army," by Lady Butler, is in the Tate Gallery, "Scotland for Ever" in the Town Hall at Leeds, "Quatre Bras" in the National Gallery at Melbourne. "The Roll Call" belongs to her Majesty, and is included in the Windsor collection; "Rorke's Drift" is at Osborne.

#### OBITUARY.

OUR older readers, and especially past students of University College, London, will share our regret at the announcement of the death, at the advanced age of four-score years, of Emeritus Professor THOMAS HAYTER LEWIS, F.S.A., at one time a well-known London architect. Mr. Hayter Lewis, who died at his residence in Kensington Gardens-square, on Saturday, was articulated to the late Joseph Parkinson, of Sackville-street, and after obtaining the silver medal for architectural drawing at the Royal Academy, he entered the office of Sir W. Tite. In 1841 and 1842 he travelled on the Continent, and then went into partnership with Mr. Finden, brother of the well-known engraver. Mr. Hayter Lewis designed the Alhambra in 1854 as a scientific institution called the Panopticon, and in 1860 he succeeded Sir M. D. Wyatt as hon. secretary to the Royal Institute of British Architects, of which body, having held the honorary secretaryship for five years, he served as vice-president in 1865-67, and again in 1878-82. He was appointed in 1864 one of the examiners in the old voluntary examinations, and for many years carried out the duties. He was at the time of his death one of the senior members of the Institute, having been elected an Associate so far back as 1845, and becoming a Fellow in 1852. In 1864 he was elected Professor of Architecture at University College. Afterwards he designed extensive additions to the college buildings in Gower-street, and in 1871 he was appointed Dean of the Faculty of Arts. He was one of the originators of the Royal Architectural Museum, served on its council, and was a liberal supporter to its funds to the close of his life. He was also for many years on the executive committees of the Palestine and Egypt Exploration Funds. For many years he held a district surveyorship in Kensington. His practice as an architect was at one time considerable both in London and in the country; but in 1869 he had a severe illness which necessitated his practical retirement. In 1881 he resigned his professorship, in order to devote himself more fully to literary pursuits, being succeeded by Mr. T. Roger Smith, and was elected Emeritus Professor. Mr. Lewis was the author of the articles in the ninth edition of the *Encyclopædia Britannica* on ancient and modern architecture, and with Colonel Sir C. W. Wilson he annotated Mr. Aubrey Stewart's translations of Procopius's work on "Justinian's Buildings." After two visits to the Holy Land, he published, in 1888, "The Holy Places of Jerusalem." In 1894 he wrote an appendix on Byzantine sculpture to Naville's "Aanas el Medinah," and more recently he edited works for the Palestine Pilgrims' Text Society. We gave Mr. Lewis's portrait in our issue for August 1, 1890. The funeral took place on Wednesday morning, the first part of the service being held at St. Stephen's Church, Westbourne Park, and the interment at Kensal Green Cemetery, where a deputation from the Royal Institute and a number of old pupils assembled to pay their last tribute of respect to their genial and accomplished friend.

MR. FREDERICK BARNES, architect, of Ipswich, to whose death at an advanced age we briefly referred last week, was born at Hackney in 1814. His father was master of Christ's Hospital School, and in that establishment Mr. Barnes received his education. He afterwards entered upon the study of the architectural profession, and on the expiration of his articles exercised his profession in London and Liverpool for several years. In 1843 Mr. Barnes went to Ipswich and assisted the late Mr. J. M. Clark, then a leading architect of that town, in building the existing Custom House. The Eastern Union Railway was in the course of construction, Mr. P. S. Bruff being the engineer, and he engaged Mr. Barnes to prepare and carry out the plans for various stations and other buildings upon the line, Mr. Bruff, who still survives, being about four score and ten. This railway work engaged Mr. Barnes's whole time for some years, and he then started in general practice in Ipswich, his first work being the design of Thurleston Lodge, Whittington, for the late Mr. Charles Stewart. To Mr. Barnes, one of 40 competitors, was awarded the premium offered by the Ipswich Corporation for the best design for the new Grammar School buildings, it being a condition that the expense should not exceed £3,000. The design was not, however, carried out, the town council eventually deciding to build according to another and much more expensive plan, which was not in the competition, a donation of £1,000 being

privately made in order to secure the additional accommodation the more costly plan provided. Mr. Barnes was successful in competitions for the Public Hall and St. Mary Magdalene Church, Colchester; the Tacket-street Congregational Chapel, the Presbyterian Church, Crown-street and Museum-street chapels, Ipswich; Stowmarket Congregational Chapel, Lion-walk Chapel, Colchester; chapels at Sudbury, Halstead, Nayland, Braintree, Tiptree, and many smaller places were all from his design, as was the new church at Melton, near Woodridge. In conjunction with Mr. Howard Gaye, he restored the tower of St. Lawrence Church, Ipswich, and built a church and parsonage (his design being selected in a limited competition) at Bickley Park, Kent. The latter work was in 1862, and in the same year he was engaged upon additional classrooms at Harrow School; designed new boarding-houses there; as well as a mansion for Mr. Charles Buxton, Foxwarren, Surrey. He planned the new buildings when the Butter Market, Ipswich, was widened, and also the Public Hall. He did much work for the late Sir Richard Wallace at Sudbourne, and built many schools in Suffolk and adjoining counties. In memory of his late wife, Mr. Barnes built and endowed almshouses in Lady-lane and founded the Caroline Barnes scholarship in shorthand at Ipswich School.

MR. JOSEPH JOINER, one of the pioneers in the manufacture of terracotta in America, died recently in Indianapolis in middle life. He was the nephew and adopted son of the late John M. Blashfield, and associated with him in his establishment at Stamford in this country. The building of the South Kensington Museum, in which, under General H. Y. D. Scott, a large amount of ornamental terracotta was used, drew the attention of the public to a material which had been almost forgotten. Soon afterwards, Mr. John H. Sturgis employed the new material, for the first time in the United States, on an extensive scale, in the Boston Museum of Fine Arts, the terracotta of which was made by Mr. Blashfield in England, and set in place under the direction of Mr. James Taylor, who was sent out from England for the purpose. Mr. Taylor remained in America and was instrumental in the early management of several great terracotta establishments; and, a few years later, his friend Joiner was also called from Stamford as superintendent of the Perth Amboy Terracotta Works. From Perth Amboy he went to Indianapolis, remaining there, in charge of the Brightwood Terracotta Works, until his death.

The Leith Dock Commissioners received on Friday a recommendation from the works committee that the ground at the north side of the Victoria Dock, adjoining the Victoria Jetty, be reclaimed, and a shed erected thereon at a cost of £8,000. The recommendation was approved, and it was remitted to the committee to get tenders and dispose of them.

The well-known picture by the late J. Laslett Pott, "Mary Queen of Scots on her Way to Execution," has been acquired for the Art Gallery of Nottingham. Laslett Pott was born in Nottingham, being the son of Mr. J. M. Pott, an estate agent and auctioneer. The boy was for a time in the office of Mr. T. C. Hine, F.R.I.B.A.; but eventually left the profession of architecture, and became a pupil of Mr. W. P. Frith, R.A., the painter of "Derby Day," &c.

Fleetwood, following the example of its progressive neighbour, Blackpool, has decided to erect a pier. Its position will be on the Fielden Esplanade, and immediately opposite Balmoral-terrace. The total length, including the jetty, is 1,300ft., and upon it will be erected a pavilion with turrets and dome, rising some 60ft. A stage is to be built, where entertainments will be given.

The Rochdale Board of Guardians have approved plans prepared by Messrs. Butterworth and Duncan, of that town, for the erection of a new workhouse infirmary at an estimated cost of £35,000. The architects have been instructed to prepare detailed plans, and obtain tenders for the immediate erection of an administrative block and two pavilions at an estimated outlay of £2,000.

After a long discussion the town council of Blackpool have adopted a report by Mr. R. C. Quin, the borough electrical engineer, and have decided to substitute overhead for the present costly and inefficient conduit system of propulsion for the tramways on the promenade. The estimated outlay on this change is about £6,000, which Mr. Quin believes will be saved in working expenses within two years.



## Building Intelligence.

**CHIDDINGSTONE.**—The parish church of St. Mary, Chiddingstone, in the Weald of Kent, was reopened last week, after restoration from plans by Mr. McCartney. The whole of the outside stonework has been repointed and repaired where necessary. The old high-backed pews have been converted into open seats, in which the old wood has been retained. New choir-stalls of English oak have been placed in the chancel, which has been thrown open. The east end has been renovated with local sandstone, similar to that of which the sacred edifice has been built. The font has been removed from the central aisle, and replaced on the site of the old vestry, while the carved oak cover has been replaced and suspended by a balance chain. Round the chancel has been erected oak panelling. The work has been carried out by Messrs. Maids and Co., of Croydon.

**DEVONSHIRE-SQUARE, E.C.**—A new block of solicitors' offices is being erected on the site of No. 16. Externally the new building is erected in red brick with Monk's Park stone dressings. Internally there are fireproof floors throughout. The five stories contain suites of rooms for partners and clerks, while on the first floor a board-room is provided for meetings, &c. At the rear of the ground floor is the strong-room, which is lined with white glazed bricks. Many of the old and interesting chimneypieces found in the demolished premises will be refitted. The building has been designed by Mr. Howard Chatfield Clarke, of Bishopsgate-street Within, and Messrs. Woodward and Co., of Wilson-street, Finsbury, are the contractors.

**DRURY LANE THEATRE.**—The first section of the electrical stage appliances at the Theatre Royal, Drury Lane, designed by Mr. Edwin O. Sachs, was completed on Tuesday. The area of the stage movable by mechanical power now exceeds 1,100sq ft. Mr. Sachs's installation primarily comprises a series of large "bridges," with the aid of which the finest terraces can be formed in a few seconds or the deepest caves arranged for underneath the stage by simply pressing a button. Whole scenes can be rapidly raised or lowered and transformations made with the greatest ease.

**LONDON COUNTY COUNCIL.**—At Tuesday's meeting drafts of the Bills to be introduced by the Council into Parliament next Session for the purchase of the undertakings of the London water companies, the introduction of a water supply from Wales, and the Holborn to Strand and other improvements were submitted and approved. Mr. John Young, of Glasgow, having declined the appointment of chief officer of tramways, which he agreed to accept at a salary of £1,500 a year, the Highways Committee recommended that Mr. Alfred Baker, at present general manager of the Nottingham Corporation Tramways, be appointed manager of the tramway undertaking about to be transferred to the Council at a salary of £1,000 a year, and to advise the Council generally on matters connected therewith. After some discussion the recommendation was agreed to. It was agreed to contribute a sum not exceeding £12,000 to the cost of widening Parliament-street. This represents the outlay on repaving only, whereas the First Commissioner of Works had asked for a contribution of £107,000, the estimated value of the land thrown into the public way.

**NORTH BRIXTON.**—The ceremony of laying the foundation-stone of the new Christ Church, North Brixton, was performed on Tuesday by Princess Christian. The old structure was originally a Congregational chapel. It afterwards became a chapel of ease to St. Mark's, Kennington, and in 1855 was acquired by Canon Hussey, and was for 37 years the centre of his religious and philanthropic work. The new church, which has been designed by Mr. Beresford Pite, F.R.I.B.A., will be in the Early English style, and will be capable of seating 1,200 worshippers without obstruction to sight or sound, though many more will be able to find accommodation within its walls. A capacious west porch with a front cloister will face the Brixton-road. Part of the scheme of rebuilding was the erection of a parochial hall at the back of the church, and this has now been completed. The cost of the new building is estimated at £12,000, towards which £10,000 has been raised.

**SHEFFIELD.**—The new church of St. Augustine,

in Brocco bank, erected as a memorial to the late Archdeacon Favell, was consecrated by the Archbishop of York on Wednesday. Accommodation is afforded in the present scheme for 650 persons, but the completion of the cruciform character of the church by the addition of transepts is contemplated, and when these are built seats will be provided for 750. The church is in the Early English style, and has been erected from the designs of Mr. J. D. Webster, of Sheffield. The total length outside is 142ft., the nave inside measures 100ft. by 54ft., the chancel 36ft. by 28ft., and the organ chamber 20ft. by 15ft. There are two vestries, one 15ft. by 16ft., and the other 11ft. by 15ft. The height from the ground to the top of the spire is 112ft., while the nave is 72ft. high outside. The nave is exceptionally broad, and is chiefly lighted from the large clerestory windows, and the whole congregation will be seated in it, the aisles being only used as ambulatories. The interior of the edifice is of Bath stone, the exterior facings are of Stoke, while the walls are of stone from a quarry at Crookes. On the floor of the chancel is a figure of St. Augustine in mosaic. Mr. James Fiddler, of Eckington, and Savile-street, Sheffield, is the contractor. Mr. Frank Tory has done most of both stone and wood carving.

**WANDSWORTH.**—The foundation-stone of the new nurses' home in connection with the infirmary of the Wandsworth and Clapham Union, on St. John's-hill, was laid on Tuesday week. The home is being erected on the northern portion of the infirmary grounds. The building will provide accommodation for 75 nurses in separate rooms, apartments for the assistant matron and for the principal night nurse. A recreation room for the general use of the nurses is placed close to the entrance-hall, and adjoining same is a separate sitting-room for the accommodation of 30 sisters; adjacent to these two rooms is lavatory and cloakroom accommodation. Leading from the entrance-hall is a wide corridor, on either side of which the bedrooms for the nurses are arranged and a stone staircase placed centrally in the length of the building gives access to each of the four floors, having corridors right and left of same extending the full length of the building. Sanitary and bathroom accommodation is provided in a central portion on each floor, and a lift for boxes, coal, &c., runs the full height of the building, and also nurses' box-room, store-rooms for linen, bedding, &c. Two separate external fire-escape staircases are to be built. The night nurses' bedrooms will be placed upon the top floor. Each nurse's room will have a minimum floor area of 100ft., and will have an open fireplace with register stove and fresh-air inlet and extract ventilator. A fitted wardrobe cupboard is to be fixed in each room. The building is being constructed upon a fire-resisting principle. The warming to the corridors and supplemental heating to the recreation room, &c., is by hot-water radiators. The contractors are Messrs. Thomas Gregory and Co., of Clapham Junction, and the work is being carried out from the designs and under the supervision of Messrs. Lansdell and Harrison, of 38, Bow-lane, Cheapside, E.C.

**WOLVERHAMPTON.**—At the meeting of the board of guardians, on Friday, the new workhouse committee reported that they had had several interviews with the architect, Mr. Marshall, as to alterations of the plans of the new building, and various suggestions had been made which it was hoped the board would adopt. If this were done, the estimated cost of the building would be reduced by £12,003, leaving the net estimated cost £117,670.

Professor C. Waldstein, Litt.D., Ph.D., lectured on Monday evening in the lecture theatre of the Newcastle-on-Tyne Literary and Philosophical Society on "The Spirit of Greek Art," with lantern illustrations.

On Saturday the Bishop of Lichfield dedicated a new mission church, which has been erected at Bilbrook, an outlying district in the parish of Tettenhall. The building, which is of brick with stone dressings, will accommodate 100 people, and has been erected at a cost of £400.

A Local Government Board inquiry was held at the Birkenhead Town Hall, on the 8th inst, by Major-General Crozier, R.E., respecting an application by the corporation of Birkenhead to borrow £15,000 for electric-lighting purposes. The electrical engineer (Mr. W. Bates) explained the details of the scheme.

## COMPETITIONS.

**BRISTOL.**—The competition for the reinstatement of the Colston Hall, Bristol, was decided yesterday afternoon. The first place is awarded to Messrs. Jones and Cummings, Parliament Mansions, Victoria-street, S.W.; the second to Messrs. Lancaster, Stewart, and Richards, of Bloomsbury-square, W.C.; and the third to Messrs. Lawrence and Smith, of Bristol.

**GLASGOW.**—The parks and galleries committee of Glasgow Town Council have approved of the recommendation of the sub-committee, advised by Mr. George Frampton, A.R.A., as to the appointment of architects to execute the sculpture-work on the new art galleries in Kelvingrove. The artists and the subjects with which they are to be intrusted are as follows:—F. Derwent Wood, London, figures of Music, Architecture, Painting, and Sculpture; H. Birnie Rhind, Edinburgh, Science; Johan Keller, Glasgow, Religion; Edward George Bramwell, London, Literature; A. Falkner, London, Commerce. At a meeting of the town council, on Friday, this report was adopted, subject to the condition that the authors of the selected models agree to give the copyright of these selected models to the corporation.

**OLD BAILEY.**—In the competition for the rebuilding of the Old Bailey, the City Corporation have appointed as assessor Professor George Aitchison, R.A., F.R.I.B.A., at a fee of 400 guineas.

**SALFORD CORPORATION.**—AGECROFT CEMETERY COMPETITION.—Numerous inquiries having been made as to this competition, we are authorised to state that twenty-two sets of plans were sent in, but have not been opened, pending the receipt of sanction to use the land for cemetery purposes. This has been delayed owing to the opposition raised by the local authority in whose district the site is situated. The Home Office inspection of the land was made as long ago as July 15 last.

## CHIPS.

The Norwich main drainage scheme is rapidly nearing completion. The work has been carried out at an estimated cost of about £152,000.

A number of valuable donations have just been made to Dundee Museum by the Egypt Exploration Fund. These consist of an outer and inner mummy case found in the necropolis of Ha-Khenenu, five tablets from Denderah, and a large number of interesting archaeological objects illustrating the religious and domestic life of ancient Egypt.

The committee who have charge of the movement for the erection of a Church-house for the diocese of Liverpool have decided to purchase, for £48,000, the Clarendon Buildings at the corner of South John-street and Lord-street, Liverpool. £18,000 has been raised, but in order to complete the first section of the buildings a sum of £10,000 is needed. The entire cost of the work, which will be done in three sections, is estimated at £35,000.

The bells in the tower of the parish church of Lenham, Kent, have been repaired, one having been recast by Messrs. Gillett and Johnson, of Croydon, at a cost of about £160. They have been rehung, and were dedicated on Tuesday last.

New Wesleyan Sunday-schools and society's rooms, erected on the site of the old schools in the rear of the Wesleyan Centenary Chapel in Red Lion-street, Boston, Lincoln, were opened last week. The buildings have been erected by Mr. W. Greenfield, of Boston, from plans by Messrs. Gelder and Kitchen, of Hull. There is a central hall with a gallery surrounding it, and opening into this are six classrooms on the ground floor, and ten on the first floor. There are also kitchens, storerooms, lavatories, &c. The central hall will accommodate 500 persons. The cost of erecting and furnishing the building has been £2,400.

The aggregate realisation at the Mart last week, £385,181, created a record for many years past; but considerably over half the amount was obtained from a new issue of Ordinary Stock of the Gas Light and Coke Company. The transactions in real estate, however, were of themselves much above the average for the winter season, and some £38,000 in excess of the returns registered for the corresponding week of 1897. The business of the present year already shows considerable advance over that effected in any year of the last decade.

The scheme for the rebuilding of the city infirmary of Newcastle-on-Tyne on a new site at the Castle Leases part of the Town Moor estates, is now fairly launched. The estate has been freely given by the corporation and the Freeman's Stewards, and over £36,500 has been subscribed towards the cost of the new institution, which is to contain 400 beds.



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## ILLUSTRATIONS.

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## Our Illustrations.

## PUBLIC LIBRARY, PUTNEY.

THE site for the public library at Putney is in the Disraeli-road, near the post-office, and the frontage facing this thoroughfare is comparatively narrow, situated between some very ordinary semi-detached villas of unimportant elevation. All the public rooms of the new building are necessarily arranged on the rear part of the site, which has a right-of-way approach by the side of the back premises of the houses in the High-street. The elevation of the new library buildings, therefore, in consequence of the peculiarities of the site and its surroundings, hardly gives an idea of the extent of the premises, while the location of the librarian's residence in the part towards the street imposed a somewhat domestic character as the most suitable treatment of the façade. The public entrance to the library proper afforded the only fitting opportunity for the display of a feature somewhat in scale with object of a public building and the position of this entrance on the plan, leading by way of a direct corridor into the middle of the public departments at the back, left no choice. The accompanying drawings, by Mr. Maurice B. Adams, F.R.I.B.A., were submitted in a limited competition recently held. The large committee-room shown overlooking the forecourt is of the size required in the instructions given to the architects, and the basement below, caused by the pair of houses originally standing on the site, is utilised for storage rooms and a heating chamber. The plan explains the scheme of the design, which is contrived to insure a perfect supervision, the administrative department being kept entirely distinct from the public rooms. The porter's entrance is separated in the most complete way from the librarian's private door, and the residences provided for these two officials are in no way connected, so that the families of both parties, each of a different social standing, are not brought into daily contact—a consideration of the utmost consequence for the satisfactory working of any public institution of this kind. The rear building had to be planned within specific figured dimensions furnished by the committee, and the relative areas of the various rooms were also thus determined. The detail drawing given with the view illustrates the main entrance part of the front. Over the portal a seated figure of “Literature” is shown. The work of the library at Putney has for some years been carried on in the house with a tower to the right of the perspective incorporated in our double-page illustration.

## NO. LXXIV. JAMES STREET, WESTMINSTER.

THIS building is proposed to be erected on the site adjoining St. James-court, where great improvements in widening James-street are about to be undertaken by the Westminster Vestry. The building is intended for shops, offices, and residential chambers, and is to be carried out in red brick and Portland stone. The floors will be fireproof. The roof is also of fireproof construction throughout. The architect is Mr. Charles J. C. Pawley, of 25, Victoria-street, S.W. The cost of the building is estimated at about £20,000.

## MOSCOW MANSIONS, CROMWELL-ROAD, KENSINGTON.

THIS illustration shows the front elevation of a block of residential flats, now in course of erection, with a frontage to Cromwell-road of about 60ft. The elevation is being carried out with Lawrence's red bricks, and terra-cotta dressings. The entrance porch is in pale green glazed brickwork, the roof is covered in green slates, and the cupolas in copper. The floors are fireproof throughout. The lifts are by Messrs. Waygood and Co. The architect is Mr. Charles J. C. Pawley, of 25, Victoria-street, S.W., and the work is being carried out by Mr. W. Goodwin, builder, of Hatton-garden, E.C., at an estimated cost of £18,000.

## HOUSE AT WEYBRIDGE.

THIS house is situated at Weybridge. The materials are red Bracknell bricks, rough cast, and dark Broseley tiles. There is a square hall, with entrance vestibule, staircase hall, hat and coat lobby, and three sitting-rooms on ground-floor, with six bedrooms and a dressing-room, bath-room, &c., over, and three bedrooms in roof. The house is being built for Mr. G. Sturt by Mr. Greenfield, of Weybridge. The architects are Messrs. Brown and Barrow, of Norfolk-street, W.C.

## “CHEQUERS MEAD,” NORTHAW.

THIS house and stables are built of brick and tile, with weather-tiling above the ground floor. The walls are built hollow, and bonded with Jennings' patent bonding bricks. The roofs are lined with Willesden paper, in addition to boarding. The tiles used are Broseley, Sovereign brand. The architect was Mr. John Richmond, Great College-street, Westminster, and the builders were Messrs. Ekins and Farley, St. Andrew's-street, Hertford.

## THE NEW PAVILION, KENNINGTON OVAL.

WE published a view of the new tavern, which has just been completed at the Oval, in the BUILDING NEWS for December 2nd, and to-day we give a view of the cricket pavilion. The whole undertaking has been carried out at a cost of between £30,000 and £40,000. Messrs. Muirhead and Baldwin, of Manchester, are the architects. Messrs. James Mudd and Sons took the photograph which we have reproduced.

## COVEHITHE CHURCH, SUFFOLK.

THIS ruin is situated on the Suffolk coast, about three miles north of Southwold—anciently called Sudwold, or the Southwood. The church, built somewhere in the earlier part of the 15th century, was contemporary with those of Southwold (for plans and sketch of which church see BUILDING NEWS, Aug. 31, 1894), Walberswick, and the present edifice at Blythburgh. (For view and plan of Blythburgh, see BUILDING NEWS, Aug. 11, 1893.) At this latter place there are evidences that a Norman church previously stood on the site now occupied by the existing one. North Hales (or Northales) appears to have been the name used in connection with this place; but it seems that the part so called lies now five or six miles out at sea. Covehithe proper obtained its name from its Lords John and Walter de Cove, in the time of Edward the First; here a river emptied itself into the sea, and every indication of this having been so is plainly seen. In fact, the precise position, though not patent to the casual observer, is pointed out at low water, and known by the few inhabitants as the “Harbour.” The Cove family built a quay, or hithe, from which vessels loaded or unloaded their cargoes, and hence the name Covehithe or Cove's Hithe. In 1308, John de Cove and his wife Eve had free warren in their lands, and in 1328 obtained the grant of a fair at this part, held on St. Andrew's Day, the patron saint, and to whom the church, built in the 15th century, was dedicated. It belonged to the Cluniac cell of Wangford, and on the dissolution of the monasteries, swelled the revenues of the Duke of Norfolk. In 1612, the impropriation changed hands, it being purchased

by Sir John Rous, and ultimately passed into the hands of the Gooch family, and the vicarage was consolidated with Benacre. It is said that the Cromwellians wreaked unrestrained rage on this particular church—acts of violence to others in the locality are well recorded—and even used their cannon in the work of despoliation. The present little structure, built on to the tower, inside the old nave, was erected with the materials lying to hand in the year 1672. John Bale (author of *Descriptoribus Britannicis*) is reported to have been born here, and was at one time rector. There are five fine bells, though rarely, if now ever, swung; on the angles of the tower are seatings for grotesque heads, as those seen at Blythburgh; in the lead flat are deeply-scored foot-prints with initials, dated over a hundred years ago, left as mementoes by old-time visitors. Flint panels to the base are to be seen in better state of preservation on the south side; the flints are cut with great exactness. There is a certain amount of sadness in the thought that, though at some distance from the sea still, there is its inevitable end to be seen in that element. This is not imaginary. Eccles is now a heap of stones on the beach; the distance between Dunwich and the restless wave is growing less every year, and the bones of those supposed laid to rest in God's acre are washed about on the foreshore. The solemnity excited by the actual ruin is very striking; a feeling of desolation and desertedness pervades the precincts. What its once glories were are magnified by the contrast of the humble building now used by the scanty and scattered population for Divine worship.

W. F. HARBER.

## VICTORIA HOTEL, HARROGATE.

THE Victoria Hotel, Harrogate, is situated at the corner of Coldbath-road and the Esplanade, facing the Stray. It will be seen that the old building is of very simple character, and it was necessary that the additions should be treated in a quiet manner. The extensions give large and commodious vaults, with clubroom over, and two private rooms, also a small lock-up shop, and a large shop and house. The materials used are local stone for the walling and dressings, the roof is covered with green Westmoreland slates. The work was carried out by local contractors at a cost of £2,000. Mr. Albert E. Kirk, A.R.I.B.A., of Leeds, was the architect.

## ENGLISH FURNITURE.

THE sketches among our illustrations represent some of the choice specimens of Old English furniture at the South Kensington Museum. The Cabinet or Buffet is of walnut wood, elaborately carved, the two lower and the recessed panels having figures of horsemen. The spandrel is enriched with draped figures and cherubs' heads. The divisional uprights are covered with fruit and foliage. The arched openings above have figure carvings. The two Chairs were made probably in Yorkshire or Derbyshire, during the 17th century, and have carved backs and partly-turned legs. Notwithstanding their age, they are in a good sound condition. The Desk and Stand are of oak, with straps of iron. The desk is of the 16th century, but the stand is a full century later in date.

## CHIPS.

WORKS are about to be begun on the construction of a sea-wall at Sheringham, Norfolk. Mr. Jeffrey is the engineer, and Messrs. B. Cooke and Co., of Battersea, S.W., are the contractors.

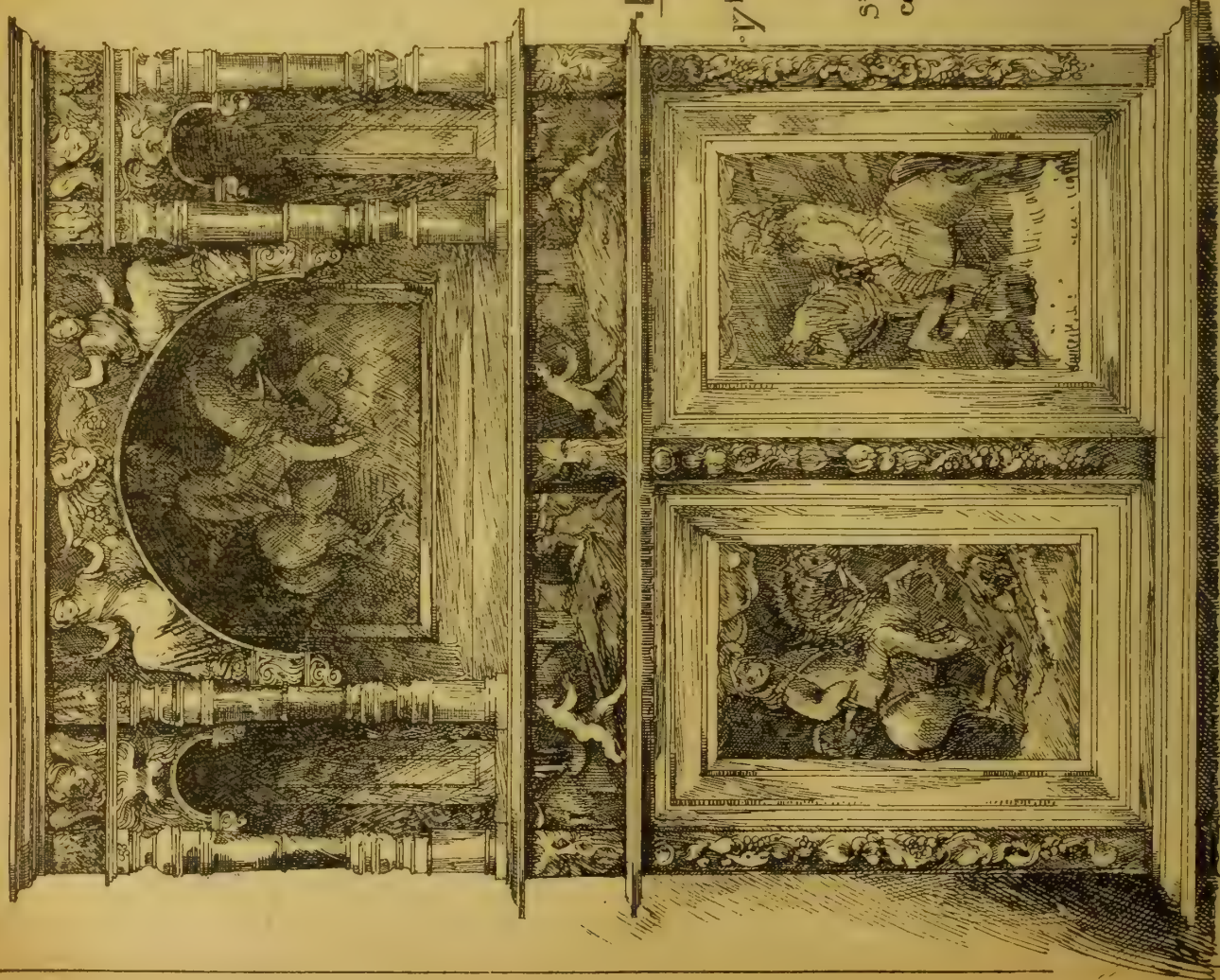
THE south aisle of Halberton parish church, Devon, is now being resealed. The nave, it is hoped, will be commenced in February, and the whole work completed by Easter, 1899. The cost of the resecaling will be £700.

THE water committee of the Tenby Town Council has received estimates from Mr. Anson, water engineer to the corporation, for obtaining a new water supply for the town from springs in the St. Florence Valley, and has decided to apply to the Local Government Board for permission to borrow money to carry out the scheme.

THE work of extension and alterations at the town-hall, Lymington, has now been completed by the contractors, Messrs. Elgar and Son.

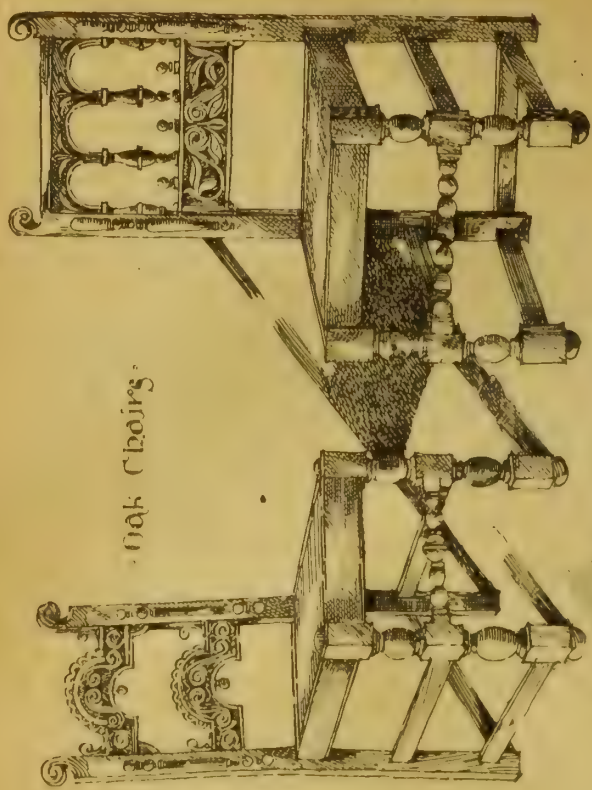
THE Mayor of Nice has appointed an International Commission to report on a scheme for the general improvement of the sanitary conditions of Nice. Dr. Allen Sturge has been asked to join the Commission in order to represent the interests of the English colony. It is stated that the Municipality will, if necessary, spend ten million of francs.



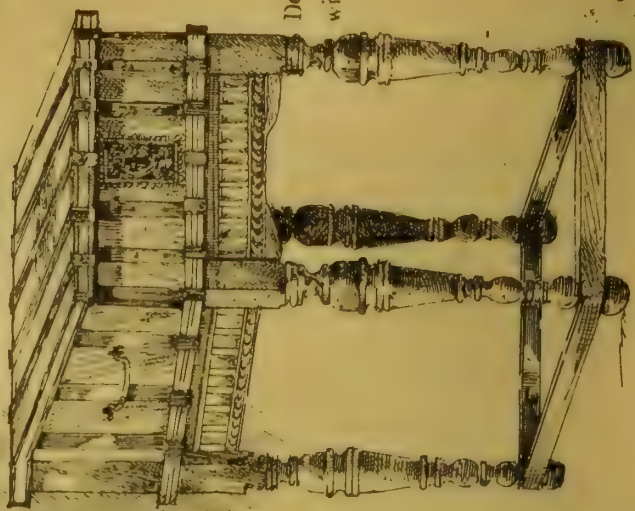


ENGLISH  
FURNITURE  
17<sup>th</sup> Cent. from the St. F.

Side Board or Buffet of  
carved walnut wood.



Oak Choring.



Desk & Stand-oak  
with iron moulds.

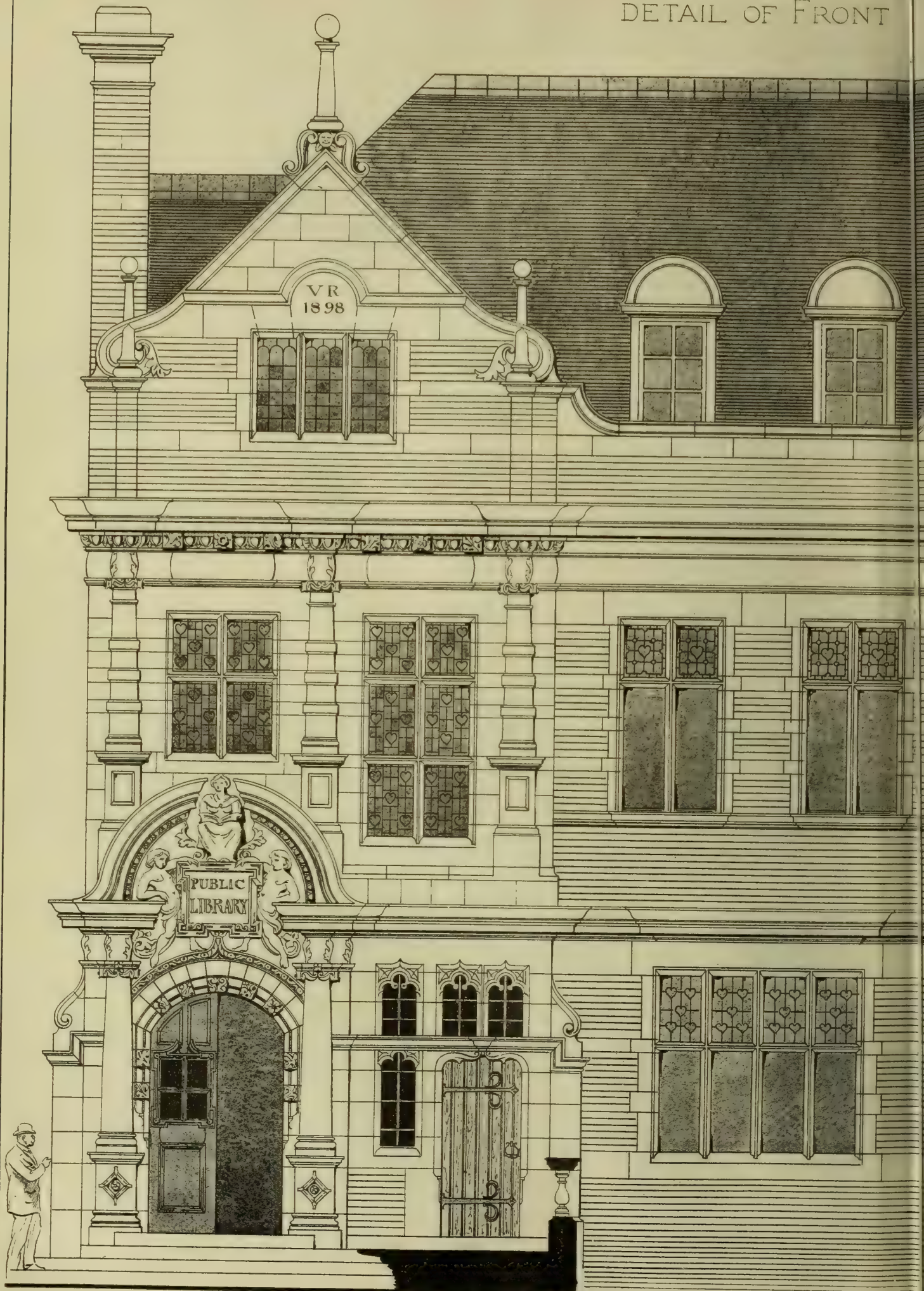
WALTER J. WILKS



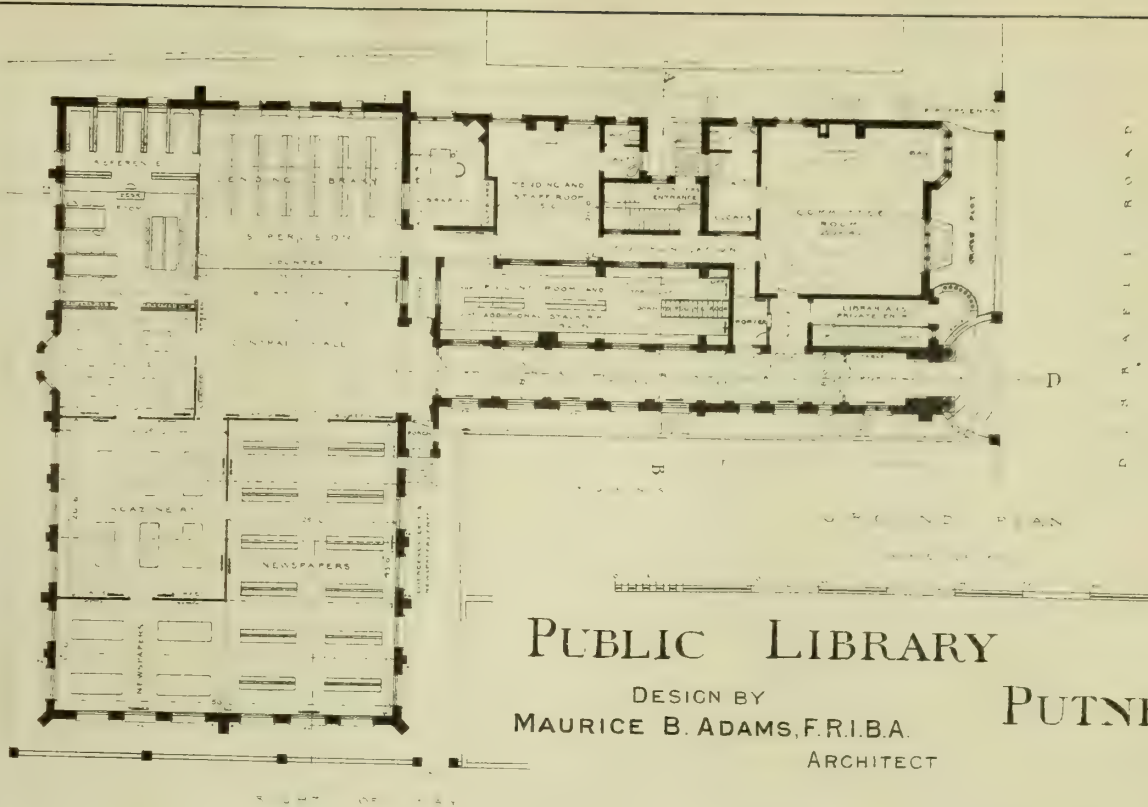




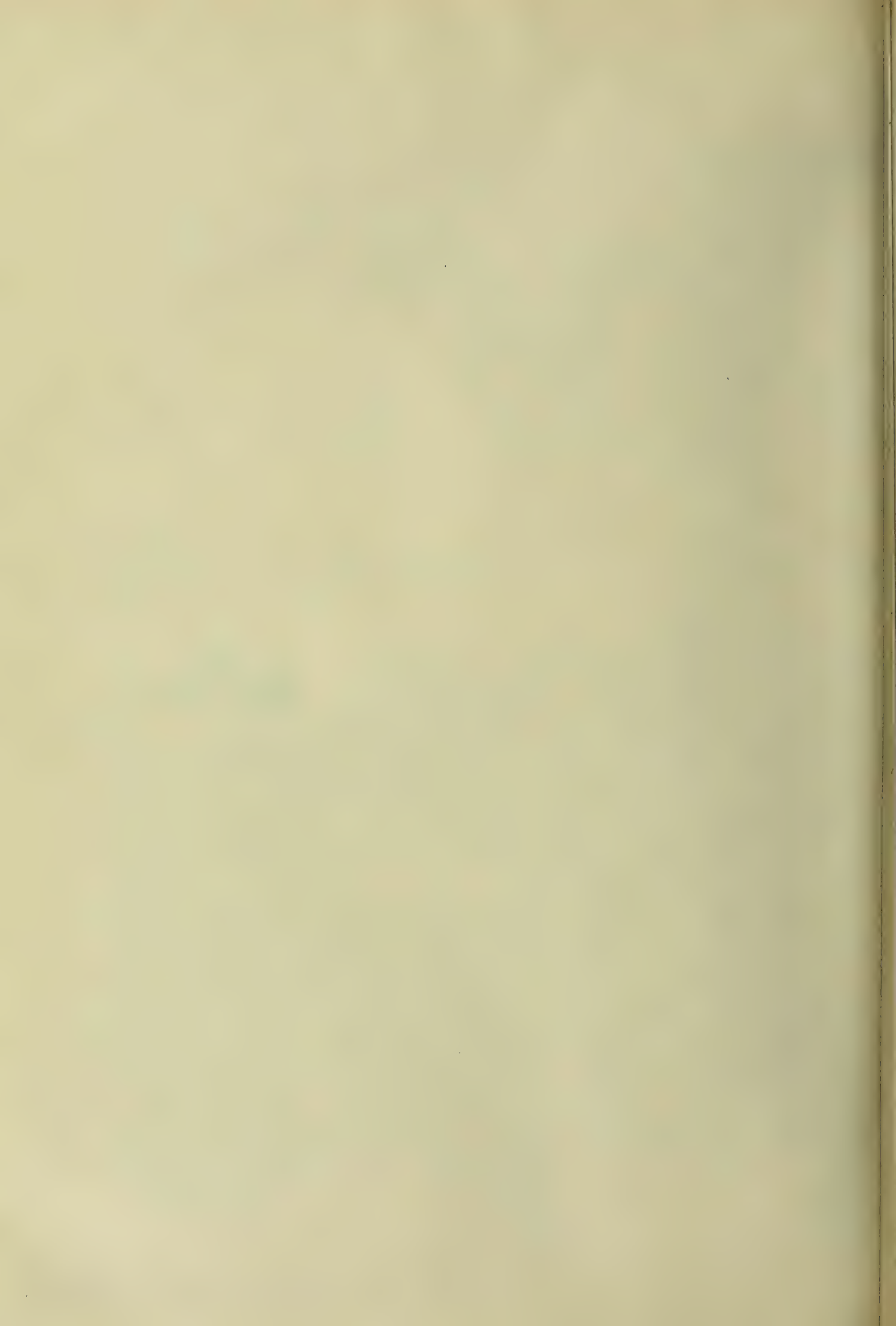
DETAIL OF FRONT

















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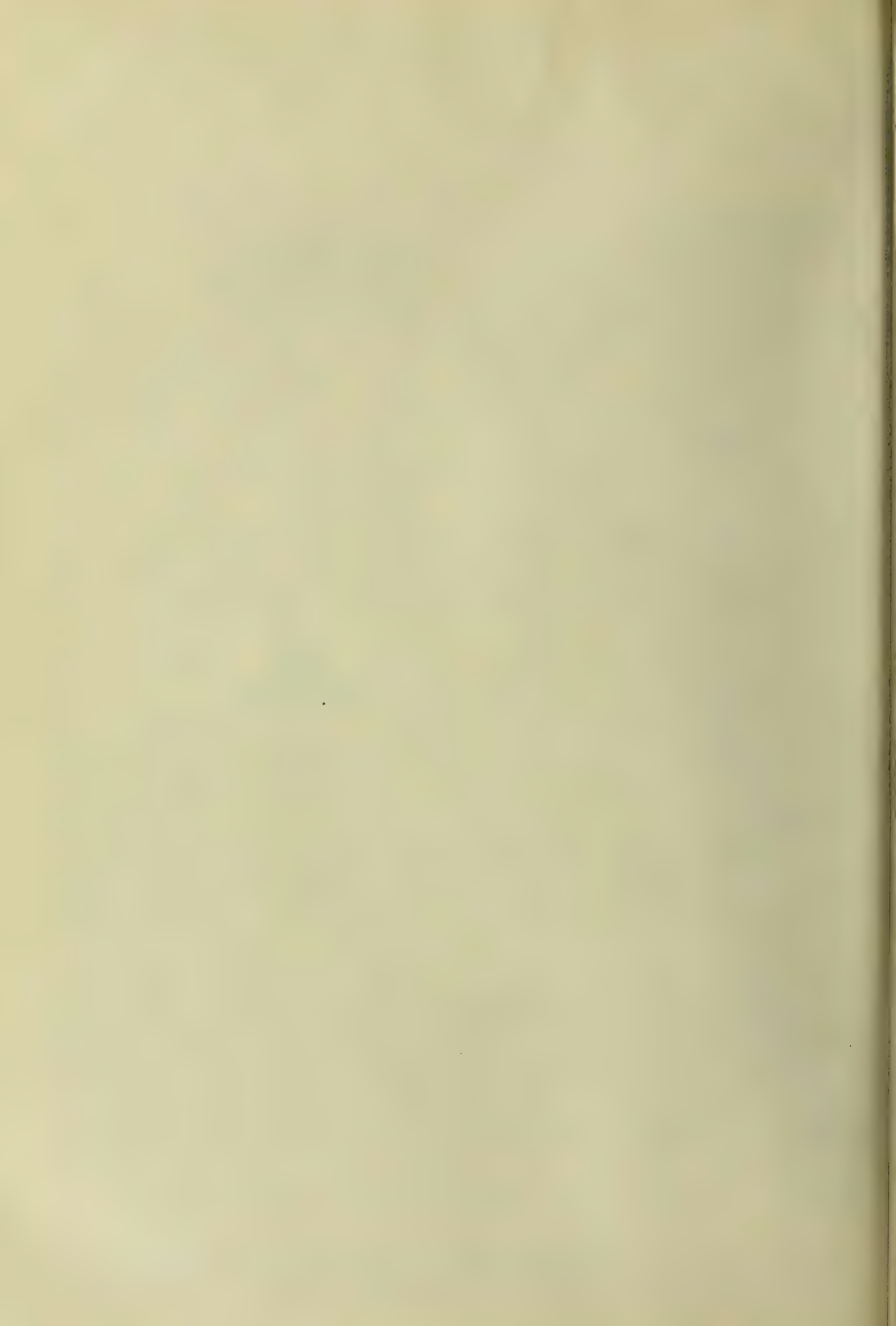


MOSCOW MANSIONS, KENSINGTON.

CHARLES J. C. PAWLEY ARCHT. ECT.



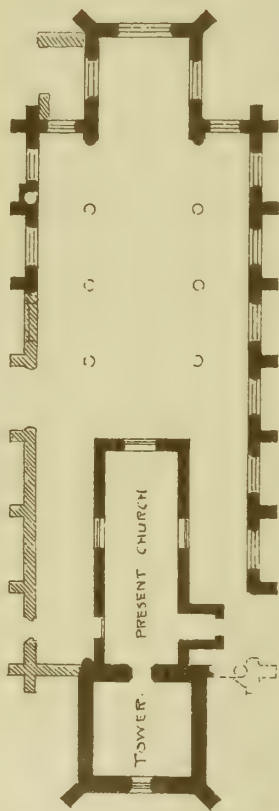












SKETCH PLAN

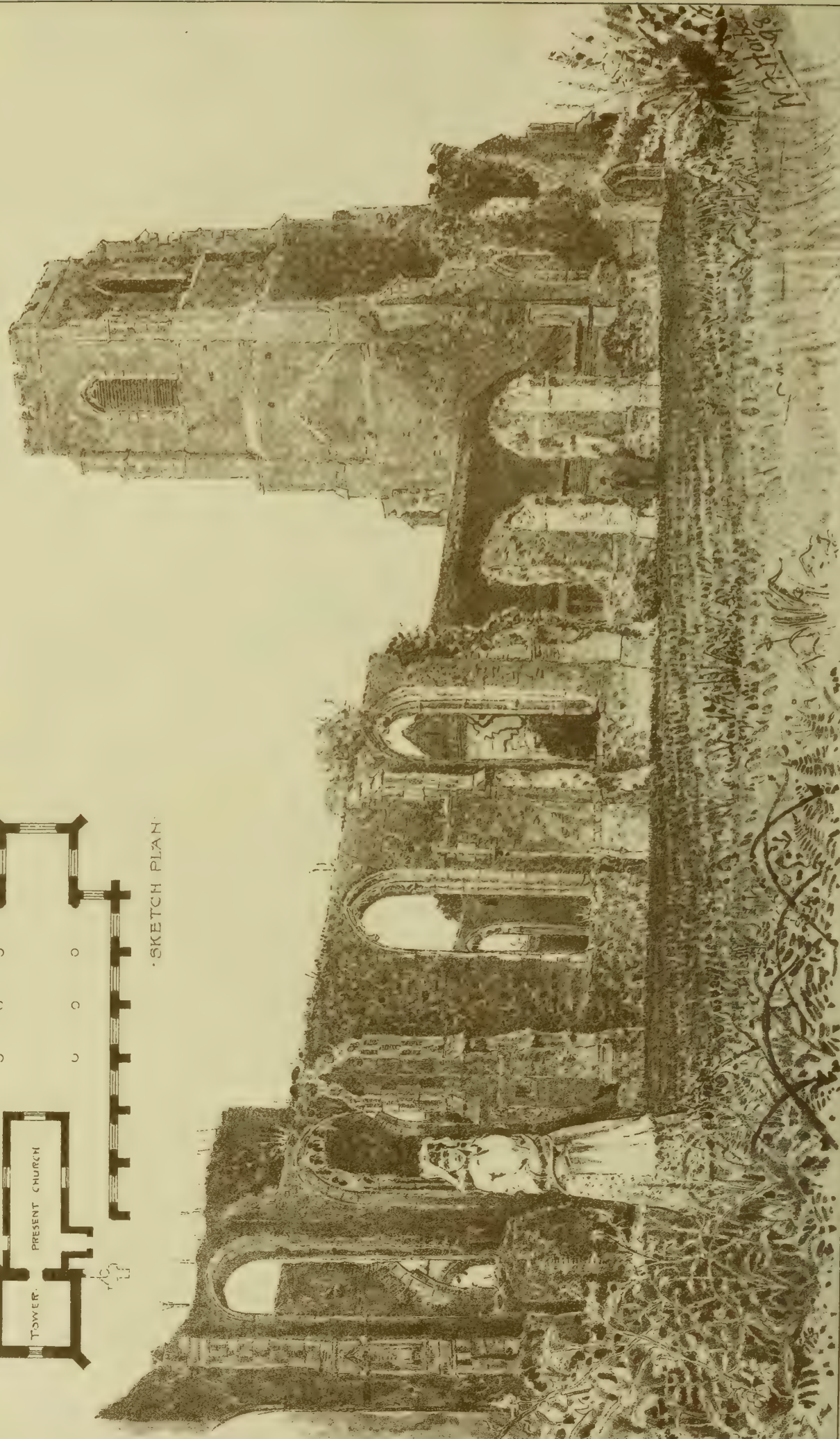


PHOTO-TINT BY JAMES MONTAGUE & SONS, LONDON

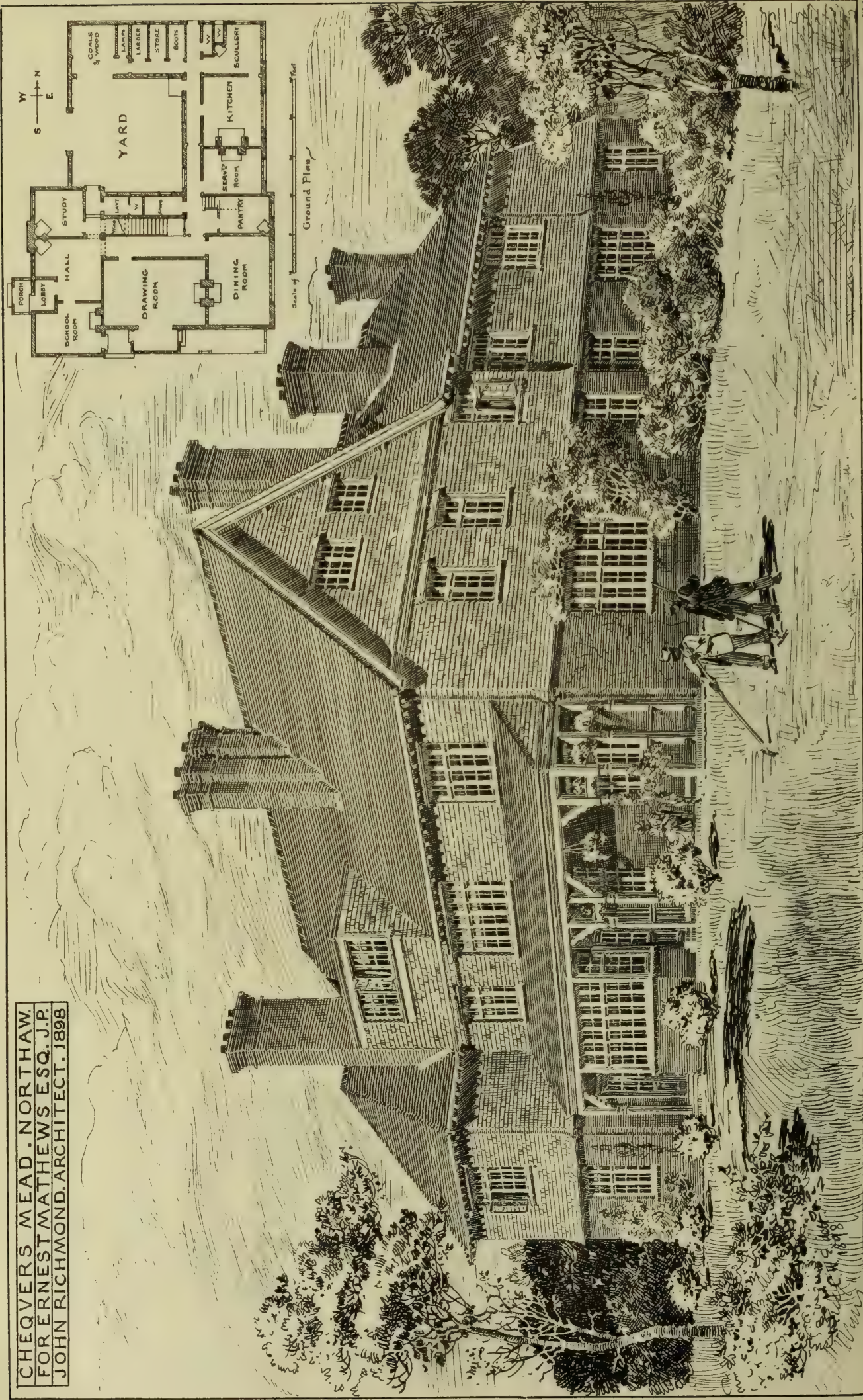
THE RUINED CHURCH OF COVEHILL, SUFFOLK. DRAWN BY W. F. HARBER.



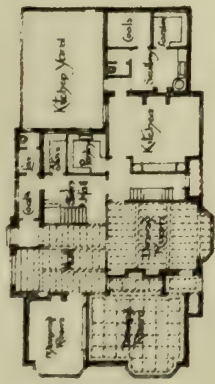




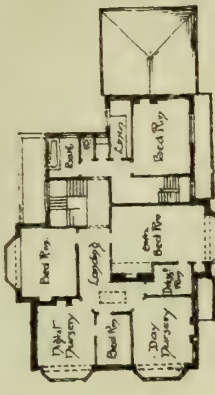
CHEEVERS MEAD. NORTHAW.  
FOR ERNEST MATHEWS ESQ. J.P.  
JOHN RICHMOND. ARCHITECT. 1898







Ground Floor Plan.



First Floor Plan.

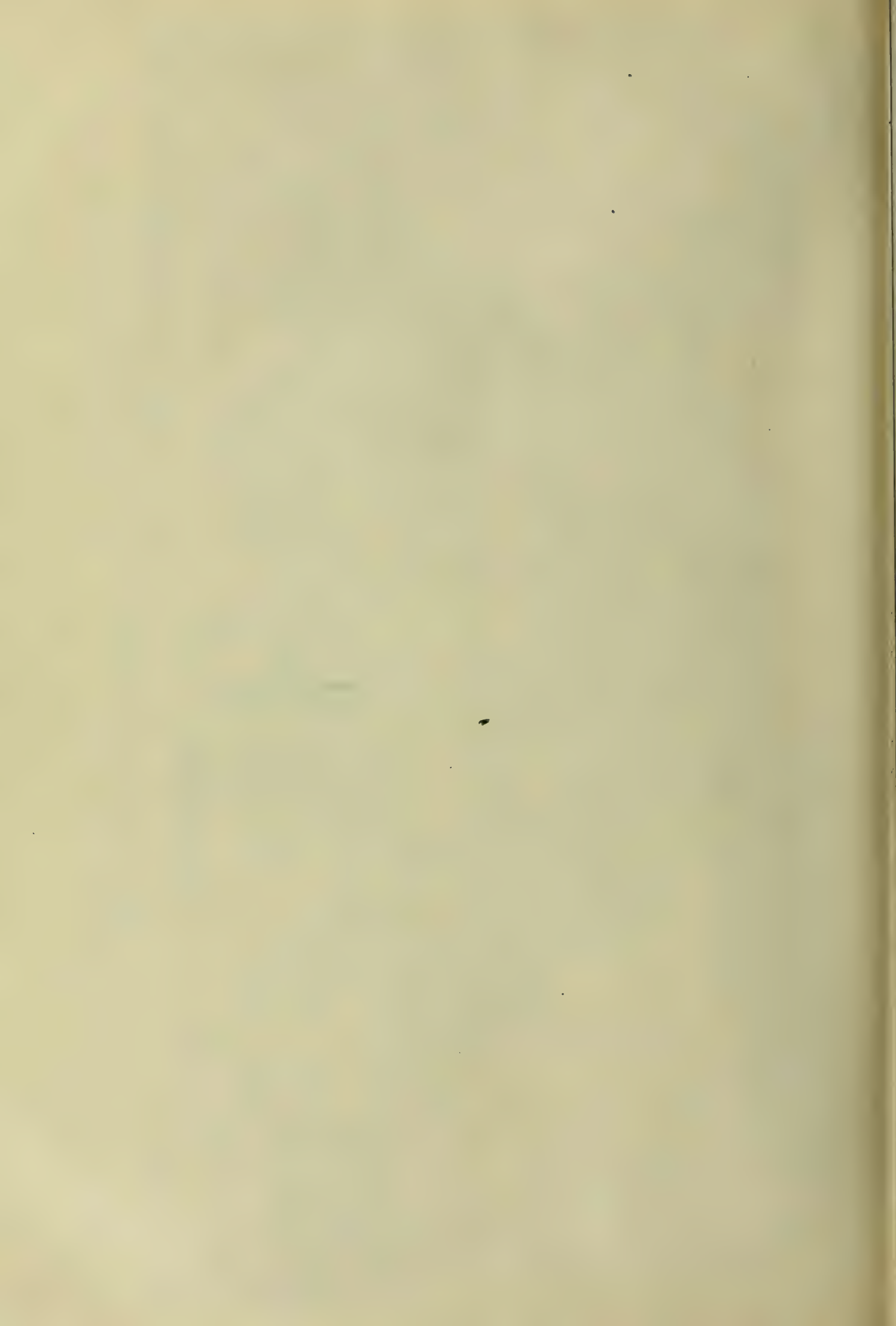


VIEW OF GARDEN FRONT.

HOUSE AT WEYBRIDGE FOR A. STURT, ESQ.

A. DUMMETT, BROWN & ERNEST, R. BARNOW } ARCHITECTS LONDON



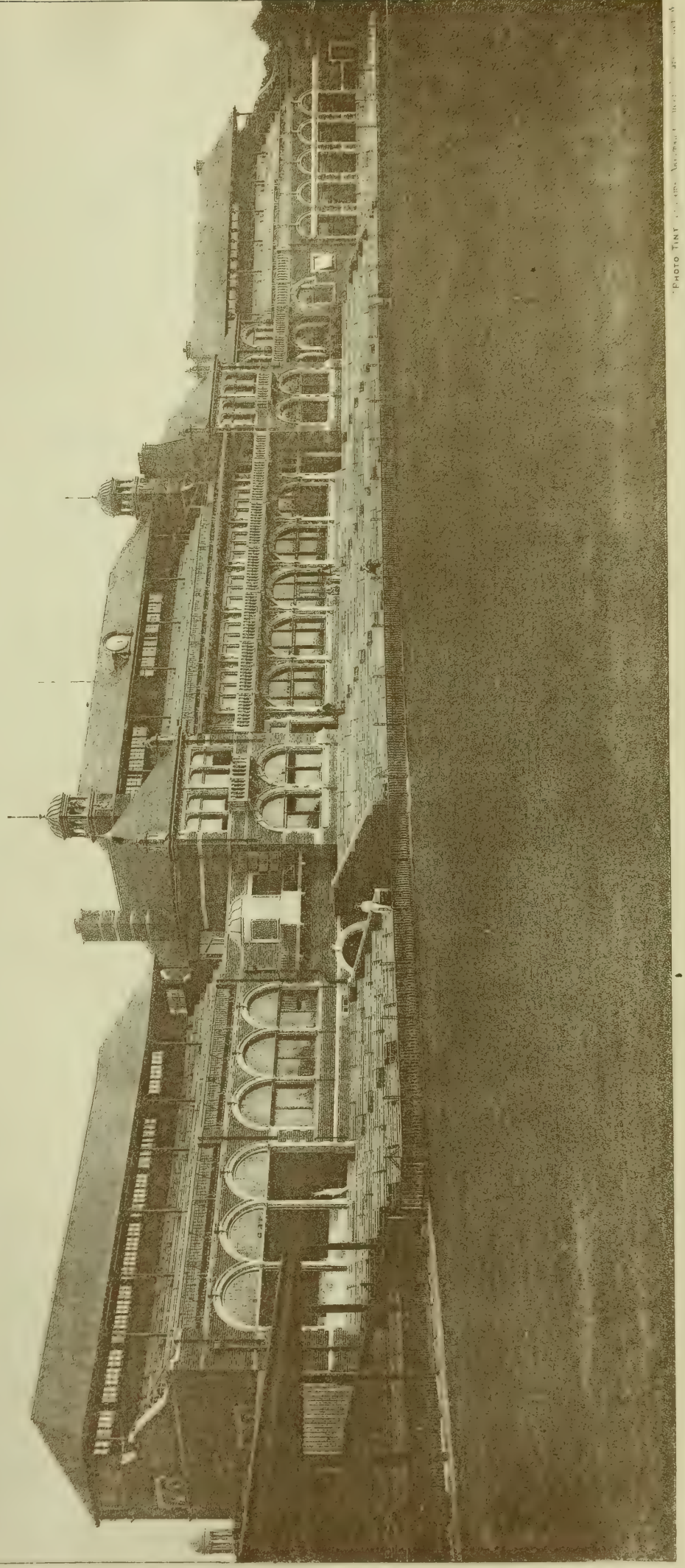




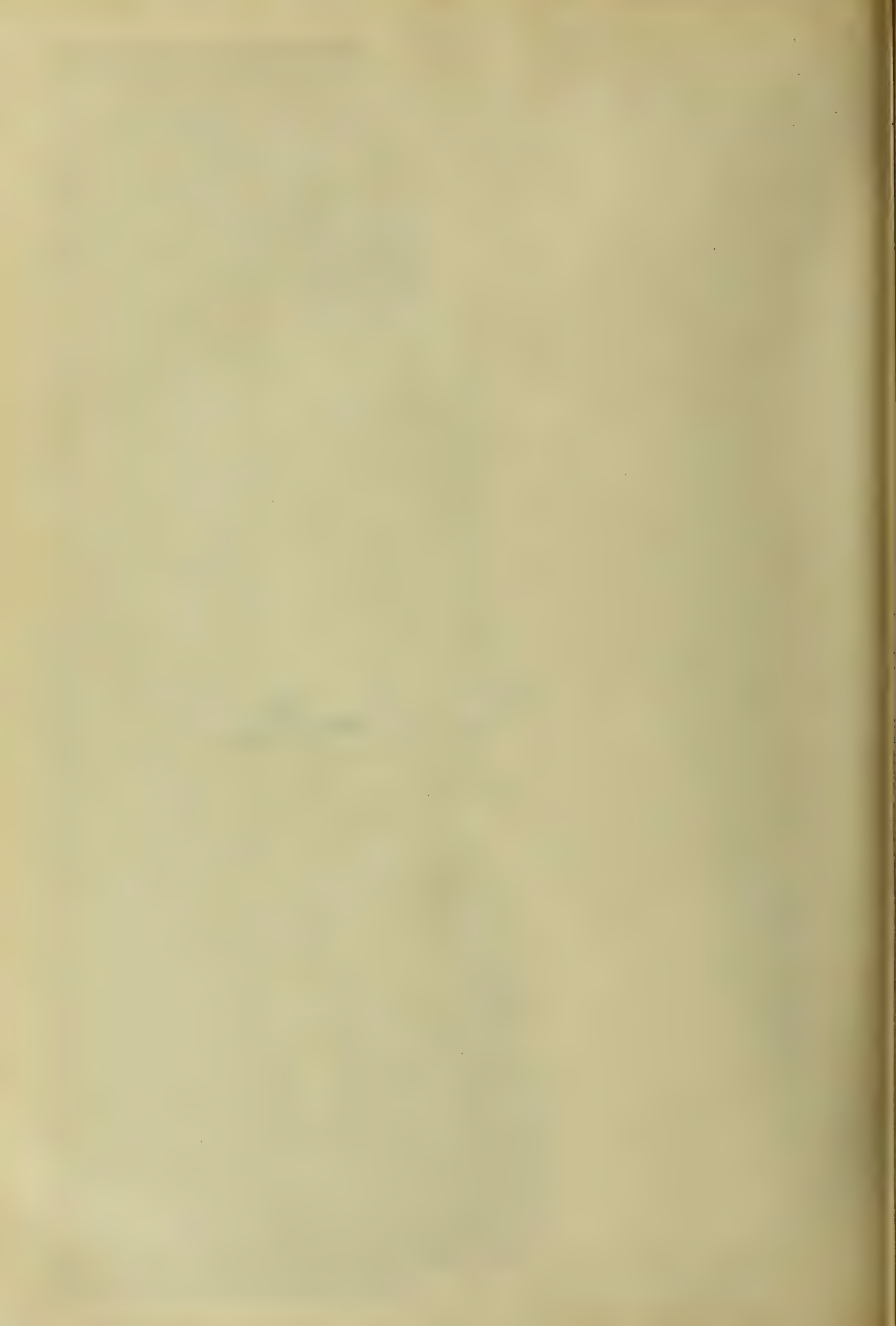
THE BUILDING JEWS. DEC. 16, 1898.

THE NEW EDITION REVISION (KAL.

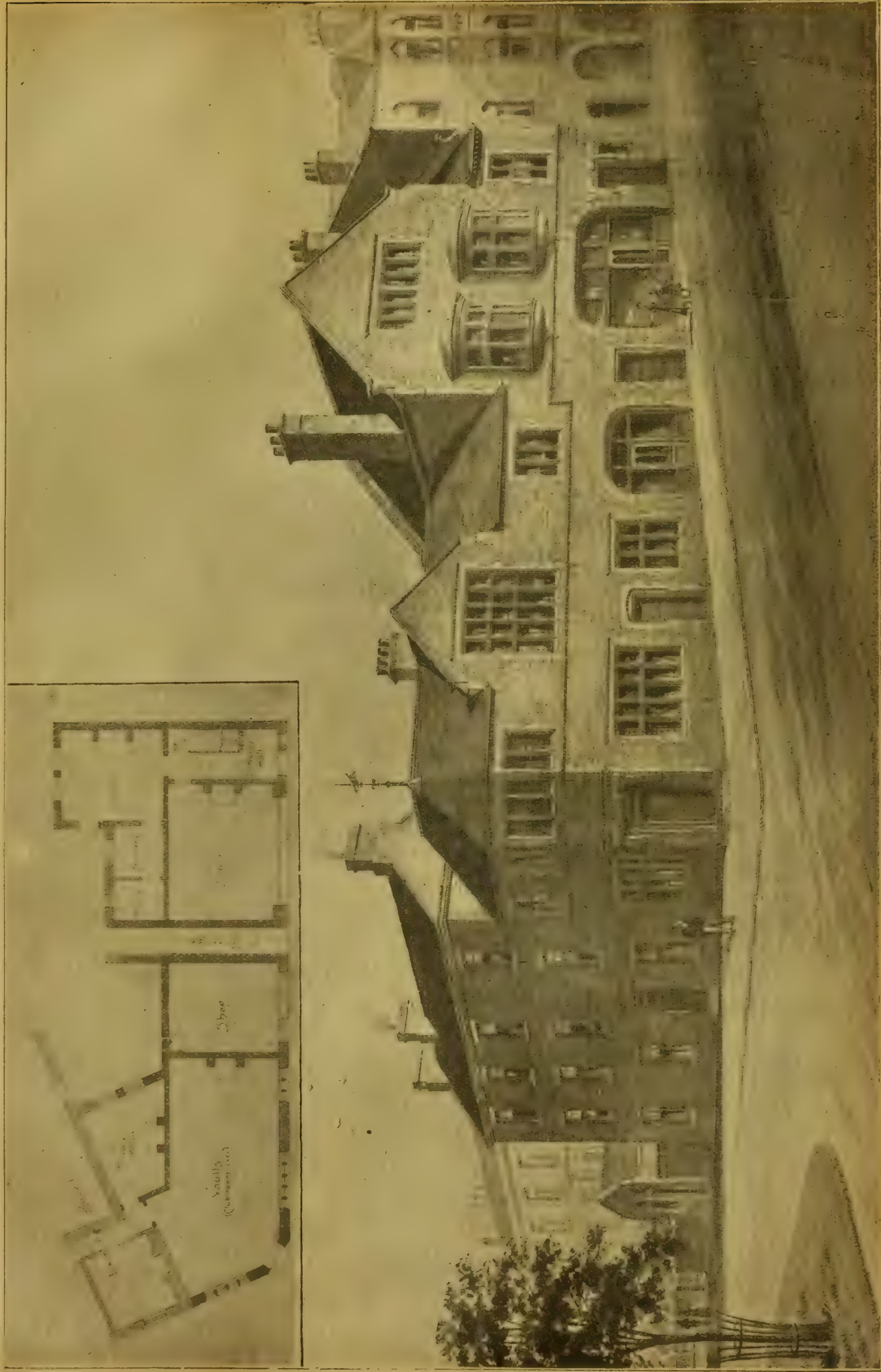
Messrs MURKHEAD & BALDWIN ARCHTS











VICTORIA HOTEL, HARROGATE.—MR. ALBERT E. KIRK, A.R.I.B.A., Architect.



## Engineering Notes.

**HERNE BAY.**—A Local Government Board inquiry was conducted at Herne Bay on Saturday on the application for a loan of £40,000 required for the renewal of the sea-wall and parade there, which was so extensively damaged in the great gale in November of last year. The clerk to the council, in the course of his evidence, said the damage was at that time caused to the whole of the sea-front and the lower part of the town, some 200 houses being affected. The sea-front was temporarily repaired at a cost of £700. It was explained by Mr. Baldwin Latham that the new sea-wall would be 1,924 yards long and 20ft. to 25ft. high, being so constructed that it would allow of the promenade being widened by 15ft. Evidence in support of the scheme and in opposition having been heard, the inquiry was closed.

**PROPOSED RAILWAY FOR NORTH LINCOLNSHIRE.**—The Barton Urban District Council held a special meeting on Thursday in last week to discuss the North Lincolnshire light railway scheme, which provides for a line from Barton to Lincoln. The line will be divided into three sections, and entail a total expenditure of £137,433 2s. 6d. The land will be purchased, probably, at £60 per acre, and the cost per mile of the first two sections will be £1,650, and of the third £1,474. This includes the erection of twenty stations. The route selected is through Greetwell, Nettleham, Dunholme, Hackthorpe, Spudlington, Normanby, Guntham, Redbourne, Waddingham, Hilbaldstow, Scawby Brigg, Elsham, Warlaby, Penby, Saxby, Hockstow, and Ferryby to Barton, where a junction will be formed with the Great Central Railway. The scheme includes the construction of a pier or jetty in the Humber 150 yards long. The highways committee recommended the council to oppose the whole principle of the order, and expressed the opinion that a proper railway should be constructed, with a tunnel or bridge across the Humber, in order to provide direct communication with Hull. The meeting endorsed this view, and decided to oppose the scheme when it forms the subject of an inquiry by the Commissioners.

The sale of the first portion of the collection of books and manuscripts formed by the late Mr. William Morris, of the Kelmscott Press, was concluded on Saturday at Messrs. Sotheby, Wilkinson, and Hodge's Rooms, in Wellington-street, Strand. The prices realised throughout have been extremely good, the total sum obtained being close upon £11,000.

A scheme of water supply is about to be carried out for the village of Great Wyrley, near Cannock, at a cost of about £1,500. Mr. W. E. Rogers, of Rugeley, has been appointed engineer at a remuneration of 5 per cent. up to £900 outlay, and 3 per cent. on the balance of cost.

The Church of the Holy Nativity, Knowle, Bristol, has been further enriched by the addition of two stained-glass windows in the south side, one representing St. Matthew and the other St. Mark, both having been designed and inserted by Messrs. Bell and Sons, of College Green, Bristol.

Requiring space for the extension of their premises, the directors of the Bristol United Breweries purchased the All Saints' Almshouses adjoining the Crown and Dove Hotel in Bridewell-street, and in order to provide accommodation for the inmates the company acquired Barton House, in St. James's Barton, which building is now in course of demolition preparatory to the erection on the site of new almshouses to accommodate eight women. The plans for the new almshouses have been prepared by Mr. T. Scammell, and the contractor is Mr. A. J. Beaven, of Bedminster.

The Dewsbury and District Joint Hospital Board finally adopted, on Monday, plans by Messrs. Holtom and Fox, of Dewsbury, for a fever hospital to be built at Mitchell Laithes at an estimated outlay of £21,950. The hospital will consist of porter's lodge with offices at the entrance of the estate, which is nine acres in extent, an administrative block of two stories high, and, besides the offices and other apartments for doctors, matron, dispenser, &c., will have 12 bedchambers. The hospital proper will be of one story, and will in the several blocks contain 56 beds.

The London and North-Western Goods Station at Dewsbury is being reconstructed. For several years past the accommodation at the existing premises has been inadequate. The work was commenced about three or four weeks ago. The extensions will cost about £40,000.

## ARCHÆOLOGICAL.

**WAVERLEY ABBEY.**—The council of the Surrey Archaeological Society have issued a statement showing the work that has been already done in regard to the excavations at Waverley Abbey, the first house founded in England of the Cistercian Order. The first points of interest disclosed included the west end of the chapter-house, with what remains of its doorway. It was then decided to continue the excavations, and Mr. William Anderson set about clearing the chapter-house and the slype, or covered way adjoining, to the original level. Since then the ground south of the cloister, and lying between the collarium and monks' dormitory, has been explored, with the result that now may be seen the kitchen block, wholly uncovered; the walls of the monks' refectory, with the stone bench running along the three sides; portions of the walls of the calefactory, or warming room, and of some other rooms. The church, too, has been partially excavated, and the divisions of the chapels in the transepts brought to light. East of the chapter-house and monks' dormitory, according to the normal Cistercian plan, should be the infirmary with its hall, chapel (said to have been larger than that at Trinity College, Oxford), and kitchen offices, the abbot's house, the prisons, &c. In the cloister, opposite the chapter-house door, the coffin was found of William Mauduit, the third Baron of Hanslope, and King's Chamberlain, whose burial took place in October, 1194, as recorded in the annals of Waverley. North of this was one other interment, and to the south of it four more, that at the end having above it a plain stone slab without inscription. The coffins were not of stone, as is usual in our abbeys, but of oak, almost as sound as on the day they were deposited here. Photographs and measurements having been taken, the earth was replaced. During the excavations many objects of interest have been brought to light, including window glass, some of it painted, with portions of the lead casements in which it was fixed, a large number of floor tiles, many having designs on them, besides a great store of fragments of Medieval pottery, and of glass vessels and other objects illustrative of the domestic life of a monastery.

## CHIPS.

A new Liberal clubhouse is about to be built in Boroughbury, Peterborough, from plans by Mr. Ruddle, of that city.

The equestrian statue of the late Duc d'Aumale has been finished by M. Gerôme. On the plinth of the statue the sculptor is to execute two bas-reliefs, "La Smala" and "Le Retour à Paris."

At the meeting of the Edinburgh Architectural Association, held on Wednesday evening, at the Royal Institution, Edinburgh, Mr. Thomas Ross, President, in the chair, Mr. Edwin Forbes read a paper, illustrated with limelight lantern views, entitled "The School of Applied Art Studentship: a Sketch of the Work in Galloway."

The new memorial window and lych-gate at Cloughton parish church, erected to mark the deep interest taken in Cloughton by the late Sir Frank Lockwood, Q.C., M.P., was dedicated on Thursday in last week by the Rev. Canon Temple, D.D., of York. The window was designed by Messrs. Atkinson Bros., of Newcastle-on-Tyne, and the subject illustrated was "The Judgment of Solomon."

The Harrogate Town Council decided, on Monday, to increase the salary of Mr. Dixon, their waterworks engineer, by £100 per annum.

On Friday, Col. W. Langton Coke, M.Inst.C.E., one of the inspectors of the Local Government Board, held an inquiry at the Guildhall, Stafford, respecting an application by the town council for sanction to borrow £5,000 for gasworks purposes.

Messrs. John Aird and Co., of London, contractors for the new reservoirs at the Nile, are now making rapid progress with the works, which are expected to produce a vast improvement in the productiveness of that country. At Assouan, all the workmen's dwellings, hospitals, hotels, and other buildings necessary for the staff of workers have been finished. At the present time more than 2,000 natives are employed in blasting operations, and some 250 Italians are quarrying and dressing the building material.

Mr. George S. Horton, for some years past surveyor to the urban district council of Felixstowe and Walton, has resigned his office.

The Cleopatra Swimming Bath, which cost £23,000 about twenty years since, and was once a familiar object off the Thames Embankment at Charing Cross, has been sold to a ship-breaker for £300.

## WATER SUPPLY AND SANITARY MATTERS.

**THE LONDON WATER SUPPLY.**—The Royal Commission on the London Water Supply resumed its sittings on Monday, Lord Llandaff in the chair. In support of the contention of the County Council, that the scheme for obtaining water from Wales would be less expensive and more effectual than the Staines reservoirs scheme of the Companies, Mr. Reginald E. Middleton, chief engineer of the latter project, was further cross-examined. Supposing that Staines is to be the source of supply in the future, he did not see why the companies should not remain the purveyors of water. The Chairman: Not necessarily. Mr. Walter Hunter, joint engineer with the previous witness to the Staines Reservoirs Committee, then gave evidence, stating that in his opinion as water engineer the Staines scheme, whilst providing excellent water, would, for at least 50 years, and probably for a much longer period, be more economical, and consequently more advantageous, than the Welsh scheme could possibly be. In carrying out the Staines storage reservoir it was considered desirable, as far as possible, to disarm opposition by falling in with the views of the advisers of the public bodies concerned, especially in connection with the proposals that pumping from the Thames should not commence until fifteen days after the commencement of any flood, and that the minimum flow at Teddington Weir should be fixed at 200,000,000 gallons. For the protection of the river, and for the equalisation of the flow, it was desirable that as much water as possible should be taken from it during the periods of flood. A comparison of the chemical and bacteriological quality of London water with that supplied from mountain districts testified to the excellence of the Metropolitan supply. If water of the brown colour drawn from mountain sources, which was frequently seen in northern towns, were supplied to London, there would be an outcry from the consumers. The Thames possessed an average flow of about 1,300,000,000 gallons daily, and it had never been suggested by the supporters of the Welsh scheme that more than 415,000,000 gallons could be obtained from Wales. It, therefore, seemed absurd to leave a larger and equally good supply obtainable close to London for a smaller supply from a distant source. The Commission then adjourned. At Tuesday's sitting further evidence was given by Mr. Hunter in favour of the Thames in preference to Wales as a source of supply, and against the management of the water supply by the County Council. Sir F. Bramwell also gave evidence against purchase and County Council management. The Commission adjourned till next Monday.

The new parochial schools of St. George, Hanover-square, in Vestry Hall-gardens, were opened on Tuesday by the Duke of Cambridge. The old elementary schools built at the beginning of the century, which were dilapidated, ill-planned, and inconvenient, have been pulled down, and the site has been extended by the addition of an adjoining plot of land containing 6,300 yards, and given by the Duke of Westminster. Part of the area has been sold, and a pathway opened from Farm-street to Vestry Hall-gardens, and on the remainder of the site higher grade schools have been built at a cost of £17,000. Covered and uncovered playgrounds have been provided in all three departments.

A travelling studentship of £50 for the encouragement of the study of decoration is offered by the Painters' Company. It is open to competition by students between the ages of 20 and 35 in any recognised school of art or other institution devoted to the study of applied art in any form, and situate within the limit of the larger Metropolitan postal area. Particulars may be obtained from the clerks, Painters' Hall, 9, Little Trinity-lane, E.C.

The solemn opening of the new chapel which has been erected in connection with St. Bede's Roman Catholic College, Alexandra Park, Manchester, took place on the 8th inst. The building, which is intended for the use of the students and staff of the college, is of plain appearance, and has been erected, from designs prepared by Mr. O. C. Hill, architect, Albert-square, Manchester, by Mr. Hibbert, builder, Moss Side.

At the monthly meeting of the St. Marychurch Urban District Council, on Friday, it was decided to expend the sum of £7,500 in carrying out a new system of drainage in the district. In 1875 a system of brick drains with curved lines was adopted by the old local board; but this is now considered inefficient, and it is proposed to carry out the more modern system of pipe-drains laid in straight lines. Mr. R. Hansford Worth, of Plymouth, will be the engineer.

At Thorneby, on Friday, the foundation-stone was laid of a new Primitive Methodist Church and Sunday-school in Peel-street. The new church will accommodate 450, and the cost is estimated at about £3,000.



### PROFESSIONAL AND TRADE SOCIETIES.

**EDINBURGH AND LEITH MASTER BUILDERS' ASSOCIATION.**—The annual dinner of this association was held in the Royal British Hotel, Edinburgh, on Friday night, and was attended by over 120 gentlemen. Mr. John Lowrie occupied the chair, and in welcoming the delegates who were present from Glasgow, Perth, Dundee, and Aberdeen, said the building trade all over the country was in an exceptionally busy condition. The chairman proposed "The Magistrates and Council of Edinburgh and Leith." Councillor Douglas (Edinburgh) and Councillor Fisher (Leith) acknowledged the toast. Mr. Rex submitted the toast of "The Edinburgh and Leith Master Builders' Association." Mr. William Forrest, replying, said their association was started about eighteen or nineteen years ago, with a membership of something like sixty, composed wholly of masons. They had now a membership of over 170, and they had amalgamated with them joiners and plumbers, and he hoped they would press forward towards having all connected with the building trades united into one. "The Representatives and Members of Kindred Associations" was proposed by Mr. Drysdale, and replied to by Mr. Forbes, Mr. McEwan, and Bailie Selkirk, Glasgow; ex-Bailie McLeish, Perth; Mr. James Worling, Aberdeen; and Mr. James Buirrie, Dundee. Mr. Drysdale proposed "The Architects and Surveyors," which was acknowledged by Mr. Hunter Crawford, Mr. Carfrae, and Mr. Lawrence. "Our Merchants and Contractors" was proposed by Mr. Elliot, and responded to by Councillor Graham Yooli, Leith.

**HUDDERSFIELD MASTER BUILDERS' ASSOCIATION.**—The annual meeting of the Huddersfield Master Builders' Association took place in the Town Hall, Huddersfield, on Saturday, the mayor (Ald. W. H. Jessop) in the chair. The report, which was adopted, stated that six new members had joined last year, the total number of members being 69. The carpenters and joiners had called for an advance of 7½d. to 8½d. per hour, which would be considered by the employers in that branch. The relations of operatives and employers in the other branches of trade were amicable. The following officers were elected for the year: President, Mr. John Dawson; treasurer, Mr. T. B. Tunncliffe; secretary, Mr. Jury.

**MANCHESTER SOCIETY OF ARCHITECTS.**—The thirty-fourth annual dinner of this society was given on Thursday in last week at the Queen's Hotel, in that city. The chair was occupied by the President (Mr. R. I. Bennett), who was supported by Mr. George Corson (president of the Leeds and Yorkshire Architectural Society), Mr. Edward Salomons, Mr. Charles E. Bateman (president of the Birmingham Architectural Association), Mr. W. P. J. Fawcus (ex-president of the Northern Society of Electrical Engineers), Mr. W. A. Royle, Mr. C. H. Heathcote, and Colonel Eaton. There were also present Mr. A. J. Murgatroyd, Mr. H. Lord, Mr. Frank W. Mee (vice-president), Mr. John H. Woodhouse (vice-president), Mr. W. Goldthorpe (honorary legal adviser), Mr. John Ely, Mr. Edward Potts, Mr. J. Swarbrick, Mr. F. H. Oldham, Mr. J. D. Mould, Mr. C. R. Locke, Mr. J. J. Bradshaw, Mr. J. H. Reynolds (director and secretary of the Manchester Technical School), Mr. Paul Ogden (honorary secretary), Mr. P. S. Worthington, Mr. J. C. Prestwich, Mr. P. E. Barker, Mr. S. Taylor-Smith, and Mr. T. G. Barker. The President proposed "The Royal Institute of British Architects." The Institute, he remarked, was started in 1831, but it was not fairly founded until 1834, and it was constituted in the following year. At a later period the Institute was incorporated by Royal Charter. Its list of past-presidents included such honoured names as those of Sir George Gilbert Scott, Charles Barry, Sir Horace Jones, Alfred Waterhouse, and last, but not least, Professor Aitchison, who now enjoyed the distinction of being president for the third year in succession. The object of the Institute was the general advancement of civil architecture. It sought also to promote and facilitate the acquirement of the knowledge of the various arts and sciences connected with architecture. The Institute had a membership of some 1,600, and they had branches and corresponding members in every quarter of the globe. In Manchester, the society endeavoured to support and protect the character, status, and interests of architects practising in or

in the vicinity of Manchester, and to promote personal acquaintance and good feeling between the members of the society, to regulate professional charges, and to establish educational facilities for younger members and students by means of classes, lectures, offering of prizes, &c. In the absence of Professor Aitchison, the task of acknowledging the toast was accorded to Mr. Charles E. Bateman, president of the Birmingham Association. Colonel Eaton proposed "Allied Societies," to which Mr. Bateman and Mr. George Corson (president of the Leeds and Yorkshire Association) replied. Mr. C. H. Heathcote, before proposing "The Northern Society of Electrical Engineers," alluded to the loss which the Manchester Society of Architects had sustained during the past year by the death of Mr. Bridford and Mr. Gibbons Sankey. Mr. Fawcus (Northern Society of Electrical Engineers), in responding, referred to the arrangements in progress for developing the uses of electricity. It is proposed, he said, in the course of the next few years to spend between six and seven millions sterling on new works. Then electricity, instead of being a dear light and the luxury of the few, will be available at a far less cost than gas is now. Fivepence a unit was now charged, equal to about 3s. per 1,000 c.f.t. of gas; but if Parliament granted the powers asked of it, the charge would be brought from 5d. to 1½d. per unit, and even less for motive power. Mr. J. Ely proposed "Municipal Technical Education," which toast was acknowledged by Mr. J. H. Reynolds.

**SCARBOROUGH MASTER BUILDERS' ASSOCIATION.**—On Friday evening the annual dinner of this association was held at the Albemarle Hotel, when upwards of forty members sat down, the President (Councillor James Bland) occupying the chair. Mr. F. Horner gave "Our Trades," which was responded to by Mr. J. P. Richardson. Mr. Southwick gave "The Local Association," and Mr. A. Moore responded. The toast of "The Yorkshire Federation of Building Trade Employers" was given by Mr. C. Pecket, and responded to by Mr. A. W. Sinclair, the local representative of the association. During the evening a number of songs were given by Mr. G. W. Miers, Mr. W. Robson, the President, and other members.

**SHEFFIELD SOCIETY OF ARCHITECTS AND SURVEYORS.**—The ordinary monthly meeting was held on Tuesday night at the School of Art, when there were present Messrs. R. W. Fowler (in the chair), C. J. Innocent, E. M. Gibbs, T. Winder, C. M. Hadfield, W. C. Fenton, C. F. Innocent, T. Myles, J. C. Teather, J. R. Hall, B. Powell, C. F. Longden, C. B. Flockton, J. R. Wigfull, and others. It was announced that the council had arranged a series of lectures for the New Year by Mr. Hugh Stannus, F.R.I.B.A., of London. Mr. Beresford Pite, F.R.I.B.A., of London, gave lecture on "Michael Angelo's Architecture." He said that the accepted verdict of architectural historians and critics was that Michael Angelo's influence was detrimental to architecture. He then enlarged upon the extent and reasons of Michael Angelo's influence, the great architect's mastery of the arts of design in sculpture and painting, and the noble character of his intellect. The importance of St. Peter's at Rome was emphasised. Imitative followers without his powers or opportunities came after him. His practical faith in the unity of art was evidenced in his work in the three directions of sculpture, painting, and architecture. There were the "Madonna" in San Lorenzo, in Florence, and the "Pieta" in St. Peter's in sculpture, and the figures of the ceiling of the Sistine Chapel in painting, which were instanced as having a basis of constructive design, and expressing ideas of scale, grandeur, breadth, and dignity of line in composition. Those qualities also existed in Michael Angelo's architectural designs. The lecture was fully illustrated by drawings, photographs, and engravings. A hearty vote of thanks was given to the lecturer on the motion of Mr. C. M. Hadfield, seconded by Mr. C. J. Innocent, and supported by Messrs. E. M. Gibbs and the president.

**THE SOCIETY OF ENGINEERS.**—The annual dinner of this society, which was established in 1854, was held on Wednesday night at the Hotel Cecil, Mr. W. Worby Beaumont in the chair. After the loyal toasts, the Chairman proposed "The Navy and Army," to which Sir John Durston, R.N., and General Sir Oriel Tanner responded. Mr. A. J. Walter proposed "The Society of Engineers." The Chairman responded.

He said there were over a million people in this country living on the labours and invention of Stephenson and a few other engineers. He acknowledged the importance of financial organisers, and pointed out that, in spite of much that had been said lately, they had to depend upon the promoters of great enterprises for the funds with which to carry them out. Mr. W. H. Preece gave the toast of "Engineering Enterprise." He said if anyone wished to understand what that meant, they had only to think of the leaps and bounds which engineering had made in the last few years. Sir Benjamin Baker briefly replied. Other toasts followed. Opportunity was taken during the evening to present an address on vellum and a silver tea and coffee service to Mr. G. A. Pryce-Cuxon, who has been ten years Secretary of the Society.

**THREE TOWNS ARCHITECTS.**—The opening meeting of the third session of the Three Towns Branch of the Devon and Exeter Architectural Society was held on Friday evening at the Plymouth School of Art. The chairman of the branch (Mr. Charles King) presided. The hon. secretary, in his third annual report, stated that much time had this year been occupied with the discussion of phases of the competition question in a very practical form, which had been more particularly brought home to them by the competition for the Tavistock-road building scheme, initiated by the corporation. During the year many meetings on this subject had been held, and a deputation, composed not only of members of their own society, but including others, representing the whole of the practising members of the Three Towns, had waited on the town clerk; a great amount of correspondence had passed; and a memorial, numerously signed, had been presented. But, after all, the negotiations fell through, the result being that with one exception no practising architect of the Three Towns competed, in consequence of the conditions not being in accordance with architectural practice. Their objections to the terms of the competition were very reasonable indeed. The promoters required full detailed working drawings for about one-fifth of their proper market value, and, naturally, local architects declined to have anything to do with a competition on such lines. They were supported by the architects of Devonport (with the reception referred to), by the council of their parent society at Exeter, by the whole of the architectural Press, and by the Royal Institute of British Architects, who recently decreed that it was undesirable for a member of the Royal Institute to act as assessor in the Tavistock-road competition on the existing conditions. The outcome of this was that Mr. Crickmay, who was appointed to act as assessor by the corporation of Plymouth, respectfully declined the appointment. The remainder of the report recorded the election of Mr. H. G. Luff (Devonport) to the vice-presidency of the society, and the election of Mr. Priestley Shires on the council; the interesting visit to Oxford in June; the viewing of the new Palace Theatre, by the invitation of Messrs. Wimperis and Arber; and the hospitality of Mr. James Hine, F.R.I.B.A., ex-president of the parent society, in entertaining members at Launceston; offered congratulations to Mr. G. H. Fellowes Prynne, who was this year guiding the affairs of the Architectural Association of London; to Mr. Harbottle Reed, hon. secretary of the D.E.A.S., on his success as the Grissel gold-medallist for 1898; and to Mr. M. Alton Bazeley on his election to the Plymouth Town Council. In moving the adoption of the report, the chairman said that, during the heat of the recent municipal elections, Alderman Radford, a member of the Plymouth Town Council, attacked their profession generally in stating they had formed themselves into a kind of trade union in order to bring undue pressure to bear upon the council in connection with the Tavistock-road competition; that their action had considerably delayed the progress of the work, and that altogether they had placed themselves in a position which was not one of credit to them as professional men. That was answered very fully at the time. The unfair nature of the competition was recognised by the whole of the profession, some of the strongest remarks coming from the youngest members, and they were represented to the committee. Throughout the correspondence they had made a point of being as courteous and conciliatory as possible, and had recognised and acknowledged that the council had shown them a kindness in the first instance by limiting the



competition to Plymouth. Mr. Dwyer seconded, and the report was adopted. The report of the treasurer, showing a balance in hand, was also passed, on the motion of Mr. Bazeley, seconded by Mr. Richards. The chairman flatly contradicted the assertion that Mr. Bazeley was nominated in their interests to represent their views in the council. Mr. Priestley Shires observed that their recent attitude towards the corporation was of not merely local interest, and would have an effect upon other municipalities and competition promoters. It was rare for architects to be so united as they had been over that question. Some discussion followed as to the desirability of inducing more interest in the society on the part of younger members; and it was also agreed to hold a dinner next month.

#### CHIPS.

The Duke of Cambridge opened, on Monday, the Victoria Cottage Hospital, in Coombe-road, Kingston-on-Thames.

On Friday, Mr. E. A. Sandford Fawcett, Assoc. M.Inst.C.E., conducted a Local Government Board inquiry at the urban district council offices, Nuneaton, as to the borrowing of £3,500 for the widening of New Bridge-street. Mr. J. S. Pickering, surveyor, explained the proposals.

On Thursday in last week Mr. Frederick Yorke, M.I.E.E., Glasgow, visited Blairgowrie, and along with Mr. Lake Falconer, architect, examined various sources of power with a view to the introduction of electrical lighting into the town. Mr. Yorke expressed his conviction of the practicable nature of the scheme, and a syndicate is being formed with a capital of from £8,000 to £10,000.

The dissolution is announced of the partnership heretofore subsisting between G. M. Callender and H. Greville Montgomery, agents for the sale of bitumen damp-course, bitumen sheeting, and damp resistance solution, Victoria-street, Westminster, S.W., under the style of Callender and Montgomery, and as the Building Exhibition, Essex-street, Strand, W.C., under the style of H. Greville Montgomery.

The new pavilion just added to the workhouse infirmary at Lewisham for the treatment of patients mentally afflicted was opened by Mr. John Penn, M.P., last week. The building is in one block and a single story in height, divided by a central wall into two equal wards with entrance-halls in the centre, and at either extremity of the block is a day-room and acute ward, with w.c.s. beyond. Eight beds are provided in each large ward, and the total cost has been £3,698. Mr. Robert Williams, F.R.I.B.A., was the architect.

In the case of the application on behalf of Arthur Warr, of Birmingham, builder, an order of discharge from bankruptcy has been conditionally granted.

As a monument to officers and men of the Royal West Kent Regiment who died in the North-West Frontier of Indian Campaigns of 1897-8, a carved oak screen, designed by Mr. F. L. Pearson, has been placed in the south chantry chapel of All Saints' Church, Maidstone. The dedication took place on Saturday.

The new town-hall at Conway will be opened at Christmas time. It has been erected for the town council from plans by Mr. Richard Davies, Messrs. Thorpe and Sons being the contractors.

Major-General Crozier, R.E., held an inquiry on behalf of the Local Government Board at the Public Offices, Egremont, on the 7th inst., respecting an application by the Wallasey Urban District Council to borrow £57,403 for ferry and gasworks purposes and for street improvements. Mr. Travis, the surveyor to the urban council, explained the proposals.

Mr. Justice Bruce and a common jury heard on Saturday an action brought by John Dawkins, foreman at Portishead Docks, near Bristol, and his wife, to recover from Alan Bromley, building inspector, said to be employed in the borough surveyor's office at Sutton Coldfield, near Birmingham, damages for the loss of the services of their daughter, owing to the misconduct of the defendant, which he denied. The jury returned a verdict for plaintiffs, assessing the damages at £150.

An inquiry was held at Stafford, on Friday, by a Local Government Board inspector, with respect to an application by the town council for permission to borrow £5,000, for the purposes of the gasworks.

For three months past the organ at Lichfield Cathedral has been undergoing cleaning and improvements, and on Wednesday week took place its re-opening in its complete state. The instrument was built by Messrs. Hill and Son, of London, in 1884, and this is the first time it has been overhauled since its erection. The cleaning and improvements have been carried out by the builders, under the personal supervision of the organist, Mr. J. B. Lott, and tubular pneumatic action has been applied to the four keyboards and the pedals.

#### TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the BUILDING NEWS, 332, Strand, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

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The charge for advertisements for "Situations Vacant" or "Situations Wanted" is ONE SHILLING FOR TWENTY-FOUR WORDS, and SIXPENCE for every eight words after. All Situation Advertisements must be prepaid.

#### NOTICE.

Bound copies of Vol. LXXIV. are now ready, and should be ordered early (price Twelve Shillings each), as only a limited number are done up. A few bound volumes of Vols. XXXIX., XL., XLVI., XLIX., LI., LIII., LVIII., LIX., LXI., LXII., LXIII., LXIV., LXV., LXVI., LXVII., LXVIII., LXIX., LXX., LXXI., LXXII., and LXXIII., may still be had, price Twelve Shillings; and all the other bound volumes are out of print. Most of the back numbers of former volumes are, however, to be had singly. Subscribers requiring any back numbers to complete volume just ended should order at once, as many of them soon run out of print.

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RECEIVED.—J. W. F.—A. R. (Exmouth).—M. K. S. Co.—L. N. G.—M. M. and Son.—H. S. and Co.

## Correspondence.

### TAVISTOCK ROAD COMPETITION, PLYMOUTH.

To the Editor of the BUILDING NEWS.

SIR,—We have advanced another step, and continue to defend the front line intact. We sent the original correspondence on to the Competition Committee of the R.I.B.A.; the result is everything that can be desired, and we are very much obliged to the R.I.B.A., and especially to Mr. G. R. Crickmay for the support he has given to our action and the dignified status he has assumed with reference to the assessorship, and which is bound to accelerate the cohesive spirit so necessary in our profession, not only in the Three Towns, but throughout the United Kingdom. I certainly think if every town in England would only do as we have done, we should soon get on to the top side of this competition question. I understand the chairman of the special works committee of the Plymouth Town Council (Ald. Law), the town clerk and borough surveyor, have been appointed a committee to seek an assessor. I hope they won't find one under the circumstances. —I am, &c.,

B. PRIESTLEY SHIRES, Hon. Sec.,  
Three Towns Society of Architects.  
Plymouth, Dec. 12.

Messrs. Pease have decided to erect schools for the education of the children of their workpeople at Ushaw Moor, county Durham. Accommodation will be provided for 600 scholars, and the cost of the premises will be about £5,000.

## Intercommunication.

### QUESTIONS.

[12128].—Red Deal Doors.—I should feel much obliged if some joiner at the bench or foreman would tell me how many hours it should take a workman of average ability and quickness to make by hand labour doors of ordinary red deal, as in table herewith, for each door. I have worked out the time from Laxton and from Hurst's Constants. According to these authorities, the time seems excessive. I have omitted fractions. Doors 2ft. 8in. by 6ft. 6in. finished from the bench only:—

	Laxton.	Hurst.
2in. (nominal) five-panel double-moulded door .....	14 hours	22 hours
1½in. (nominal) ditto .....	13 "	19 "
1½in. (nominal) four-panel square door .....	9 "	13 "

—S. K. P.

[12129].—Floor Boards.—Which is really the most durable timber as far as decay is concerned—good white or the ordinary red flooring (probably prepared from Swedish timber)? I do not refer to American red or red Norway flooring. White flooring is generally specified for upstairs rooms, and red for ground floors. When it is remembered that there is frequently bright sap on the edges of the ordinary red flooring, it appears to me that it possesses, as far as dressing is concerned, no advantages over white for a well ventilated ground floor. Am I right?—STUDENT.

[12130].—Roof Construction.—Common practice dictates that ordinary wood principals of 25ft. to 45ft. span be placed from 10ft. to 14ft. from centre to centre. Now and then those distances are slightly exceeded. The practice often limits the scope of the original designer in planning. Why, in the days of rolled-steel girders 12in. to 14in. deep, cannot, where convenience of arrangement requires it, the purlins be of steel (clad, if need be, with wood), and then 20ft. to 28ft. centres could be adopted? Are there any practical difficulties? One has seen principals dispensed with in house-roofs where steel purlins, say, 20ft. span, have been used.—R. S. J.

[12131].—Fibrous Slab Decoration.—Which are the best nails or screws to use, and how should the slabs or pieces of decoration be joined? Any other details will oblige.—S. P.

[12132].—The Slide-Rule.—Do architects and engineers use the slide-rule in their calculations? As an aid to calculations of all kinds the slide-rule is useful, and I should like to know of any simple guide that will instruct me in this instrument. Logarithms and the slide-rule are, it has been said, two of the most valuable aids to shorten calculation and are, really, two modifications of the same system. Is a knowledge of logarithms necessary?—A. NOVICE.

[12133].—Plumbing.—Are there any practical works containing the requirements of the plumbing of large residences, including the hot and cold supply services to bath, sinks, and closets, wastes, and the disconnection or mode of fixing the pipes to allow of repair, &c.? An answer will oblige.—ARCHITECT.

### REPLIES.

[12114].—Keen's or Keene's Cement.—I am rather of the opinion that "Keen's" is the right way to spell the name in question. But it does not make any difference to the quality of the cement whichever way the name is spelt; and I am sure the spelling does not trouble the average plasterer, as he generally has other and more expressive names for it.—L. E.

[12117].—Law of Contract.—The question is not very clear as to whether A or B withdraws—I presume A. The second contract, being verbal, does not count for much. Before the question can be answered, the terms of the contract ought to be known. If the contract to C is a legally drawn-up contract, A can do so; but there is apparently a muddle somewhere. Why should it be necessary to take down part of B's work unless it is faulty? B would certainly have a right to protest against any interference on the part of a third party if there had been a proper contract.—OBSERVER.

[12118].—Fibrous Plaster Decoration.—If the core is a very small one, it may not be necessary to have any backing; but one of any size ought to have a backing on which to fix it.—LOUIS ERWOOD.

[12119].—Hydraulic Tables and Discharge of Circular Pipes.—These tables will be found in Molesworth's Pocket-Book. Other works contain tables also; this book is handy to carry about if it is required to do so.—L. E.

[12119].—Hydraulic Tables and Discharge of Circular Pipes.—There are tables published. Col. Moore's "Sanitary Engineering," just published by W. T. Batsford, gives tables of discharges of circular pipes. "Learner" would do well to procure the work, which is a very comprehensive treatise on the subject.—G. H. G.

[12120].—Cast-Iron Soil-Pipes.—Cast-iron soil-pipes are jointed with lead run in and caulked, the same as water-mains are jointed. Lead soil-pipe can be used if sufficient lugs are attached to it to prevent it slipping down, as lead will easily do.—L. E.

[12121].—Problem.—The problem can be solved by joining the given points to the centre of the given circle. Then on each line construct segments containing equal angles, and draw the loci of their intersections. Where the curve crosses circumference of circle is point required. There may be a more scientific way of solving the question, but this one is correct.—L. E.

[12123].—Commercial Values of Iron Ores.—"Max" will find information on the questions he puts by consulting a work like Miller's "Elements of Chemistry."—G.

[12125].—Dissolving Limestone.—Salammoniac will combine with the CO<sub>2</sub> and prevent its being evolved



as gas, while the calcium chloride will go into solution; but the action, I am afraid, will not be very rapid. This reaction is made use of in softening "hard" waters; but in that case the  $\text{CaCO}_3$  is already in solution in the  $\text{CO}_2$  dissolved in the water.—W. J. G. F.

[12126].—**Heating Power of Quicklime.**—I know of no tables such as "R. H. D." requires. A pure lime slakes violently, and with a great amount of heat, while an eminently hydraulic lime is a long time slaking, and evolves a small amount of heat. Limes will be found between pure and eminently hydraulic lime to give a varying amount of heat during the process of slaking.—L. E.

[12127].—**Origin of Coronation Stone.**—I have been given to understand that the stone referred to came somewhere from Scotland, and unless Jacob went there to repose, he never rested his head on the now historical block.—L. E.

[12127].—**Origin of the Coronation Stone.**—The late Sir Gilbert Scott, R.A., in his most interesting "Gleanings from Westminster Abbey" (1863), says:—"In Volume XIII. of the *Archæological Journal* will be found a most interesting article by the late Mr. Joseph Hunter, upon 'Edward the First's Spoiliations in Scotland, A.D. 1296.' In it we find . . . at the beginning of August he visited the Abbey of Scone, where the kings of Scotland had always been crowned, and where he found the 'fatal stone' inclosed in a chair. No stone ever had so wonderful a history; it was said to be the identical one upon which Jacob's head rested when, at Beth-el, he saw the vision of the angels, ascending and descending; it had from thence travelled to Egypt, from there to Spain, thence to Ireland, and, lastly, to Scotland. Moreover, King Kenneth caused the following distich to be engraved upon it:—

'Ni fallat fatum Scoti quocunque locatum  
Inveniet lapidem regnare tenentur ibidem.'

A prophecy which was, of course, fulfilled when James I. was called to rule over the whole island. There is a rectangular groove, 1ft. 2in. by 9in., on the upper surface, which may probably have received this engraved plate of metal. However, Edward had very different views on the matter. In his eyes it was both a precious relique and an emblem of sovereignty, which it was most desirable to remove from the eyes of the Scotch people; and accordingly we find it was removed, for shortly after his visit several inventories made mention of 'Una petra magna super quam reges Scocie solebant coronari' . . . The next thing that we hear of the stone is contained in a royal writ of July 1, 1328, addressed to the abbot and monks of Westminster, saying that the council had come to the determination to give up the stone, and enjoining them to deliver it to the Sheriff of London, to be carried to the Queen Mother. This resolution does not, however, appear to have been carried out, for the Scotch have never shown the stone to have been in their possession since Edward carried it off, and we Londoners have always been able to point to it." In "Illustrated History of Furniture," by Frederick Litchfield (1892), reference is made to the Coronation Chair (1296, 1300), and we read:—"The famous coronation stone, which, according to ancient legend, is the identical one on which the patriarch Jacob rested his head at Beth-el, 'when he tarried there all night because the sun was set, and he took of the stones of that place and put them up for his pillows,' (Gen. xxviii.) can be seen in the quatrefoil openings under the seat." Those who would read a very interesting account of the history of this stone are referred to the late Dean Stanley's "Historical Memorials of Westminster Abbey."—HARRY HEMS.

The new building of the Opera Comique at Paris, a mediocre building erected on the site of the former one from plans by M. Louis Bernier, was opened on Wednesday in last week. The best feature of the decorations is the ceiling, by M. Benjamin Constant; but the paintings on the grand staircase, by M. Flameng and M. Olivier-Merson, do not rise above the commonplace.

The extensive and heavily-stocked furniture warehouse and manufactory of Messrs. Scott and Son at King's Lynn were totally destroyed by fire on Friday afternoon.

The organ in the town-hall at Leeds was reopened on Saturday, after having been renovated and rebuilt internally by Messrs. Abbott and Smith, of that city.

At Twywell, Northamptonshire, last week, carved oak clergy and choir stalls and a tablet, which have been placed in the parish church as memorials to the late rector, the Rev. Horace Waller, were dedicated. They have been designed by Mr. J. C. Traylen, A.R.I.B.A., of Stamford, and carried out by Messrs. Harry Hems and Sons, of Exeter.

Mr. O. F. Giddy, an auctioneer, sued, in the Queen's Bench Division on Tuesday, the five daughters of the late Lady Watkin to recover compensation for the sale of an estate at Walton-on-Thames to which they became entitled on the death of their mother. The plaintiff had found a purchaser, but the defendants refused to complete. The jury stopped the case, awarding Mr. Giddy the £345 he claimed, and the Lord Chief Justice entered judgment accordingly.

Lord Roberts laid, on the 8th inst., the foundation-stone of the Soldiers' Victoria Hall and Institute on the Western Heights at Dover. The building is being erected at a cost of £2,000, from plans by Mr. Beeston.

The partnership heretofore subsisting between F. E. Preston and J. M. Wilson, architects and surveyors, of Rushden and Kettering, under the style of Preston and Wilson, has been dissolved.

## LEGAL INTELLIGENCE.

IN RE E. NICHOLLS.—At the Hull Bankruptcy Court on Monday, Edward Nicholls, contractor, Morecambe, and carrying on business in Hull, appeared for his examination. His statement of affairs revealed debts to the amount of £4,017 19s., and assets £1,817 4s. 4d., leaving a deficiency of £2,200 14s. 6d. Debtor accepted the contract for the laying of the Hesse-road electric tram section for the Hull Corporation, and attributed his failure during the time that work was in progress to errors in the measurement of the work done, owing to which he received a certificate for £500 instead of £1,500. The examination was adjourned to the January Court.

A DISPUTED CONTRACT.—Before Deemster Sir James Gell, in the High Court at Castletown, last week, John Kelly, master mason, sued Edwin Clark, farmer, for the cost of erecting a stone wall, 170ft. in length and 8ft. high, at the Close, Castle Rushen. The advocate for plaintiff stated that the contract price made by Kelly and accepted by Clarke for the building of the wall was 1s. 1d. per square yard. For the defendants counsel said he did not dispute the price or the length, but the work had to be done in a satisfactory manner and within a given time. The wall was not built in accordance with specification. His Honour decided that the matter should be settled by arbitration, and appointed Mr. John Cannell, T.C., builder, Castletown, arbitrator for the plaintiff, and Mr. John Robert Gelling, builder, Port St. Mary, arbitrator for the defendant, with instructions to report at a future court.

THE L.C.C. AND THE TRAMWAYS.—The arbitration between the North Metropolitan Tramways Company and the London County Council to determine the price to be paid by the Council to the company for the tramways recently acquired by the Council, was opened at the Surveyors' Institute, Savoy-street, on Monday. Lord James of Hereford was the sole arbitrator. At the request of the counsel on both sides the proceedings were conducted in private, and the witnesses and the representatives of the Press withdrew. The arbitration has lasted throughout the week.

ARE GRANITE SETTS "WROUGHT" STONE?—In the Queen's Bench Division on Friday the case of *Manuelle v. the Great Yarmouth Port and Haven Commissioners* came before the Lord Chief Justice, who was sitting without a jury. The plaintiff sued for the return of £75 13s. 4d., money paid to defendant as port dues upon 4,540 tons of stone imported from Aberdeen, Belgium, Jersey, and other places, in the form of granite sets, for the repair, as he alleged, of the roads at Norwich. The defendants charged a due of 6d. per ton, whereas according to plaintiff's contention the charge ought only to have been 2d. per ton. The defendants contended, on the other hand, that the stone being stone upon which a certain amount of work had been done to increase its value, the higher charge of 6d. per ton was the proper charge. The plaintiff said he had paid the higher charge under protest, but this the defendants denied. There was a long technical discussion between the learned counsel as to whether the granite sets being used for the repair of the roadway between the electric tram rails at Norwich came within the words in the schedule of charges which the defendants are entitled to make under the sixpenny head or under the twopenny head. Plaintiff's counsel argued that they came under the twopenny head, because in the words of the schedule they were "stones for the repair of roads, broken or otherwise." Defendant contended that the word "otherwise" referred to unbroken stone, such as pebbles which form the beach at Yarmouth, which were at one time largely used for the repair of roads; but these granite sets were stones upon which a certain amount of work had been done to increase their value, and they were therefore [rightly] classed under the sixpenny schedule. It was denied also that the work done on the tram-line could be properly called repair: it was construction. His Lordship, in giving judgment, said that the question whether the plaintiff was entitled to recover the money sued for depended upon the construction of certain words in the schedule of rates made under statutory authority, and in conformity with the authority of the Board of Trade. His Lordship pointed out that the Norwich Electric Tramway Company was bound to restore the road which they had picked up for the purposes of the tramway to the satisfaction of the local surveyor between the rails and for 18in. outside each rail, and this obligation was not for the benefit of the tramway works, but for the advantage of the public, as the whole space from footpath to footpath on each side remained a public roadway. Therefore it appeared obvious that the sets were imported for the repair of the roads, and therefore ought to come under the same head of the schedule as "stone used for the repair of the roads, broken or otherwise." As to the labour having been expended upon the granite sets, his Lordship did not think there was anything in that, as labour had also to be expended in breaking

stones. His judgment would be for the plaintiff for the amount claimed, with costs. Stay of execution granted to allow of an appeal.

ARBITRATION CASE AT SOUTHAMPTON.—A High Sheriff's inquiry was held at the Masonic Hall, Woolston, on Friday, to determine the compensation that should be paid by the London and South-Western Railway Company to Mr. Tankerville Chamberlayne for the purchase of lands at Woolston, in the parish of St. Mary Extra, near Southampton. The hearing was expected to be a protracted one, but early in the day a conference between the parties was held, and it was announced that the sum of £6,800 had been agreed upon. Sir J. Whittaker Ellis, Bart. (Messrs. Farebrother and Co., London), Mr. E. H. Bousfield (Messrs. Edwin Fox and Bousfield, London), Mr. Jas. Green (Messrs. Weatherall and Green, London), and Mr. E. Bance, Southampton, were surveyors who had been retained for the railway company, while Mr. Tuson (Messrs. Debenham, Tuson, and Farmer), Mr. Richard Austin, Mr. W. Burrough Hill, and Mr. C. Bovill Smith would have been called as the surveyors for Mr. Tankerville Chamberlayne.

THE RATING OF RESERVOIRS.—In the Court of Appeal, before Lords Justices A. L. Smith, Rigby, and Collins, the hearing was concluded on Friday of an appeal of the Hampton Urban District Council against a decision of a Divisional Court. The council had sought to rate at its full annual value a reservoir belonging to the Southwark and Vauxhall Water Company, for whom it was contended that the reservoir came within the meaning of a section of the Public Health Act, 1875, which provides that "land covered with water" is to be rated at a fourth of its net annual value. The Divisional Court upheld the contention of the company, and their Lordships now affirmed the finding of the Court below, and dismissed the appeal.

RE ARTHUR BURR.—A new first meeting of creditors was held on Tuesday under the failure of Arthur Burr, land agent, of Walbrook, E.C., and Bellagio. The debtor has been interested in the promotion of the Kent Coal Fields and kindred companies, and he has filed accounts showing total liabilities £94,654, of which £15,407 are unsecured, with an estimated surplus in assets of £230,557. Mr. A. E. Fox, chartered accountant, was appointed trustee of the estate, together with a committee of inspection.

## CHIPS.

Bermondsey Vestry have instructed their surveyor, Mr. Sumner, to obtain the assistance of an architect in order that plans may be prepared by which the second-class baths may be greatly improved. These, the oldest baths in London, are necessarily somewhat behind in the advantages which new institutions of a similar kind confer.

The Leeds city council have raised the salary of the electrical tramways engineer, Mr. John Burbridge, from £300 to £400 a year.

The city engineer of Nottingham has prepared a report to the corporation recommending the construction of a new south-eastern main thoroughfare, much on the lines of a scheme laid down by him 15 years ago, but never adopted. The cost would vary from £235,000 to £260,000.

At an extraordinary meeting of the shareholders of Stockport District Waterworks Company, on Monday, the action of the directors, in agreeing to dispose of the undertaking to the Corporation of Stockport on terms representing £785,000, was approved.

At Norwich, on Tuesday, the foundation-stone was laid in Unthinks-road of the new Jenny Lind Infirmary. The building will cost £5,000, and is to be built from plans by Messrs. E. Boardman and Son, of Norwich. The style is Free Renaissance, and the walls are faced with red bricks, stone being used for dressings, and Broseley tiles for roofing. Mr. T. H. Yelf, of Thorpe Station-yard, is the contractor.

The new bridge, erected by the district committee of the Aberdeen County Council, over the Ythan at Lewes of Fyvie, was opened last week. It has been constructed from plans by Mr. Watson, C.E., Mr. Fergusson, of Bogtama, being the contractor.

A social club in the village of Islip, near Oundle, was opened on the 8th inst. It has been erected by Mr. A. Traynor, of Islip, from plans prepared by Messrs. Blackwell and Thompson, architects, of Kettering. The building is of red brick, with Bath stone dressings, and is entered by a lobby leading to the committee-room, which is divided from the reading-room by a movable partition.

The Leeds City Council, after a long discussion, decided at their last meeting to call in Mr. Edwin T. Hall, F.R.I.B.A., of London, to prepare an outline block plan and a detailed report for enlarging the fever hospital on the Manston Hall Estate from 140 to 400 beds, together with nurses' and servants' homes and other administrative offices.



## Our Office Table.

THE London County Council received on Tuesday a report from the Finance Committee, submitting half-yearly statements of works executed by the Works Department up to September 30. Works commenced under the late management—i.e., prior to February 2, 1897, show an actual cost of £103,429, or £24,720 above the final estimates. Of this excess £22,924 occurs in the construction of the Lewisham sewer. Works commenced under the present management—i.e., since February 1, 1897, show an actual cost of £10,481, or £3,720 below the final estimates. Thus the total balance of cost above the final estimates becomes £21,000. The amount of work executed during the year 1897-98 is stated to have been £173,739, and that for 1898-99 is estimated at £240,000. A statement is given including all works executed by the department since its creation in November, 1892. The works commenced under the late management cost £760,202, being £50,239 above the final estimate. The works commenced under the present management and completed to September 30, 1898, cost £33,520, or £9,373 below the final estimate. Thus the total becomes an actual cost of £793,722, being £40,866 above the final estimates. Jobbing works, costing £82,140, were £6,186 below schedule value. Works completed to September 30, 1898, but not reported to Executive Committees, were originally estimated at £46,030.

THE Local Government and Taxation Committee of the London County Council announce that the supplementary valuation lists for the County of London coming into force on April 6, 1899, have been examined by the statistical officer in accordance with the usual practice, but they are unable as yet to give the complete figures. The total increase in the supplemental lists as far as they have been examined is—gross, £540,797; ratable, £438,994; and assessable, £439,214. The principal increases in ratable value (parish and union) are as follows:—Wandsworth and Clapham Union, £56,630; Holborn Union, £43,367; Fulham Union, £39,550; Lewisham Union, £35,677; Hackney Union, £28,075; Greenwich Union, £26,874; Hampstead, £26,747; Kensington, £19,546; Islington, £17,892; Camberwell, £16,931; Strand Union, £15,689; St. Saviour's Union, £15,647; Chelsea, £13,072; Woolwich Union, £11,698; and Lambeth, £10,503. No alterations have occurred rendering supplemental lists necessary in Lincoln's-inn, Charterhouse, and Staple-inn. Several errors have been discovered in the course of the examination of the lists; but these, which do not involve large amounts, have been corrected by the assessment committees. The valuation lists are now drawn up in the form prescribed by the Local Government Board for the purposes of the Agricultural Rates Act.

At a meeting of the executive committee of the National Trust for Places of Historic Interest, held at 1, Great College-street, Westminster, the question of the ownership of the Medieval well of St. Winifred, at Holywell, Flintshire, was discussed, and it was decided to ascertain in whom the right of taking water from the well was vested. The proposed inclosure of the public recreation ground at Alfriston, in Sussex, was also discussed, and the chairman (Sir Robert Hunter) said he was advised that the parish council had no legal right to inclose the Tye, or consent to its exchange for other land. The committee undertook to draw up a set of regulations for the use of the public recreation ground, comprising the site of Duffield Castle, which is to be presented to the public by the Hon. Edward and Frederick Strutt, the ownership being vested in the National Trust.

UNDER the superintendence of Mr. George Farren, M.Inst.C.E., ex-president of the Liverpool Engineering Society, a monster blast took place in the quarries of the Welsh Granite Company, Limited, Trevor, Carnarvonshire, on Wednesday week. It is the first large blast undertaken in North Wales to obtain good workable rock. The quarry is situated at 600ft. above sea-level, and the bank to be operated on was 100ft. high. The plans of operations consisted in driving in a heading about 15ft. above the level of the bank, and 53ft. long. Another heading, 23ft. long, was driven from this, and a chamber formed there. A second tunnel, 29ft. long, was driven to the right, and a chamber formed at the end. Duplicate high-tension fuses

were employed, and a long cable was laid to the cabin. There was very little report, which, of course, is good, and by measurement it was found that about 80,000 tons of rock was displaced, and fell on the bank exactly as prepared to receive it. A further quantity of 20,000 tons has been loosened. There was 6½ tons of powder used as an exploding charge, and a small Siemens dynamo of 400 volts was used as the exploder. The whole arrangement was successful.

THE Registrar-General for Ireland has submitted to the Lord Lieutenant a general abstract of forestry operations in Ireland during the year ended June 30, 1898. Since 1857 the acreage of land in Ireland under woods and plantations has been ascertained annually in connection with the agricultural statistics. During the period 1851-98 the number of acres under woods and plantations varied from 304,906 in 1851 to 339,858 in 1880. The acreage in 1898 was 308,161. During the year 1897-98, 1,431 statute acres were planted with trees. In 1897 the total area planted was 1,134 acres. The total number of trees planted on 1,431 acres in 1897-98 was 2,691,082. Larch, fir, spruce, and pine were the trees chiefly planted. The total number of trees felled both for clearance and thinning plantations was 671,962. The total area cleared was 1,102 acres. Of the 671,962 trees felled, 270,133 were used for propping, which appears to have been the chief purpose to which the timber of almost all descriptions was applied. Of 169,799 trees felled the only information afforded by the returns is that they were exported.

THE Corporation of Glasgow discussed at great length at their last meeting the clauses of the Local Buildings Regulations Act Amendment Bill. A determined, but unsuccessful, effort was made to drop the Bill altogether, and the first three clauses were approved without alteration. The fight raged fiercely around clause 4, which seeks to regulate the height, and this had not been passed, although several hostile amendments had been rejected, when the meeting was adjourned. The draft clause provides that "in a street of a less width than 40ft. from building-line to building-line no building of the warehouse class shall be erected in, on, or adjoining such street of a greater height than the width of such street from building-line to building-line, opposite the site of the building to be erected. In a street of a width of from 40ft. to 60ft. from building-line to building-line the buildings of the warehouse class to be erected in, on, or adjoining such street may be so erected to a height equal to the width of such street, and one-fifth more of the said width, and in the case of a street of a width exceeding 60ft. from building-line to building-line, the buildings of the warehouse class to be erected in, on, or adjoining such street may be so erected to the height of 80ft. In each of the cases referred to in this section the height shall be exclusive of ornamental towers, turrets, or other architectural features or decorations."

MUCH interest has been created among geologists by the discovery in the yards of the Peterborough New Bricks Company, at Fletton, of the skeleton of an unusually large prehistoric saurian. The bones were encountered in the clay deposit nearly 20ft. below the surface of the ground. Mr. A. Keeble, member of a well-known Peterborough firm who have to do with the brickyards named, at once communicated with Major Leeds, of Eye, who has since carefully superintended the recovery of the remains. The skeleton, so far as has at present been ascertained, measures some 50ft. in length. The tail is 16ft. long, and one of the foreleg joints is 4ft. long and about 2ft. in diameter.

THE Duke of Portland has offered to pay one-half of the cost of the proposed sea-wall or esplanade at Troon, provided the total estimate did not exceed £9,000.

THE officials of the New Brighton Tower Works and several friends have just presented to Mr. J.W. Davidson, who until lately was the general foreman of the Tower Works, a gold watch, chain, and pendant, as a mark of regard and esteem.

MR. Weale, the late Keeper of the Art Library at South Kensington, having been retired by the authorities of the Science and Art Department after having given evidence before the Royal Commission, on the ground that his services were no longer required there, has been engaged by the Trustees of the British Museum to compile a catalogue of the bindings in the Department of Printed Books and Manuscripts.

## MEETINGS FOR THE ENSUING WEEK.

MONDAY.—Royal Institute of British Architects. "Application of Electrical Power to Practical Purposes in Buildings," by H. A. J. Burstell; and "Practical Hints on Production and Use of Electricity for Lighting Country Houses," by Bernard M. Drake. 8 p.m.

The Liverpool Architectural Society. "Saracenic Architecture," by R. Talbot Kelly. 6 p.m.

Leeds and Yorkshire Architectural Society. "Sienna and Baldassare Peruzzi," by F. W. Bedford, A.R.I.B.A. 6.30 p.m.

Northern Architectural Association. "A Cistercian Abbey," by the Rev. D. H. S. Cranage, M.A., F.S.A. 7.30 p.m. Bristol Society of Architects. Revision of by-laws, and suggestions for improving the Society.

TUESDAY.—Institution of Civil Engineers. Discussion on "The Ventilation of Tunnels and Buildings" and a paper on "High-Speed Engines," by John Handley Dales, Assoc.M.I.C.E. 8 p.m. Special General Meeting of Corporate Members at 9.15 p.m., to consider, and, if approved, enact a Supplemental By-law.

THURSDAY.—Carpenters' Hall, London-wall. Prize Distribution by His Grace the Duke of Fife, K.G. 8.30 p.m.

FRIDAY.—Institution of Civil Engineers. "The Kentish Town Widening, Midland Railway," by Walter Daniel, Stud.Inst.C.E. 8 p.m.

## CHIPS.

In the case of David Powell, of Cardiff, builder, the order of discharge has been suspended for four years, ending July 17, 1902.

The Salford Corporation at their last meeting adopted plans for two convalescent blocks to be added to the sanatorium, estimated to cost £19,550.

The first sod of the new branch railway into Deptford Foreign Cattle Market was turned on Tuesday. The line of railway will be about 1,100 yds. in length, and single. It will enter the market at the Grove-road entrance, and will be continued along the various avenues in front of the slaughter-houses and chill and storage rooms. The plans for the railway have been drawn up by Sir J. Wolfe Barry, and the contract for that portion between the Deptford Wharf and the Grove-road entrance has been let to Mr. J. Strachan, contractor, of Cardiff. The contract for the railway within the market will be let next week. The cost of the railway, including the property to be acquired, will be between £30,000 and £32,000, while the extensions of the market about to be undertaken involve an expenditure of £67,000.

At Christ Church, Plymouth, on Tue day, the Bishop of Crediton dedicated a stained-glass window, the work of Messrs. Fouracre and Sons, of Stonehouse, Devon, and also reopened the organ, which was destroyed by a storm on May 1, and has been rebuilt by Messrs. Hele and Co., of Plymouth.

During the past year the Primitive Methodists have erected fifty new churches. Forty-seven are in the United Kingdom, one in Australia, and two in New Zealand. The value of these new churches is £68,522, and more than half of the cost has been paid. The extra sittings provided number 12,235.

The parish church of All Saints, Brixham, was reopened on Friday after complete restoration, including re-roofing. Mr. J. T. Micklethwaite, F.S.A., of Westminster, was the architect; and Messrs. Yeo, of Torquay, were the contractors.

The Duchess of Devonshire performed the inaugural ceremony on Wednesday in connection with the gift of two hospitals, a general and an infectious institution, by the late Sir Joseph Whitworth to the Darleydale and Matlock district. The hospitals have cost upwards of £25,000, and will be opened on Jan. 1.

Before the Board of Trade on Wednesday, opposition was offered on behalf of the Great Western Railway Company to a scheme promoted by the London United Tramways Company under the Light Railways Act for an electric tramway from Hanwell to Uxbridge in connection with their authorised lines. The Light Railway Commissioners have passed the scheme, which is opposed by the Great Western on the ground that it is a case of direct railway competition, and ought to go to Parliament in the regular way by Bill. The decision of the Board of Trade was reserved.

An arbitration was opened at Brighton on Wednesday before the Deputy Sheriff and a special jury. The Brighton Corporation are seeking to acquire compulsorily 57½ acres of agricultural land at Shoreham for waterworks purposes, and Sir Edward Clarke, on behalf of the owner, put in a claim for £62,000, based on 25 years' purchase for royalties on water calculated to be drawn at 1d. per 1,000 gal. At the conclusion of Sir Edward's speech the Under-Sheriff and jury proceeded to Old Shoreham to view the property, and the hearing was adjourned.



# THE BUILDING NEWS

AND ENGINEERING JOURNAL.

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FRIDAY, DECEMBER 23, 1898.

## BUILDING BY-LAWS AND THEIR ADMINISTRATION.

**T**HAT the administration of the building by-laws in our large towns and throughout the country is in a very unsatisfactory condition few will be inclined to dispute. Provincial architects complain, and not without just grounds, of the vexatious and trumpery variations that exist in building regulations; that while in one district or town the architect's plans will be passed without demur, in an adjoining district or town they will be rejected. For example, it is not uncommon to find a petty objection taken to brick and timber constructions by one local authority in the neighbourhood of a large city like Birmingham, whereas in the adjoining district no objection is raised. And so of many other by-laws. No doubt it is true that in several cases different interpretations are put on the same by-law. One surveyor will take a very narrow and restricted view of the meaning of a certain regulation, like that referring to the bearing and support of bressummers, or to the disconnection of main drain to air inlets, or open space at rear of building, or the height for habitable rooms, in each of which cases some reasonable degree of option ought to be given to the surveyor or the local authority. Another authority will allow departures from the obvious meaning of the by-law. These divergent views are very distracting to architects who, on the one hand, wish to comply with all reasonable rules, and to make them harmonise with architectural considerations, and on the other hand are scandalised by seeing "jerry" builders and other irresponsible building owners ignoring all sound construction. The deputation from the Royal Institute of Architects which visited Birmingham the other day on the invitation of the Architectural Association of that city for the purpose of considering the new building by-laws which are about to be framed, will have done good service if they succeed in calling attention to the manifest want of uniformity of the by-laws of Birmingham and the surrounding districts. Unfortunately, any representation by architects has its disadvantages. It is regarded by corporations with some suspicion as possessing an interested bias, and local authorities, especially the smaller ones, like to assume an arbitrary and dictatorial attitude in matters of building. Many of the members of urban boards are owners of property in the borough. Mr. Henman's paper, reported in our last issue, is written from the architect's point of view, and while pointing out undoubted defects and weaknesses in the by-laws and their administration, no doubt will tend to aggravate this view. It runs counter to local prejudices, and criticises the model by-laws, which, Mr. Henman rightly says, are confused in arrangement, and go too much into detail on matters of minor importance. The district by-laws are set forth in a confusing manner, especially when local Acts affect building. The district surveyors in many cases are alleged to be selected from road surveyors, with little knowledge of building construction or architectural propriety, and have the idea that architects are their natural enemies. The paper alleges these surveyors devise means to give the architect trouble and to waste their time, whereas the "jerry" builder is allowed to go scot-free. These are sufficiently grievous charges to make against

local authorities and their officials, though many of them are just—to provoke a kind of local dislike to architectural interference, or at least a retaliatory attitude. Small local authorities have a liking to put laws into force, and to exact obedience to them in a rather vexatious manner; and there are some officials of a very unconciliatory temper. Be that as it may, there must be building by-laws enforced, and the architect cannot complain if the unscrupulous "jerry" builder is made to suffer for his ignorance or presumption. No competent architect ought to object to any enforcement by statute of sound construction;—rather, he ought to welcome it with satisfaction. But there are a few members of the profession who oppose statutory enactments with the same feeling as the most evasive builder. Whether it be simply because they dislike restriction of any kind, or are ignorant of the provisions of the Act, we do not know; but we have heard it alleged on good authority that architects are often the greatest sinners, and are most disloyal in their observance to local by-laws. Notwithstanding these allegations, building regulations are often framed on local Acts, or are interpreted by them. Local authorities try to obtain arbitrary powers, and a fussy kind of administration is the consequence, very prejudicial to any architectural freedom. There are vexatious restrictions placed on such things as bay-windows, gables, half-timber, concrete, and other features that arouse resentment, yet we are ready to admit that building regulations should be strict and prohibitive of defective construction.

The breaches of by-laws by local builders are frequent in Birmingham and other large towns. In one case no fewer than five different charges were brought against one builder—first for covering up drain to fresh-air inlet without notice for its inspection; second, for a zinc ventilating shaft instead of one of iron; third, that he constructed an internal closet without having deposited plans and obtained approval; fourth, for putting in a drain underneath a building where it could be laid outside; for allowing house to be occupied without sending in completion notice. Many similar contraventions of the by-laws occur every week. Bad or defective joints are found repeatedly in drains of a certain description of property. Erecting buildings without depositing plans is also a very common delinquency, and one which involves loss of time and costly litigation on the part of authorities and the owners.

But it is the want of uniformity in the enforcement of building regulations that the architect and the public have most to complain of. They do not like to be interfered with about some minor point in one district which in another is allowed. We are not now speaking of local variation in dealing with materials and methods of working; but, of course, a certain latitude should be permitted, as, for example, in a stone district the by-laws should be framed with special reference to stone conditions. Such variations are absolutely necessary, and every architect would appreciate them; but what he cannot tolerate is that his design should be called into question for some trifling irregularity, such as the building of a cavity wall or an ornamental gable, or the non-submission of a drawing, when precisely similar buildings have been erected under the same conditions or the same regulations. Some little petty-fogging detail about a shop-front is enforced in one case but not in another, or a little irregularity is objected to here, when a much greater evasion of the local by-laws is unblushingly allowed in the same street.

In a few great towns by-laws have been formed to meet architectural requirements. The Manchester building by-laws are well abreast in modern details. Half-timber

walls are permitted, much after the model by-laws, a distance of not less than 15ft. from any adjoining building being required. The filling-in between the timbers may be of concrete, rough cast, or other non-combustible material. Then the Manchester by-laws allow cavity, or double walls, to the stories of dwelling-houses below the level of the ground, and prescribe the kind of ties (galvanised iron) and their distance apart. One of the bones of contention in many of the local by-laws is the meaning attached to certain terms like "party-wall" or "topmost story." In Manchester, parapets to external walls of buildings of certain kinds, over 30ft. in height and within 15ft. distant of any other building, are to be carried up a foot at least above highest part of roof; floor and ceiling joists have their scantlings prescribed. The spaces about buildings, and the provisions as regards drainage, are also matters which require careful framing.

The author of the paper to which we refer deals with another aspect of the question—the employment of district surveyors in carrying out buildings such as hospitals, baths, markets, libraries, and even municipal offices. No doubt this has long been a cause of ill-feeling between architects and local officials. The practice is seldom justified by results. Exceptions there are; but these rather bring more into light the defects as a system. The architectural hack is engaged to make the design to suit the surveyor's plan—an arrangement that is acceptable to the council, though how far these employments are remunerative to the ratepayers is certainly questionable. So long as borough surveyors are allowed to take private practice, we are afraid this ill-feeling between them and the profession is likely to remain. Of course, there are two sides to this question of the interference of surveyors with architects' plans. As one or two speakers hinted, there was a certain amount of tact necessary. If the architect went about it the right way, he generally got what he wanted; the committee of appeal usually listened to reasonable requests. That the by-laws are inelastic when evasive builders try to break through them or deny their force cannot be questioned. To more reasonable and conciliatory men who care to appeal to the surveyor or committee, the regulations are often found elastic enough to meet a special case. The only way out of the present difficulties is for towns about to adopt the by-laws to call in the aid of architectural bodies like that of the Birmingham Association, and obtain the opinions of the local architects, and for district councils to confer among themselves. A certain degree of uniformity is desirable in every great city; for, as Mr. J. Cotton, of Birmingham, said, what they could do in one town need not be the measure of what they could do in another. The by-laws should vary to suit local conditions. Mr. Gordon Smith, architect to the Local Government Board, pointed out how it was that Birmingham, having special powers under the Consolidation Act, might frame laws that the suburban districts could not copy, and he suggested a conference of the local authorities of the neighbourhood to frame a code—the only way to insure agreement and unification.

## MODEL SPECIFICATIONS.—XLIV.

DECORATIVE PLASTER-WORK, PLUMBING.

**B**ACKINGS or foundations for ornamental ceilings are necessary. Concrete surfaces may be left rough for ordinary plaster ceilings, or hacked over. For securing fibrous plaster or papier mâché decorations, fixing-blocks are necessary while the concrete is laid. Panel mouldings can be planted after the ceiling is set. These mouldings or ribs can be "run" or cast in pieces and planted on. As a foundation Portland cement and coarse stuff may be used. For fibrous plaster



slabs and papier maché battens are desirable, the fixing being with brass screws. These fabrics have advantages for moulded ribs and panels, as they can be cast in large sections, and can be fixed with a degree of accuracy unattainable in plaster-work. The most delicate scroll or strap-work and low relief ornament can be put up, though they are often too elaborate. Modelled plaster-work is a thing of the past, and competent modellers are necessary for the highest class of work. For consoles and projecting decorations lattice brackets or metal lathing become desirable. Panelled beams can be run in two parts, or fibrous plaster on canvas, wire, or wood be used instead.

We now give a few details of decorative plaster-work. Sketch 1 represents a coved or domical ceiling of a hall or saloon for which fibrous plaster or papier maché decoration can be applied. The curved portion may have a cradling of wood or be metal-lathed. No. 2 shows an enriched cornice of papier maché or fibrous plaster with enrichments, and 3 a hall cornice with modillions; A is a frieze of the "Asbestos Patent Salamander" decoration. The other sketches show ribbed ceilings.

Imitations of marble are not to be recommended for good work. Of these Scagliola is the best known, made by mixing fine plaster of Paris with size, and various colours stirred through the mass. With the powdered gypsum prepared and thus mixed, the plasterer applies it on the shaft of column over a "pricked up" coat of lime and hair, and then the surface is floated with wooden moulds made to the proper size, the workman using the tinted plaster necessary, which becomes mingled during the floating operation. The first coat or "pricking up" may be done on metal lathing or "expanded metal," leaving an air-space between the iron or core and the plaster. One authority thus describes the process. "Generally a cradle is formed of wood, lathed and 'pricked up' with lime and hair mortar. After set and dry, a floated coat is put on consisting of plaster of Paris mixed with various colouring matters in a solution of glue or isinglass to give solidity and prevent the plaster setting quickly. When the surface is hard it is rubbed with pumice-stone, being kept damp and clean with a sponge; it is then rubbed with Tripoli and charcoal, then polished with a felt rubber dipped in Tripoli and oil, and lastly, finished by means of a piece of felt dipped in oil."

49. *Decoration of Saloon.*—The walls and ceilings of saloon (or buffet) to be decorated with carton pierre (papier-maché or fibrous plaster) according to the architect's design, who will prepare full-size details of all enrichments, mouldings, and ribs, for the use of the modeller, who is to prepare models of each portion for approval. Fur up where required, and fix the carton pierre (or fibrous plaster) ceiling in squares of 24in. (or more) upon the floated plaster (or boarded) surface prepared to design, marked A on plan (or p.c. 30a. per yard super.); fill up joints with plaster of Paris, and leave perfect. The cornice B to be moulded to profile, and put up in lengths of —ft., fixed to wooden brackets 12in. or 18in. apart with galvanised screws. The ornamental frieze C in relief, with frieze mouldings, to be fixed with galvanised screws to fillets plugged to wall, and to be neatly stopped with plaster of Paris. All the mitres, internal and external, to be true cut. The filling D and dado E to be of carton pierre or fibrous plaster, made in panels, and fixed to battens (or backing) with brass screws. Fill up all joints with plaster of Paris, and leave perfect. Or—

The decorations to be executed by the Plastic Decoration and Papier Maché Company, Wellington-street, under the architect's direction, and according to designs selected by him.

50. *Consoles, Brackets, &c.*—The consoles and modillions to cornice of hall to be carefully modelled from the architect's drawings, and the moulds or plaster casting to be submitted to him for approval. Or—

The consoles to be made in papier-maché or carton pierre, according to architect's design or pattern selected, and to be sharp and clean, and to be fixed in cornice upon proper grounds or

wooden brackets; or to be of fibrous plaster, moulded upon a backing of wire or coarse canvas.

51. *Coffered Ceiling and Pilasters.*—The coffered ceiling and circular panels round lantern to be formed with plaster of Paris on a backing of canvas put up in pieces, and fixed to wood joists or brackets. The fluted and ornamental pilasters and panelled dadoes to be of fibrous plaster cast in moulds on coarse canvas or wire backings, and fixed by brass screws to wood battens and prepared grounds (or cradlings), and neatly stopped. The work to be prepared under the direction of the architect, and according to his designs. The ornamental relief to be clean and sharp.

52. *Centres.*—Fix securely in centres of ceiling (or soffits of coffer) ornamental centres (or rosettes) of carton pierre or fibrous plaster, 18in. or more diameter, from special designs of the architect, with brass screws to wood joists.

53. *Scagliola Work.*—Execute in the best scagliola composition the shafts of columns, pilasters, &c., in the hall or reception-rooms, the plasterer providing the wood furring and cradling necessary for the same. The shafts to be in imitation of Sienna (verde antique or other marble), the caps and bases to be executed in Keene's cement, and the whole to be brought to a high polish and left to architect's satisfaction.

54. *Scagliola Columns.*—The columns and pilasters in hall (or saloon) to be executed in scagliola to imitate marble. The shafts to be formed of cradling lathed (or expanded metal lathing), and to be "pricked up" with lime and hair mortar. The floated coat to be of the finest plaster of Paris or powdered gypsum, mixed with the necessary colouring matters and size, and to be floated with wooden moulds of the required size. The shaft to be rubbed with pumice-stone and polished with Tripoli powder and charcoal to bring it to a fine polish with pure oil. The whole to be executed in the best and most artistic manner to the architect's satisfaction (or the shafts and pilasters to be executed in the best scagliola by an approved firm of manufacturers or scagliola workers).

55. *Sgraffito Decoration.*—The following is a specification of sgraffito work: The wall or gable to be decorated in sgraffito according to the design or cartoons prepared full size. Hack off old plaster from wall, and rake and sweep out the joints. Well saturate or damp the wall. Render the wall with a coarse coat of two or three of sharp clean sand and one of Portland cement, about  $\frac{1}{2}$ in. thick, and leave coat rough for next coat. When set, fix cartoon by nails and pounce through the pricked outline of design, and remove cartoon, replacing the nails. Mark in with chalk spaces for the different colours, as shown by the impression on coarse coat, and lay the several colours of the colour coat, composed of one of colour, one and a half of old Portland, laid  $\frac{1}{2}$ in. thick, according to outlines. Roughen the surface, and when set follow with

final coat of Aberthaw lime and selenitic cement, sifted through fine sieve—only as much as can be cut and cleaned up in a day. Fix up the cartoon in its right position, pounce through pricked outline, remove the cartoon, and cut the design on the surface coat before it sets, cutting through the different colours. (Distemper colours, such as yellow ochre, Indian red, manganese black, and lime blue should be used in the colour coat; for the final coat Parian cement sifted may be used).

#### PLUMBER.

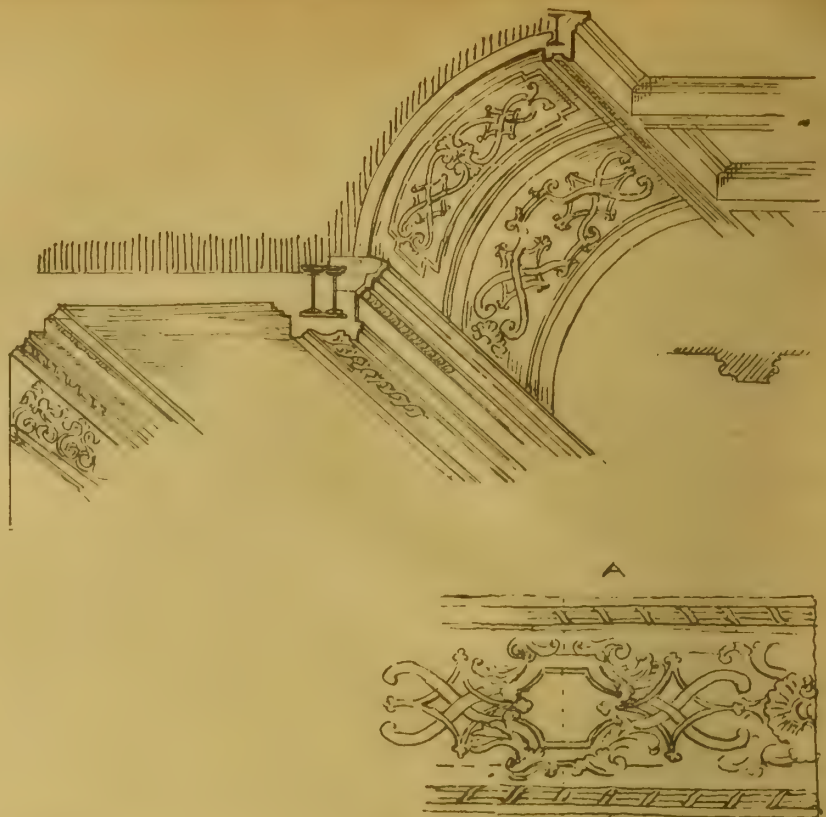
This is a very important trade, and is often very inadequately described. We refer the student to special treatises like S. S. Hellyer's work on lead and lead-work. We now give notes on external plumbing. Sheet-lead is to be milled, and of uniform thickness, free from cracks and other defects. The architect should have samples of the sheet-lead to be used for special purposes, or be permitted to cut out samples from any leadwork laid, allowance to be made for such tests and replaced sheets.

Milled lead is rolled in sheets 25ft. to 35ft. long, 6ft. to 7 $\frac{1}{2}$ ft. wide, and is made from 11lb. to 12lb. per super. foot. Thickness ought to be looked to; 5lb. lead has a thickness of .085in.; 6lb., .102in.; 7lb., .118in., &c.

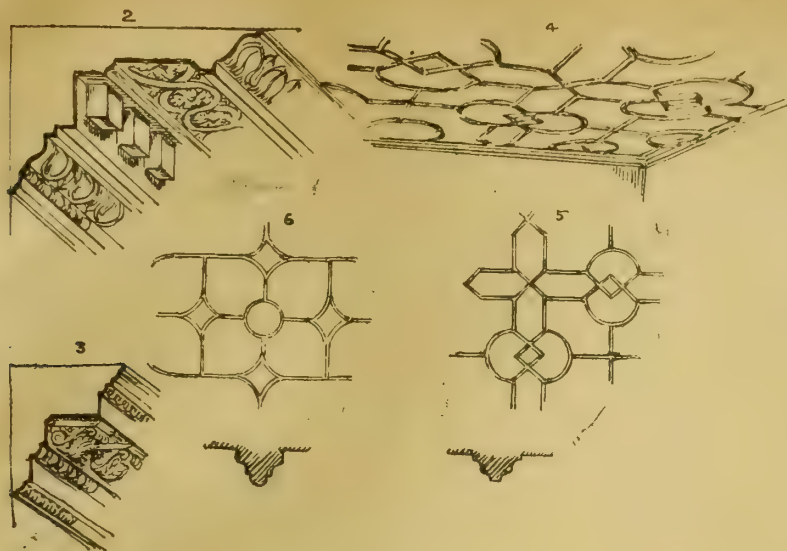
It is desirable to describe the weight of lead solder, wall hooks, copper nails, width of flashings, laps, aprons and their width and position, weight of lead and width of stepped flashings, and where to be placed, the weight of lead for gutters, how many inches to turn up against walls, roof, &c.; width of narrowest part of gutter, their fall per 10ft. run, the weight of lead lining to cesspools, socket diameter of pipe; also to give weight of lead, inches of lap, &c., to hips, valleys, ridges, lanterns, lead flats.

For good work the following weights of milled lead should be used:—

Hips, valleys, ridges, &c., 6lb. per foot to 7lb. For roofs, flats, main gutters, &c., 7lb. to 8lb. Flashings, aprons, seatings to columns and girders, soakers, &c., 5lb. per foot. This should be the thinnest for flashings. Sinks, cesspools to gutters, &c., 7 to 8lb. per foot, the latter weight for bottom of cisterns and sinks. Seatings to stone, iron girders and columns, secret gutters, &c., 4lb. per foot. Soil-pipes should be equal to 8lb. sheet lead. The L.C.C. requires that branches







of lead or iron to iron soil-pipes to be made with brass ferrules. Iron soil-pipes are desirable where hot water is used, and no iron soil-pipe should be less than  $\frac{1}{2}$  in. in thickness. The L.C.C. prescribes 4 in. soil-pipes for 4 in. drains, and nothing less than  $3\frac{1}{2}$  in.

For cisterns galvanised iron may be specified, or earthenware cisterns. For hard water lead cisterns may be used, but not for soft water. The cistern (if only one), and used for the hot as well as cold water supply, should be large enough to keep the circulating system going as well as the cold water services.

**Notes for Specification.**—In laying sheet-lead the grain of the wood boarding should be laid parallel with the current, and the boarding should be quite even. Narrow battens should be used for gutters. Lead should be laid so as to be free to expand or contract, and therefore nailing is to be sparingly used, and soldering should be avoided, so as to prevent buckling under the sun. In gutters and flats the lengths of lead ought, according to one authority, not to be more than 7 ft., and the fall of gutters should not be less than  $\frac{1}{4}$  in. in that length. Flashings are secured by small fillets of cement in the mortar joints of brickwork and by lead wedges, the open joint between them pointed in cement. In stone, "raglets" or grooves are made  $\frac{1}{4}$  in. deep, to receive edge of lead flashings.

**Stepped flashings** are usually 12 in. wide—6 in. of it on roof and 6 in. against wall—about 6 ft. in length; the upper edge is turned  $\frac{1}{4}$  in. into the joints of brickwork, raked out, and secured by lead wedges, and the joints stopped in cement. The lower edge of lead is free to contract or expand.

Specify lap joints for vertical and inclined surfaces not less than 4 in. and 6 in. respectively. For flat roofs the lap should be more, and a groove be sunk in boarding to form a water groove. For very flat roofs drips ought to be specified.

**Drips.**—These should be 2 in. or 3 in. deep: when less a groove should be made in boarding to form a water check, and to prevent capillary attraction. We shall show sections of ridge rolls and the way the sheet-lead is dressed (illustrations in our next). No sheet should be greater in length than 10 ft. without a drip. Wood or lead wedges are used to secure lead flashings, and copper tacks are used to avoid solder.

**Rolls.**—Wooden rolls are used at the ridges of roof, and on flats  $\frac{1}{2}$  in. or 2 in. diameter, fixed at the joints, and the sheet lead is dressed round the roll so as to break the joint and form a lap. It is well dressed into angles of roll, and the upper sheet forms an overcloak on one side—or one sheet is dressed

up over the roll on the inside, and the other over both of them on the outside.

#### EXTERNAL PLUMBING.

1. **Generally.**—The plumber to provide all solder, copper nails, oak and lead wedges, wall-hooks, and everything necessary to the performance of the work, and to leave the work perfect to the satisfaction of the architect, and in accordance with any by-laws or regulations of the local authorities and water company. Give all necessary notices to the water company, and pay all fees for making connections with main. The whole of the work is to be tested at the expense of contractor, at such time and in such manner as the architect shall decide.

2. **Flats and Gutters.**—Except in special cases the flats and gutters to have a fall of  $\frac{1}{4}$  in. to 10 ft. at the least. The work to be done with sheets 10 ft. by 3 ft. 6 in., to be secured in rolls with bossed ends and drips. No solder to be used, and all nailing to be with copper nails. The lead gutters, shown in drawings, to have 7 lb. lead, 9 in. in narrowest part, turned up 9 in. under slates, and dressed over 3 in. tilting fillet, and turned up against parapets 6 in. covered by an apron of 5 lb. lead, inserted into groove  $\frac{1}{4}$  in. deep in stone, and to be secured by lead wedges, and the joint made good in cement. Or—

All the flats and gutters to be laid with milled lead of 7 lb. (or 8 lb.) to the foot superficial; the lead to be turned up against walls 7 in. and against roofs 10 in. Rolls not to exceed 27 in. apart.

3. **Flats.**—Cover the boarded flats with 7 lb. lead carefully, dressed over wood rolls 2 in. by  $\frac{1}{4}$  in.; the lead well undercut with undercloak to cover two-thirds of roll, and the overcloak to be dressed right round roll, and to lay  $\frac{1}{4}$  in. at least; the lead to be turned up 6 in. against walls, and flashed with 5 lb. lead 6 in. wide. Drips to be 2 in. deep.

4. **Aprons.**—Put aprons of 6 lb. milled lead 10 in. wide to parapets and skylights.

5. **Valleys.**—Put 6 lb. lead to valleys 18 in. wide, dressed to slope of boarding, turned over tilting fillet on each side, and 6 in. under slates, with 6 in. lapped joints.

6. **Hips and Ridges.**—The hips and ridges to be covered with milled lead 6 lb. to the foot, and at least 18 in. wide, well secured with lead-headed nails. Or—

Cover hips with 6 lb. lead, each sheet copper nailed at the upper end. Cover the rounded rolls of ridges with 6 lb. lead, dressed well into angles of roll, and lapped 7 in. over slates on each side with 6 in. lapped joints.

7. **Dormers.**—The dormers to be covered with 5 lb. milled lead, turned down all round 8 in. at the least; the sills of window to have a 5 lb. flashing of milled lead 30 in. wide fixed over them.

All external wood mouldings of roofs of dormers (or pavilion roofs) to be covered with 6 lb. milled lead turned up 6 in., with flashings of 4 lb. lead turned down 5 in.; or the flanks of dormers where they abut against roof to have a secret gutter formed of 5 lb. lead dressed over tilting fillet, and 8 in. under slates, and turned up 5 in. against side of dormer. The dormer sides to be covered with 6 lb. lead, turned over and copper-railed along vertical side, and top secured by secret tacks. It is to overhang secret gutter, and be cut to rake of roof.

8. **Flashings, &c.**—Put to all flashings of vertical faces 5 lb. lead, 6 in. wide.

Put 6 lb. lead soaker slates, 12 in. wide, to rakes of roof abutting against walls, chimney-stacks, dormers, &c., and 5 lb. lead stepped flashings, 7 in. wide. Or—

Put 4 lb. lead soakers one to each slate, and to lie 5 in. under slates and turn up 5 in. against wall, with stepped flashings fixed over them. Cover flashings to be secured with tacks of 6 lb. lead.

9. **Stepped Flashings.**—The flashings to be of 5 lb. to the foot, and to be worked into the wall, and to turn down over gutters and flats. Put 5 lb. or 6 lb. lead stepped flashings to all slopes of roof against chimney-stacks and walls, to average 12 in. wide. Or—

The gutters behind chimneys to be 6 in. wide at narrowest part, and to fall from centre both ways, and to be of 6 lb. lead, dressed over tilting fillet and 6 in. beneath slates, the end turned up 5 in. against wall, and dressed 3 in. round returns of chimney covered with 5 lb. lead apron, raised 4 in. over flashings and stepped into brick joints over soakers.

#### ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE fourth ordinary meeting for the present session of the Institute was held on Monday evening, the President, Professor G. Aitchison, R.A., in the chair.

THE LATE PROFESSOR HAYTER LEWIS.

Mr. WALTER EMERSON, Hon. Sec., announced with regret the deaths of Mr. Henry Bridgford, Fellow, of Manchester, and Professor T. Hayter Lewis, F.S.A., Fellow since 1852, and who filled the offices of hon. secretary, member of council, and vice-president. The President expressed in feeling terms his personal regret at the death of Professor Hayter Lewis, and moved that a letter of condolence be sent to the family. Mr. JOHN SLATER, in seconding the motion, said no reference had been made to Professor Lewis's work as professor of architecture at University College, an office in which he succeeded the late Mr. Donaldson, the first holder of the professorship. Mr. Slater added that he had the privilege of being a student during the days of Mr. Lewis, and, although he was not an ideal lecturer, he impressed the young men with the fact that his one aim and great desire was to give them as much help as possible in their architectural studies. The motion was agreed to in silence.

#### SOME PRACTICAL HINTS ON THE PRODUCTION AND USE OF ELECTRICITY FOR LIGHTING COUNTRY HOUSES.

Mr. BERNARD DRAKE, M.I.E.E., read a paper on this subject, in which he observed that to the multifarious knowledge of the architect must now be added a grasp of the "practice" of electric lighting and its attendant paraphernalia. He proposed to confine himself to the practical points which crop up daily in an architect's office, and are searched for in vain amongst the textbooks at his disposal. In lighting a country house, the first question concerns the provision to be made for the generating plant, and where it shall be put. The various developed methods at disposal are:—(1) Steam-engine; (2) petroleum engine; (3) gas-engine; (4) water-wheel or turbine; (5) wind-engine; (6) primary battery. The advantages and disadvantages of each method were fully considered by the author, whose own experience was that a combination of gas and petroleum, or turbine and steam-engine, gave the best results. Each case, however, required an individual study of the local conditions and working requirements before deciding what would be best; it was not a matter which could be safely left to the decorator or hot-water engineer to diagnose. From whatever source the power is obtained, the dynamo for ordinary requirements is the same, except that it requires to be fitted with a flywheel for use with petroleum and slow-speed gas engines, providing the engine has to be run while the lights are used. Where only required for charging the accumulators, this may be omitted, as it wastes power. The most important features in the dynamo for country-house lighting are:—(1) Absence of sparking, which wears out both brushes and commutator; (2) perfect balance of the armature or revolving portion of the machine, vibration being one of the causes of what are known as flats on the commutator; (3) strong shaft and wide bearings; (4) good automatic lubrication, the best form of lubricator being a loose ring revolving in an oil bath;



(5) absence of heating—undue heating of the armature and magnets causing unnecessary loss of efficiency. The accumulator is a necessity in every country-house installation, and the position of the room for its accommodation requires careful consideration. For reasonable distances up to 150 yards the engine and accumulator rooms should be placed alongside each other, as the attendant can see that each cell charges up equally, which is essential to success. Where the current is brought from a distance, or where the light will always be supplied from the accumulator alone, a considerable saving can be made in the cost of cables by separating the engine and battery room. There must be no direct communication between the dynamo and cell-room, or the cotton insulation will be found to rot off the dynamo after a few years. In selecting a type of accumulator, the main question is absence of attention, which can only be obtained by having the plates well apart, say  $\frac{1}{2}$  in., so that any detached portions fall away instead of bridging across and exhausting the cell. If one or two cells are empty, the light will be bad, even though all others are perfect. The author considered that a clear space between the plates was also preferable to inclosing them in any form of celluloid bags or wrappings, which soon became clogged with oxides. The use of a registering meter is recommended in the engine-room as the best check on the amount of coal, oil, or gas consumed. The engine-house should be placed with due regard to prevailing wind, and not less than 50 yards from the main building. The author next considered the questions of first cost and working cost, giving data applicable to average country-house installations, from which also could be determined the class of motive power to be adopted. Results were also given of a week's recent test with a modern generating plant for a large installation of 2,000 lights. In discussing the lighting of rooms, the author emphasised the necessity of having light and dark portions, and, as it were, semi-tones. A room lit equally throughout gives a flat effect, and is neither artistic nor restful. A bright light causes an involuntary contraction of the pupil of the eye, and causes a tired feeling which may ultimately result in eye troubles. The ignorance of electricians concerning this simple fact is probably responsible for the complications ascribed by oculists to the electric light itself. The secret of a restful light is the illumination of a large surface with an absence of any dazzling spots of small area. In a room thus lit the pupil of the eye expands to its full limit, and the weakest eyes can read with comfort. To get this result either the rays must be diffused by transmitting them through a large shade, or reflection must be resorted to and the directed rays be projected on the walls and ceiling from some hidden source. The illuminated surface is then greater than that of even the largest shades, and the effect, therefore, more restful. This treatment in the case of light-coloured walls and ceiling is capable of wide adaptation. A combined shelf and picture rail containing a row of hidden lamps for reflected light has been employed by the author, and pretty effects could also be produced with small lamps concealed in the overmantel and in china cabinets. Coming to the question of fittings in old houses, the existing candle fittings have often to be adapted, as being in accordance with the style of the room. As regards the objection that imitation candles are inartistic, it must be remembered that the designer had the candle in view as the basis of his outline, and without it the proportions are wrong, and the drip cups and other parts meaningless. An incandescent lamp springing direct from a candle socket is a squat abortion that has nothing to commend it. In these cases every effort should be made to get the precise effect of candles without their disadvantages, and as far as possible to conceal the fact that electric light has been employed. Examples were shown of the way in which old fittings may be treated without detriment to their appearance, and attention was called to the economy of shading only the front of lamps placed against a wall, for thus the full advantage of reflection is obtained, and an 8c.p. lamp will take the place of a 16c.p. if totally enclosed. There were also shown a few typical fittings made expressly for electric light. Having touched upon the fittest materials for shades, the colours of which should be tested before making a selection; the objections to working the lamps into plaster-work in the ceilings instead of using metal fittings; the precautions to be taken to avoid risk of fire from the heated lamps, the

author concluded with some hints on the treatment of the different rooms, passages, and staircases. In adapting candle fittings to a dining room table the wires are distributed by a patented connector lying under the table centre, and so contrived that neither the table nor the cloth is pierced. One of the best effects produced by the author was in the dining-room at Chatsworth, where powerful lamps were hidden in reflectors at the base of the pictures all round the room—thus pictures and ceiling were illuminated, and the rest of the room remained in repose. In drawing-rooms, which should be brilliantly lighted, the author preferred to light principally from the walls and from standards, as a top light is unbecoming to ladies, causing dark shadows under the eyes. In picture lighting top as well as base reflectors are frequently necessary with large pictures. A good method in bed-rooms is to place two lights, either telescopic standards or on jointed brackets, one on either side of the dressing-table, and other lights might be placed near the bed, with facilities for turning on the current if needed to read in bed. In conclusion, the author mentioned that recent improvements in incandescent gas and oil lamps were most helpful and stimulating to electricians as developments in cheaper illuminants, educated the public to demand a strong light, and so led people to employ electricity for lighting. A number of lantern views were exhibited of photographs of the interiors of mansions taken with the actual electric fittings in use, all devised by the author's firm. These included Devonshire, Londonderry, and Lansdowne houses, Crewe Hall, Mr. Currys's residence, and the author's office, all being lighted by concealed electric lights placed behind reflectors, and devised to illuminate statuary, pictures, china, or to throw up the lines of carved friezes or plastic ceilings. On a screen and tables were also exhibited dining-room and dressing-table electrolights, imitation candles, &c.

#### PRACTICAL APPLICATIONS OF ELECTRICAL POWER.

A more prosaic treatment of electricity—that of its application to lighting, ventilating, and heating purposes—was the subject of a second paper, read by Mr. H. R. J. BURSTALL, M.I.C.E., who dealt with the general principles underlying the application of electrical power, and then proceeded to describe a few typical forms of apparatus, and to discuss the question of the cost of power under ordinary circumstances. Electrical power, as distinct from lighting, in buildings for non-manufacturing purposes, may be generally applied to, roughly, five classes of use—lifting and hoisting, ventilating, driving machinery for small trades and for domestic purposes, pumping, heating and cooking. In all except the last class electrical power is applied by means of electric motors, the type varying according to the purpose for which the motor is required. Most motors are supplied from a continuous current system, the electrical pressure varying from 100 to nearly 500 volts, 200 to 250 volts being now the most usual. Describing the general type of motor and its method of working, the author showed that the regulation of speed and power in it is carried out entirely by electrical methods, no sort of governor, as in a steam or gas-engine, being, as a rule, required. Motors used for the purposes under consideration are usually supplied at a constant electrical pressure, and generally made in three types. Where constant speed is required, a shunt-wound motor is used. Where a large turning effort is required and not a constant speed, a series motor is used. A compound type is employed in certain cases. It is sufficient to know not only the power required for a particular purpose, but also the conditions of running, before selecting the type of motor desired, and this selection can only be made from previous knowledge of the work or by experiment under working conditions. The author explained how the motors were regulated to avoid waste of energy. The speeds of electric motors, as usually supplied, range from 1,000 to 1,500 revolutions per minute for sizes from 1 to 5 H.P.; but motors running at from 200 to 500 revolutions per minute can now be had at reasonable prices. Slow-speed motors are largely on the increase, the extra first cost being compensated for by the reduced wear and tear, and by the advantage gained through direct coupling the motors to the machines. The special machinery and apparatus required in the application of electrical power to each of the five uses above mentioned were next discussed and described. In lifts, although the

broad principle of electrically driving them is quite a simple one, the actual machinery has to be most carefully designed and arranged, special motors and switches and gear being employed to insure efficiency and economy. In ventilation electric motors form the best driving power for operating fans, whether large fans for the ventilation of a building on some complete system, or small fans for extracting the air from particular rooms, or even for stirring up the air in any room in the manner of a punkah. Special care is required to avoid the noise of the machinery, and fan and motor should, wherever possible, be carried not from the sides of the air-trunk, but quite separately from a substantial wall. Noise is often caused by the pulsations of the air set up by the improperly-shaped blades of the fan; in this case little can be done except to alter the fan. The loss during transformations of energy from the boiler furnace at the generating station to the coils in the heating apparatus is so considerable that heating by electricity cannot compete with direct heating as to price by means of gas or coal for any purpose where a large quantity of heat is required. As, however, ordinary heating operations in a house are carried on under conditions in which the heat utilised is but a small proportion of that generated, it is possible, by properly applying the electric energy, to use such a large proportion of the energy as heat that competition with coal and gas is rendered possible when other considerations as to dirt, &c., are taken into account. Generally speaking, heating by electricity is applied by passing a current through coils of wire of high resistance; the wires are imbedded in an insulating covering, and are heated, together with their covering, to the temperature required. Another method, in the author's opinion of great value, is to pass the current through a number of glow-lamps, the lamps being proportioned so that their filaments are not completely incandescent, the room then being heated by radiation as with an ordinary fire or gas-stove. The lamps are arranged in special reflectors so as to obtain a "beam" of heat rays. The apparatus is simple, easily fitted and understood, and free from risk of breakdown. The heat obtained being radiant heat, does not produce the enervating feeling caused more or less by all methods of heating by warming the air, and the effect produced is similar to that from an incandescent gas-stove or bright-red coal-fire. The author then discussed the question of cost. Electrical energy is charged for at the rate of so much per Board of Trade unit, a unit being an amount of electricity which will keep an 8c.p. lamp alight for about 35 hours. This amount of energy is equivalent to 1.34 H.P. exerted for one hour. The Corporation of Edinburgh charge 1½d. a unit for power. In London the average charge is from 3d. to 4d. Private installation on a reasonably large scale, and economically worked, would cost at from 2d. to 3d. per unit. A passenger-lift for carrying nine persons, running at a speed of 175 ft. per minute, will require about 0.06 units per journey, taking the average of the day's work. This, at 4d. per unit, will work out at about ¼d. per journey. In ventilating, generally and very approximately speaking, 1 H.P. is required to deal with 20,000 c.ft. per minute, which would correspond to about ¼ of a unit per hour, and, at 4d. per unit, would cost 3d. per hour. Small machinery may be driven by electrical power for fifty-four hours per week at a cost of £48 6s. per actual horsepower per annum. An electrical pump, 1 H.P., will require the expenditure of about 1½ unit per hour. For heating, an ordinary electrical radiator suitable for a small room costs, at 4d. per unit, from 4d. to 8d. per hour. The Dowsing glow-lamp reflectors require about ¼-unit per lamp, and a radiator of four lamps, sufficient for a small room, would cost 4d. per hour at the 4d. rate. An appendix to the paper gave a number of figures in tabular form as to the cost of cooking apparatus. In installing electrical machinery, the regulations of the various fire offices as to the use of electric motors should be borne in mind, so as to avoid any trouble after the apparatus is installed. The lecturer concluded by showing a new electrical radiator, which gave from behind ground-glass, fitted into a fireplace, four long vertical beams of brilliant light, and also emitted considerable warmth; the working cost of this was estimated, at London prices of electricity, at about 4d. an hour. He also exhibited lantern-slides showing various motors and appliances of electrical power to printing machinery, &c.

Mr. MONKHOUSE asked Mr. Drake if wind-



power had been used for generating electricity otherwise than experimentally; he feared it was too uncertain and infrequent to be of commercial value as an agency in this country. The vibration complained of in dynamos was more often due to badly-jointed belts than to defective bedding or construction, and the jointless belting ought to be employed for driving in electrical lighting works. He doubted whether the cost of electric lighting had not been underestimated by Mr. Drake, and also the loss of light by frosting glass. His own experiments led him to believe that nearly 50 and not 10 per cent. of light was shut out by frosted as contrasted with clear glass. The lights to dressing-tables should allow of movement, for ladies required to see the backs of their dresses and arrangement of back hair as well as their faces.

Mr. JOHN SLATER proposed a vote of thanks to Messrs. Drake and Burstall. Having himself read a paper in that room 17 years ago on electric lighting when power had to be generated in a building then in course of erection near by—and when he showed an early Swan incandescent form of lamp lent by the late Mr. Spottiswoode—he was impressed by the striking advance in lighting which had been made in that period, especially as shown by Mr. Drake's illustrations. It was obvious that the point to be aimed at in artificial illumination was to give a very diffused light, and Mr. Monkhouse would find that a frosted lamp gave a better effect than a clear one, although doubtless much of the light was lost, simply because it was diffused. The electric radiator shown by Mr. Burstall would be of immense advantage in any of the modern series of flats on different floors, where the cartage of coal and the resultant ashes and dust were a difficult problem. If the charge per unit for electric power could be reduced in London to anywhere near the price that prevailed in Edinburgh, the demand for it would be enormously increased for workshops and factories.

Mr. BERESFORD PITE, in seconding the motion, thanked the lecturers for the admirable and lucid way in which they had both treated the aspects of the subjects dealt with. He did not think the photographs of interiors shown by Mr. Drake would be regarded as satisfactory in the eyes of architects. For himself, he disliked these dramatic methods of lighting wall and ceiling surfaces by concealed lights, ingenious as were the devices, and regarded their effect on pictures and statuary as simply disastrous. Nothing could be better than the evenly-diffused light of day, and he thought if electricians would consult painters and sculptors they would hear nothing but condemnation of clever but theatrical modes of lighting. The plasterwork of ceilings was never designed to be shown up in detail by these powerful search-lights.

Mr. E. W. HUDSON inquired as to the cause of the immense difference between the cost per unit of electrical light in Edinburgh and London.

Mr. DRAKE, in reply, said that experiments on a large scale had been made with wind as a generating power. It was used at Mr. Cadbury's house, and at Messrs. Cadbury's works at Birmingham, supplemented, of course, by other means, and was found to be more effective than had been anticipated, averaging a speed of 12 miles an hour for eight hours daily throughout the year. He was himself about to make experiments with a windmill at his own house, and a large windmill is about to be erected on Salisbury plain by Mr. Stevens. As to frosted v. clear glass, he had explained in his paper that, notwithstanding the obvious loss by obstruction with the former, the effect, owing to diffusion, was better than with clear glass, and on the table he showed two lamps of like candle-power, one frosted, the other plain, which, when lit, demonstrated this fact. (The demonstration was greeted with applause.) As to whether concealed lighting should be denounced as theatrical and unreal, as Mr. Beresford Pite thought, was a matter of opinion; but electricians did not pretend to compete with the sun's rays, and found that, other things being equal, nearly everyone preferred a different effect of lighting to that which existed in the daytime.

Mr. BURSTALL also responded, and explained that the low price per unit of electric light at Edinburgh was the result of the spirited policy of the corporation of that city, who had consequently enormously stimulated the demand for electricity. In London, although we had keen competition, no trading company had as yet ventured on a similarly bold policy. The effect of

reducing the price on the popular demand for the light could, however, be easily foreseen, and it would doubtless be tried before long.

#### THE SOCIETY OF ARCHITECTS.

THE second ordinary meeting of the Society of Architects for the fifteenth session took place at St. James's Hall, Piccadilly, S.W., on Thursday evening in last week. Lieut.-Col. F. Seymour Leslie, R.E., Vice-President, occupied the chair. The meeting took the character of a social gathering, little groups of chairs being arranged here and there around tables, and coffee and smoking were the order of the evening. In illustration of the two lectures on very diverse subjects—an ancient Fenland cathedral and the making of an up-to-date colonial railway—nearly a hundred lantern slides of unusual merit and interest were shown. Four architects were unanimously elected by ballot as members, viz.:—D'Auvergne Findlay, 10, Basinghall-street, E.C.; W. J. Oliver, 1, Darlington-street, Wolverhampton; A. J. Randell, Exchange-place, Devizes, Wilts; and A. W. Roques, 10, Basinghall-street, E.C.

#### ELY CATHEDRAL.

An address, descriptive of the Society's visit to the cathedral of Ely in July last, was given by Mr. ELLIS MARSLAND, hon. secretary, illustrated by a series of lantern slides from photographs taken by the lecturer, and Messrs. R. W. Coventry Dick, H. G. Quartermain, and George Trotter. Throwing on the screen in the first place a ground plan, Mr. Marsland rapidly sketched the history of Ely, reminding members that the building was founded in 673 by Etheldreda, a daughter of Anna, King of the East Anglians, and having been destroyed by the Danes in 870, was refounded by Ethelwold, Bishop of Winchester, about a century later. Of those two buildings not a trace remained. The present building was due to Simeon, the first Norman abbot, who laid the foundation of the church between 1082 and 1094. The work was continued by his successor, Abbot Richard, who died in 1107, and had then so far completed the work as to remove the body of St. Etheldreda from the old Saxon church into the Norman choir. The present edifice is dedicated to St. Peter and St. Etheldreda. The work of continuing the nave westwards was in progress for some seventy years, and Bishop Ridel completed this, together with the north-west and south-west transepts and the western tower, towards the close of the 12th century. The work of these Norman builders was very poor structurally. The whole of the north-western transept fell at some period now unknown to us, and the central tower soon showed signs of impending collapse. To save it, Bishop Eustace at the beginning of the 13th century erected the Galilee porch. If one may judge from the thickness of the walls, more was done in the 15th century by building the inner piers to the tower arch, by which, as would be seen from the view, the western entrance was considerably narrowed. In 1223 Bishop Hugh de Northwold built the presbytery, or eastern portion of the choir, by taking down the apse and adding six bays to its length. The central tower of Abbot Richards fell down on Feb. 12, 1321, and carried with it three bays of the choir. Alan de Walsingham was, happily for Ely, sub-prior at the time, and under his masterly and energetic direction the matchless octagon was set out and completed, and also the three bays of the choir and the Lady-chapel. The latter, an almost detached building on the north side of choir, is 460ft. wide, being probably the widest church spanned by a vault. Bishop Alcock's chapel at the end of the north aisle dates from 1486-1503, and the corresponding chapel to Bishop West at the end of the south aisle was built in 1515-34; it would be seen to be very Late Perpendicular work with some Renaissance detail. Having alluded to Sir Gilbert Scott's works of restoration and completion of the octagon lantern, Mr. Marsland accompanied the audience in a perambulation of the building by throwing successively on the screen general views of the cathedral from the south-west and from across the Ouse, thence past the Porta, or monastery entrance, a Late 14th-century gateway of Barnack stone, to see the western tower and buildings of the Benedictine monks, giving distant and nearer views of the tower and its transepts, and the charming Early English Galilee porch, and so round the cathedral, moving northwards, outside

the north transept, and across and into the Lady-chapel, completing the circuit by the east end, the scanty ruins of cloisters and the south and south-west transepts. Entering the Galilee porch, the members were taken through the long nave to the octagon, a singular view being shown, looking directly up at the vaulting seen in elevation. Passing into the choir, the two Norman columns, the only remains in Ely of that date, were pointed out, and also Northwold's presbytery and Sir Gilbert's flimsy Geometrical reredos. Having peeped into Alcock's chapel, several views were shown, taken from the triforium level, looking first into the south-west transept, and then into the choir and octagon, another slide showing the clumsy timber construction that carries the lantern. Emerging on to the roof of the latter, glimpses were caught of the transept buttresses, and across the long nave roof to the western tower, a return view being taken from the western turret over the lantern, transepts and Lady-chapel. The unique series was closed with detailed views of the Prior's and monks' Late Norman doors, and some old timber houses in the village "city."

A hearty vote of thanks was accorded Mr. Marsland on the motion of Mr. THOMAS R. RICHARDS, seconded by Mr. HARVEY PIPER.

#### THE RAILWAY TO BULUWAYO.

THE CHAIRMAN said they were favoured by the presence that evening of Mr. Henry Carter, one of the assistant engineers for the construction of the Buluwayo Railway, who had brought with him some fifty slides, taken during its progress, and which had not previously been exhibited in this country. Mr. CARTER proceeded to give a running commentary on his slides, giving lucid and brief explanations of the difficulties encountered during construction and the means taken to overcome them. The railway, he explained, was 490 miles in length and single, and surveys had now been made for its extension northwards from Buluwayo to the southern end of Lake Tanganika. It was designed by Sir Douglas Fox, and had been constructed in a remarkably short space of time by Messrs. Pruhling and Co. The gauge is 3ft. 6in., similar to that on the Soudan and Nile Side Railway, and the Cape Colony Government Railways, and the line was substantially made, the rails weighing 60lb. per yard; they rested on steel sleepers, and the ballast was the local "rotten limestone," a material little better than chalk. Two great difficulties encountered were the scarcity of water—there were two sections, divided by a deep stream with, on either side of this river, north and south, 130 miles of arid country without any intervening water supply, and the other was that the streams in summer time were level wastes of pure sand, with here and there pools of water, and in flood time these became impassable torrents. To complete the line by the specified time, it was decided to cross the rivers by temporary tracks carried down to the level of the bed and supported on concrete piers. Short deviation lines were constructed, on which the permanent way was carried at a high level on viaducts crossing the rivers on iron girder bridges carried on lofty concrete piers, with wooden framework in the centre of each span. Series of slides showing the construction of these temporary and permanent bridges across the Bonapiti and Mohalapsi Rivers were shown, the latter stream being crossed by series of 75ft. and 100ft. spans of iron girders. Working from the south, the railway brought its own ironwork and other materials, and, by an ingenious arrangement, the spans, all but the last, were first built of greater width than was necessary, so as to allow the succeeding ones to be brought across them and placed in position. For excavating foundations for the concrete piers caissons were built of corrugated iron, having a cutting edge or shoe of hardened steel securely fastened to the lower edge of each plate. The sand was dug away from within this caisson till bed-rock was reached, and this having been levelled, the concrete was built upon it. The work was done by native "boys" under the supervision of English engineers and foremen, who were lodged in corrugated iron huts. The cost per mile of the completed railway worked out at £44,000. The engines varied in weight up to 65 tons carried on six wheels, and two of 85 tons carried on eight wheels, the permanent way and bridges being most severely punished by the former class. Of course, the speed allowance was very moderate—17 to 20 miles an hour being the maximum.

At the close of the lecture many questions were



asked by Messrs. W. COOPER, A. A. ATKINS, W. G. QUARTERMAIN, COVENTRY DICK, the CHAIRMAN, and others, and were duly answered, and a hearty vote of thanks was awarded Mr. Carter.

### IRON CONSTRUCTION IN DRAINAGE WORK.—IV.\*

By T. E. COLEMAN, F.S.I.

IT is interesting to notice that when drains of different diameters are laid to the same gradient or fall, the discharge varies as the square

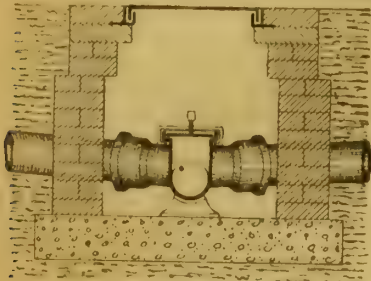


FIG. 11.

root of the fifth power of their respective diameters (or  $\sqrt[5]{d^5}$ ). A knowledge of this fact affords a ready means of estimating the discharge from a drain of any diameter, provided the discharge from a similar drain of known diameter, and laid to the same gradient, has already been ascertained. For instance, the discharge from a 6in. drain having a gradient of 1 in 60 may be

FIG. 12.

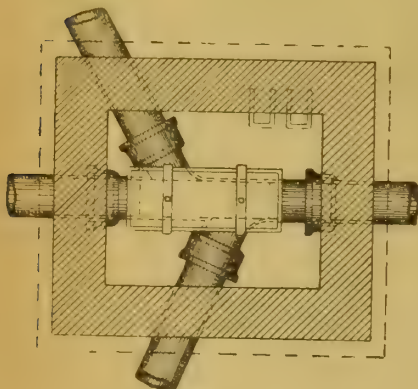
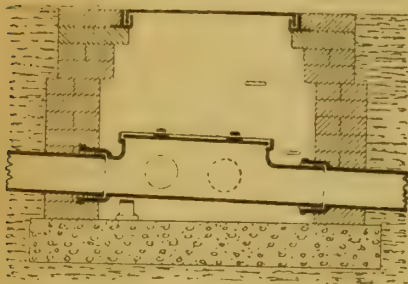


FIG. 13.

easily found if the discharge from a 4in. drain aid to the same gradient is known.

From the preceding table it is seen that a 4in. drain, with a gradient of 1 in 60, discharges about 116 gallons per minute when flowing full. Therefore—

$$\begin{aligned} \text{As } \sqrt[5]{4^5} : \sqrt[5]{6^5} :: 116 : x \\ \therefore x &= \frac{\sqrt[5]{6^5} \times 116}{\sqrt[5]{4^5}} \\ &= 319 \text{ gallons per minute.} \end{aligned}$$

The quantity thus found is practically the same as that already given in the foregoing table—viz., 316 gallons per minute.

This well-known rule relating to the discharge

\* All rights reserved.

of pipes or drains is also very useful when it is required to ascertain the diameter of a pipe or drain which shall be large enough to discharge the total volume of two or more branch drains delivering into the same main drain. The following

FIG. 14.

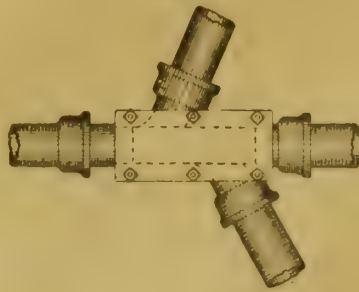


FIG. 15.



typical example is given with the object of showing the practical application of the principle, viz. :—

Find the minimum diameter necessary for a

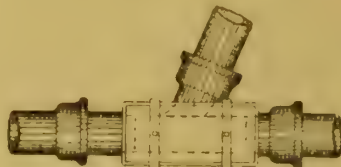


FIG. 16.

drain laid with a gradient of 1 in 60, which shall be capable of taking the discharge from three branch drains, each of which is 4in. in diameter, and laid to a fall of 1 in 60.

In this instance the ratio of discharge of the



FIG. 17.

main drain to that of the branches is in the proportion of 3 to 1.

Therefore—

$$\begin{aligned} \text{As } 1 : 3 :: \sqrt[5]{4^5} : \sqrt[5]{x^5} \\ \therefore \sqrt[5]{x^5} &= \frac{3 \times \sqrt[5]{4^5}}{1} \\ \sqrt[5]{x^5} &= 96 \\ x &= 6.21 \text{ in. or } 6\frac{1}{4} \text{ in. nearly.} \end{aligned}$$

The discharge from a pipe  $6\frac{1}{4}$  in. in diameter is

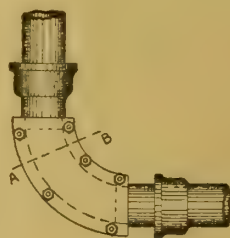


FIG. 18.



FIG. 19.

consequently equivalent to the collective volume of discharge from three 4in. pipes when the whole are laid to the same gradient. As, however, drain-pipes  $6\frac{1}{4}$  in. are not usually manu-

factured, it would be necessary to provide the nearest stock size suitable for the purpose.

The inspection chambers required in connection with a drainage system are usually con-

FIG. 20.

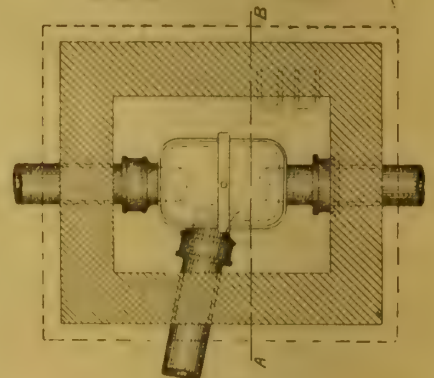
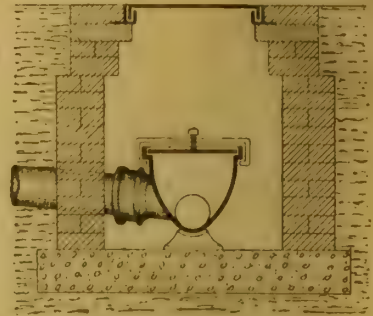


FIG. 21.

structed with a Portland cement concrete bottom and brick sides, built in cement. They vary in size and shape, according to the number and position of the branches or curves entering the chamber; but generally they need not be greater

FIG. 22.

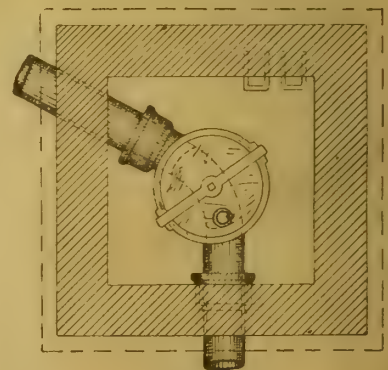
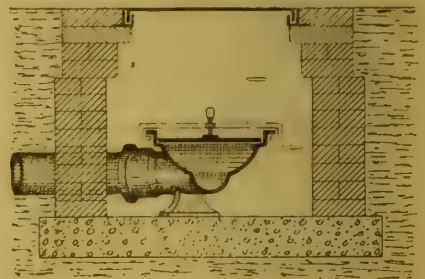


FIG. 23.

than 3ft. by 2ft. 6in., or 3ft. by 3ft., for ordinary house-drainage purposes.

When the chambers do not exceed 7ft. or 8ft. in depth, the upper portions of the sides may be gathered over so as to gradually reduce the opening to the same dimensions as the manhole cover.



Where manholes of greater depth are required, a portion of the chamber should be arched over and a small shaft (about 2ft. 6in. by 2ft. in the clear) carried to the surface of the ground in order to provide just sufficient room for entrance into the chamber at the bottom.

Figs. 11, 12, and 13 show the plans and sections

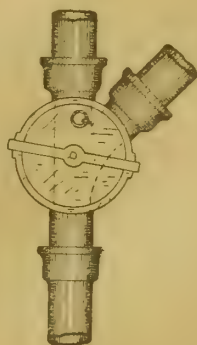


FIG. 24.

of an inspection chamber, containing the access pipe on an iron drain, and provided with a right and left-hand junction for the branch drains. The cover to the access pipe is secured by means of two wrought-iron straps or "bridles" fitted with "pinching screws." These covers may also

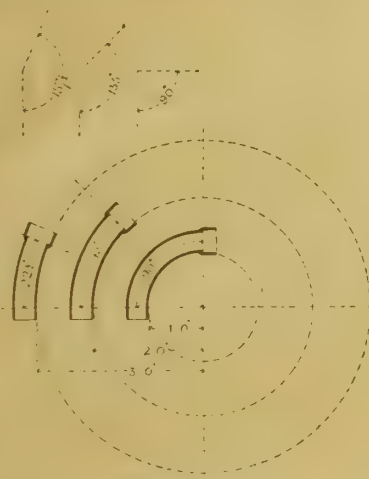


FIG. 25.

be arranged for fixing with six brass screw-bolts and nuts (see Figs. 14 and 15) instead of a bridge fastening.

Cast-iron access pipes are made in a great variety of designs to suit different requirements. Junctions provided with one or more arms or branches, and placed at varying angles, may

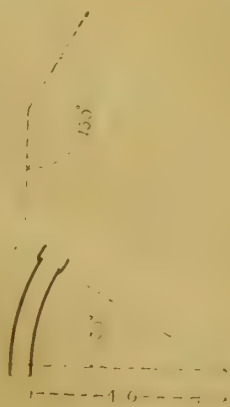


FIG. 26.

therefore be readily obtained. Figs. 16 and 17 represent the plan and section of an access pipe with left-hand branch, the cover of which is secured with the ordinary bridge fastenings and pinching screws. Similarly, different forms of bends or curves are also obtainable. A "quadrant" bend having a cover fitted for fixing

with brass bolts and nuts is illustrated in Figs. 18 and 19.

Another form of access pipe is seen in Figs. 20 and 21, the width of the opening being increased



FIG. 27.



FIG. 28.

so as to afford better facilities for the examination or inspection of the drains.

Figs. 22 and 23 are the plan and section of an inspection chamber in which the bend of the drain is provided with Moscrip's patent "Tron"



FIG. 29.



FIG. 34.

inspection eye. Fig. 24 shows the same arrangement for a drain receiving a right-hand branch. The cover is secured by means of a bridge and screw fastening.

The bends most commonly used in drainage works are known as  $\frac{1}{4}$ ,  $\frac{1}{2}$ , and  $\frac{3}{4}$  bends. A "quarter" bend consists of a curve equivalent to

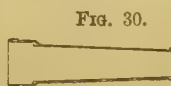


FIG. 30.

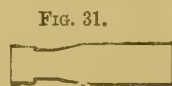


FIG. 31.



FIG. 32.



FIG. 33.

the quadrant of a circle of some specific radius, so that if four of these bends be placed together they will describe a complete circle having that radius. Fig. 25 is an illustration of a quadrant or quarter bend having a radius of 1ft. Such bends are required in positions where the direction of the drain or soil-pipe must be diverted to one at right

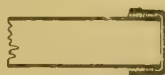


FIG. 35.

angles (or 90°) to its former direction. When an angle of 135° is required, a  $\frac{3}{4}$ th bend is used, and similarly a  $\frac{1}{2}$ th bend is suitable for rounding an angle of 157½°. Sketches of a  $\frac{3}{4}$ th and  $\frac{1}{2}$ th bend having a radius of 3ft. and 2ft. respectively are also shown in Fig. 25. A right angle curve of

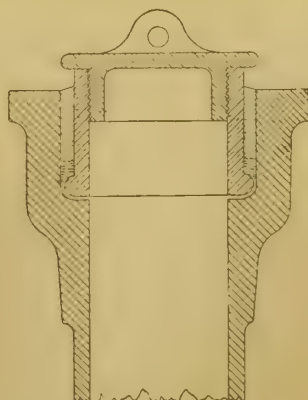


FIG. 36.

comparatively flat sweep may be obtained by the use of two  $\frac{3}{4}$ th bends, whilst two  $\frac{1}{2}$ th bends will provide a flat sweep for an angle of 135°. Where bends of any particular curvature are required, the radius and angle must be stated. Fig. 26

shows a bend of 4ft. 6in. radius with an angle of 30°, which is suitable for a pipe laid at an angle of 150°. It will be observed that the one angle is

FIG. 37.

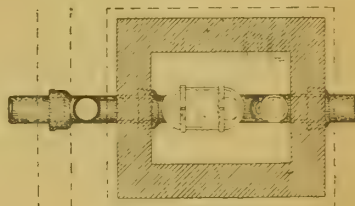
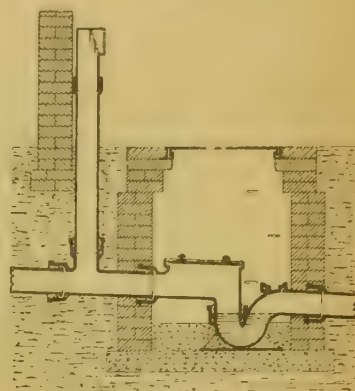


FIG. 38.

the supplement of the other, the two together amounting to 180°, or the number of degrees contained in a semicircle.

When it is necessary to connect flanged pipes or fittings with ordinary spigot and socket pipes,



FIG. 39.

a proper connecting-piece must be provided. Fig. 27 illustrates the form of "flange and spigot" piece for connecting to the socket end of an ordinary pipe, whilst Fig. 28 shows a "flange and socket" piece for jointing to the spigot end.



FIG. 40.

Sometimes it is necessary to connect two pipes having their spigot ends coming together, as in the case of alterations or repairs to iron pipes. A loose cast-iron "collar" is then slipped over the joint and run with lead, as in Fig. 29.

Figs. 30 and 31 show the ordinary form of

FIG. 41.

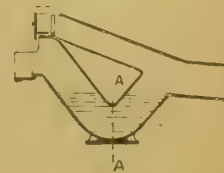


FIG. 42.



reducing pipes with diminishing spigots and sockets respectively. Similar reducing pipes are illustrated in Figs. 32 and 33, except that the invert is so arranged as to be quite level through-



out, the necessary tapering being confined to the top and sides of the pipe. They are useful in situations where the size of the drain must be reduced in diameter.

The socket end of a cast-iron pipe may be permanently blocked off by means of an iron

Fig. 43.

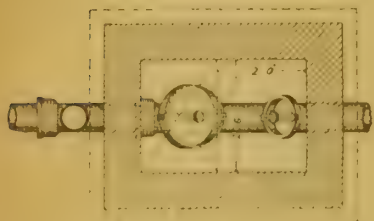
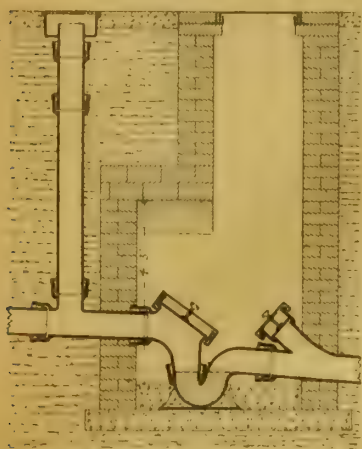


Fig. 44.

"stopper" run with lead and caulked, as shown in Fig. 34, whilst the spigot end of a pipe is made secure with a cast-iron "cap," as indicated in Fig. 35.

A brass screw stopper should be provided to the inspection eyes or cleaning arms of cast-iron pipes or intercepting traps, so that they may be readily removed and refixed when required. A strong brass sleeve or ferrule fitted with a brass screw stopper is securely leaded into the socket of the cleaning arm, as shown in Fig. 36.

An intercepting trap with efficient water seal should be fixed near the junction of the house-drainage system with the public sewer. By this means the drainage of each building is separated and kept distinct, and the passage of any unwholesome gases or vitiated air, from the sewer

Fig. 45.



Fig. 47.



Fig. 46.

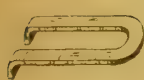


Fig. 48.



into the house-drains, and its probable discharge within the immediate vicinity of the building, is reduced to a minimum. The plan and section of an intercepting chamber for cast-iron drains are shown in Figs. 37 and 38. The intercepting trap is arranged with a cleaning or inspection eye on the sewer side of the trap. An access pipe fitted with an airtight cover is also provided, together with a mica flap fresh-air inlet to the house-drain.

Numerous descriptions of cast-iron intercepting siphon traps may be obtained. Fig. 39 is a section through the Harkness patent "Exchange" trap, with fresh-air inlet and cleaning arm. Another form of siphon trap with cleaning arm

is seen in Fig. 40; whilst that shown in Fig. 41 is suitable for fixing within an intercepting chamber having open channels. The usual cleaning arm is provided, but the lower portion of the trap is oval in section (as indicated in Fig. 42) so as to increase the scouring and cleansing action of the liquids passing through it.

Figs. 43 and 44 indicate the plan and section of an intercepting chamber arranged with Moscrip's patent "Waverley" trap and cleaning eye. A low-level fresh-air inlet is fixed at the ground level for the purpose of introducing an ample supply of air within the drains. An inspection-arm or branch is also provided on the sewer side of the trap; whilst the inspection covers are each secured by means of a bridge and screw fastening.

Where deep manholes or inspection chambers

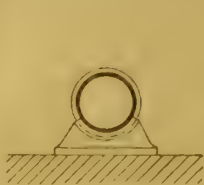


Fig. 49.

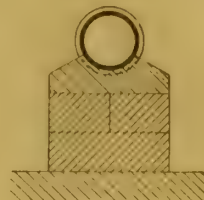


Fig. 50.

are required, step-irons of a suitable description should be securely built into the side of the chamber or shaft. Figs. 45, 46, 47, and 48 are sketches showing the ordinary U and angle patterns as manufactured in cast and wrought iron respectively. They may be obtained either plain or galvanised. The step-irons must be conveniently fixed so as to form a ladder, spaced vertically about 12in. apart, and well pinned in with cement.

When drains pass under buildings they are sometimes placed within a culvert or subway extending throughout the whole length of the buildings. If practicable, it is desirable that ventilating openings directly connected with the external air should be arranged at each end of the subway, so that a current of air may be continually passing through it.

In some town buildings it is necessary to carry the drains through the basement or cellar, and at the same time above the basement floor level. Fig. 49 is a sketch showing the drain supported on cast-iron chairs resting on the floor. Another method is shown in Fig. 50, the pipes being carried on brick piers with stone templates.

#### THE COLSTON HALL, BRISTOL, COMPETITION.

WE briefly announced in our last issue the award of premiums in this competition made by the directors on the recommendation of Mr. H. L. Florence, V.P.R.I.B.A., on Thursday in last week. The competitive designs, forty-nine in number, were exhibited on Friday, Saturday, Monday, and Tuesday in the assembly room of the Grand Hotel at Bristol, and were inspected by large numbers of the citizens.

The conditions provided that the building was to occupy the site of the hall recently destroyed by fire, and of which the main walls are still standing, and the cost was limited to £10,000. In order to increase the seating capacity of the hall two galleries are introduced into many of the designs, some confining themselves to a tier surrounding three sides of the area, with a second gallery above it at the back; but one competitor proposes to provide three galleries, extending the whole way round the hall, except at the portion of one end occupied by the orchestra and organ.

The *Western Daily Press* gives a short description of the premiated plans, from which we gather that those to which the first prize of £100 was awarded, "No. 2," were sent by Messrs. F. H. Jones and E. S. Cummings, of Parliament Mansions, Victoria-street, Westminster, and, unlike many others, were not accompanied by a general perspective. The treatment proposed a good deal of change in the way of entrances, retiring-rooms, &c., to the great hall. A step or two from the street pavement leads a visitor to a loggia, overhung by the Lesser Colston Hall. It is suggested that this shall be altered materially. Only the centre part of the loggia is to be retained, and the building is brought out to the pavement to the right and left. To the right is

a separate entrance for the members of the choir and a committee-room; to the left a separate entrance to the gallery, with a reception-room behind it. A visitor passing from the vestibule will see straight in front of him the grand staircase, leading straight up to the level of the hall-floor. Instead of one extremely broad flight of steps, the width has been divided between two flights, and between them (on the vestibule level) the refreshment buffet finds a place. To the left of this central staircase will be found the ladies' cloak-room, to the right the gentlemen's cloak-room. In the old hall the entrances to the gallery were notoriously unsatisfactory, and as the architects have provided two galleries, or, as they term it, a grand tier and a gallery, a good deal more space has necessarily to be allotted to means of access to these parts of the house. Entering the proposed hall, a visitor will find no need of dodging pillars, so obstructive of a view. On the main floor seats are shown in the drawing in two great blocks, with middle and side aisles, and an important feature is that these side aisles are against the walls. The light iron or steel columns used to support the galleries mark, as it were, the boundary of this surrounding "gangway," and do not intervene between the seats and the orchestra, as used to be the case, and as is the case in most public places having galleries. Roughly, the side galleries have a depth of 18ft., the pathway spoken of occupies about 5ft. of this, the balance overhangs the line of columns, the weight being supported on girders projecting bracket-fashion. Both grand tier and gallery have five rows of seats, and there is a refreshment-room at the rear of the latter. Two emergency doors open into Trenchard-street (entirely new features), and from that street will be means of access to the principal floor and the grand tier, and also to the gallery. A feature in the orchestra is the arrangement for the organ. An organ projecting into the orchestra as in the old hall divides the choir in an inconvenient fashion, and this is remedied in the design in question by raising the instrument, so that the choir seats may continue an unbroken sweep. Had an apse been possible, the solution would have been easier; but, as already said, the directors had to be content with present boundaries. Beneath the orchestra is a large room for the principal artists, and on the Trenchard-street side of the orchestra an emergency staircase from the gallery and other accommodation. The roof is slightly curved, will be ornamentally moulded, and a large central ventilating shaft rises from its centre. Additional ventilation is obtained by piercing the cornice and utilising the space behind it for an air passage.

The set of plans which won the second prize of £50 are very different in treatment. Messrs. H. V. Lanchester, J. S. Stewart, and E. A. Rickards, 1, Vernon-place, Bloomsbury-square, London, are the authors, and they sent a sketch showing the hall as it might be when used for a dance or a *conversazione*. In this case there is a grand tier carried completely round three sides of the house, and a gallery above it at the back only. The general treatment is decorative, and more room is given for ornamental features by confining the upper gallery to the rear end. The supporting columns are much after the style of those in the design already referred to. The organ is shown projecting as of old, and other features which recall the destroyed hall are the great square columns below the orchestra and the little side tribunes. Beneath the orchestra are rooms for the members of the choir, and above them artists' retiring rooms. The refreshment department is at the rear of the hall. The alterations on the Colston-street side are not nearly so extensive as in the first set of plans. The main entrance is as now, but a special approach to the gallery is shown to the left. The ticket-office is shifted, a new cloak-room for gentlemen formed on or near the vestibule level, and one for ladies above it. The former cloak-room to the left of the main staircase has suffered in these changes. In Trenchard-street is a gallery exit next to the present lower door, and at the upper end of the street a hall exit, stage-door, and balcony exit. The accommodation in this case would be less than in the first plan.

The third award of £25 went to a Bristol firm (Messrs. G. C. Lawrence and Harold Smith, 23, Clare-street). They also give a pictorial representation of the completed hall. They leave the loggia as at present, carry the main staircase straight up from the vestibule, branching to the



right and left at the top. Cloak-rooms are placed on each side, and the present cloak-room—near which was once the staircase to the President's Gallery—has been otherwise utilised. Beneath where that gallery once was the plan shows a crushroom. Two galleries are carried round three sides of the hall, supported, apparently, on girders built into the wall. No columns are visible in the sketch. The organ projects into the orchestra, and the space beneath is used for storage purposes. The accommodation for performers is at the side. The hall is given a flat ceiling, relieved by deep panelling with ornamental moulding and a decorative cornice. There are entrances from Trenchard-street as well as from Colston-street, and the architects have placed on the plan a memorandum that emergency doors to that thoroughfare could be provided if desired.

At the annual meeting of the shareholders in the Colston Hall Company held on Monday, it was decided to proceed with the rebuilding at once; it was stated that efforts would be made to complete the new hall by August next.

## "BUILDING NEWS" DESIGNING CLUB.

### A MOUNTAIN CHAPEL.

THIS subject has been well competed for, and, on the whole, we may say that the fifty proposals sent in show skill and a decided degree of good taste. Some of the designs, of course, are more curious than successful; but the industry displayed by the members of our Designing Club demands the warmest praise. Churchwork is not so much to the fore as it was, and the dominating influence of two or three strong men of conspicuous ability and opportunity, such as Sir Gilbert Scott or G. E. Street, no longer serves to guide the pupils of the day. The fashion of speaking slightly of these masters of the craft has not yet expended itself, but in the mean time no one has, so far, been able to take the lead as the Gothic revivalists did. J. D. Sedding's influence was too short-lived and limited to a cult. Still, ecclesiastical design has in many ways advanced, and an endeavour is gradually being realised towards erecting churches for modern worship with a less rigid striving after Mediæval precedent on the one hand, and with a greater desire on the other to build churches on common-sense lines by making them in fact more in harmony with every-day needs. There should be no such strained antiquarian look about a church as to sever it so manifestly from the best domestic buildings with which the church is surrounded. If religion is to be carried into the homes of the worshippers, any studied anachronism about the buildings in which the worship is conducted should be reckoned quite out of place. Precedent cannot be rightly ignored, and architects, as well as the clergy, must, to some extent, follow the old lines; but this must be in the spirit of the historic character, rather than in the mere dead letter of any given period or style. We do not pretend to say that any one of our Designing Club members has on the present occasion produced a design which quite realises the position which we have now suggested; but there are architects whose recent works could be cited, which do accord with the principles herein indicated, so that students are not without capable guides, if they have only the discrimination to look in the proper direction for them. With these preliminary remarks we will turn to the actual designs now before us. Our choice has fallen as follows: First, "McGilligan"; second, "Thistle"; and third, "Tokio."

The conditions and instructions issued to competitors were these:—"B.—A Mountain Chapel, to be built in stone in random courses with worked quoins and dressings. Style, Late Gothic. The nave to seat 200 worshippers, with stalls in the square-ended chancel for two priests, eight choir-men, and ten boys. The floor of the chancel to be three steps above the nave floor, and the altar-space four steps above the floor of the choir. A small organ transept to be contrived on south side of the chancel, with space for the stone stairway leading down to the choir vestry. The priests' vestry to be level with the choir, and to have an external lobby or porch, with outside stone steps leading down to the churchyard, and inclosed with a dwarf wall only. The choir vestry to be about 22ft. long by 15ft. to 16ft. wide, or of that area, so contrived as to be suitable for small public or church meetings, and having a porch into the churchyard. The land rises rapidly from east to west at the rate of one in eight, and the

approach is from the south-west of the building. The exposed position of the church, standing over against a Welsh hill-side village, must be considered in making the design. Put a good porch on south side. No side aisles are necessary, and the central gangway of the nave is to be 6ft. wide. At the west end, beyond the seatings, a space 12ft. deep the whole width of the church is to be provided. Here the font is to stand. An oak pulpit and screen on a stone base at entrance to the chancel to be shown with a rood over the cornice of the screen. A return way for communicants is optional; but the organ must not be boxed into a so-called 'organ-chamber.' The vestry to have an e.c. and lavatory in connection with it; but this accommodation must not be too much in evidence, and, at the same time, should be placed conveniently for the use of the clergy without passing through the larger vestry. The roof of the church to be open-timbered and covered with stone slab slates. No objection would be made to rough-cast walls outside; but the stone dressings in any case must show. A square simple tower the width of the nave, with provision for a small peal of bells is suggested. The seating of the church to be shown. Elevations and sections  $\frac{1}{4}$ th scale. Plans may be to smaller scale. A view is essential."

"McGilligan" draws well, and very adroitly handles the sketch-view, which sets forth his proposal to the most appropriate advantage. The freedom of his perspective lines in some parts lead to inaccuracies, however, and he omits the cusped heads to the windows, and so on. Still, it must be admitted that the conventional mannerism of his drawing is rather pretty, while the design itself is sturdy and suitable. The plan, too, is fairly good. The vestries should be more privately connected. As it is, every time any individual passes from the upper to the lower vestry, he must do so in full view of the congregation. The general contrivance also of the chancel is not good, and as for the architectural treatment of the responds to the chancel-arch and screen, we cannot like it at all. The e.c. window at the foot of the steps leading up to the priests' vestry is not private enough for comfort, and the heating chamber is too small for stowing coal in. Of the exterior there is not much to say which is not quite evident already. We do not admire the sprawling arch over the belfry windows, and the same feature under the eaves of the nave is equally unsatisfactory. The absence of hood-moulds over the big traceried windows is noted, and no stack-pipes are shown. The porch to the choir vestry is incorrectly drawn in the view. It looks better in the elevation, but either way is not quite pleasing.

"Thistle," the author of the second design, sends a plan which is more compact, though neither of the first two schemes show how the tower is intended to be treated inside above what may be called the crossing. "Thistle" places the tower over the choir, and introduces a double transept for effect outside. The staircase between the two sacristies is better managed than in the first design, and the w.c. is more out of the way. The organ is not well placed, and the screen is common-place. So, also, are the windows of the nave. The tower belfry, too, is not very interesting: it is poor, and yet in some ways we prefer it to the treatment of the sprawling arches introduced by "McGilligan." "Thistle's" tower, however, is distinctly lacking in interest, and his church hardly befits a mountain site, in so far as its contour is concerned. "Tokio" is the author of a stately design, dignified and quiet. It is marked by a sense of nice proportion, and has a good plan; but the scheme assumes still more the character of an ordinary village church than we had intended, and can hardly be described accurately as a mountain chapel. The traceried windows to the belfry decidedly partake of the monumental, and the whole scheme is too expensive in idea for the intention in view. Therefore, we can do no more for "Tokio" than place him third; but in doing so we recognise the capability of his orthodox work. "Grip" is not an attractive draughtsman, and we consider he does himself an injustice by the lack of "go," which is so very conspicuous in his sheets. Still, we place him fourth in merit, because he does know how to treat a plain good outline. The end gables are bald, with nothing in them, and the saddle-back tower is plain enough; but this very simplicity is a merit. His plan has grave faults, such as the crowding-up of the nave pews against the lectern and the pulpit, while the choir-seating is not good, and is wasteful of space. The organ is poked

into a sort of chamber. The vestries are better managed. "Dachs" is a much more clever contributor; indeed, he is too clever in a sense, trying too evidently to do something out of the way, and demanding remark. He overdoes his design with effort, careless of the dignity of repose. How trivial all these notchings, buttressings, and cranks, say, for example, in the upper portions of the tower, against the majesty of a mountain. The planning of the choir and sanctuary of his church is quite admirable, and the contrivance of the vestry meeting-room below is without doubt the best sent in; though with the only window of the room at the back of the platform, the faces of the speakers could never be seen. "Dachs" will be the first to acknowledge the force of what we have said, and he is too good a man not to take our remarks in good part. "Swan" is unequal, and although his church is sturdy and plain, it looks cheap and thin. Rough-cast is not the best treatment, with sparse-looking lanky buttresses in jointed masonry coming through the plaster. The clergy vestry, the organ-chamber, and, above all, the sanctuary, are schemed by "Swan" without any adequate regard to the purposes for which they are intended. The altar is only about half the necessary size, and the altar-space is as inconvenient as it could well be. "Cambria" has exactly the same fault; but his clergy vestry is very good, and the return way for communicants is convenient. His design is one of the best: the tower is good and bold, with detail generally in character. The aisles, however, are hardly wanted in such a church. "Whitefriar" does not draw well, but there is merit in his design, which is marked by a conical spire over the big bulky tower. This feature is rather French in idea, the belfry setting in a massive manner, quite out of accord, however, with the thin walls displayed by the plan. The detail of the fenestration is meagre. The pulpit is paltry, but the screen is the best of any yet noted. "Quadrant" is queer, and this is not a recommendation. His tower has the faults of the selected design in the matter of sprawling arches. He exhibits points of merit which we duly recognised. "Quadrant," moreover, avoids the conventional, and endeavours to do something fresh and up to date. Far be it from our desire to blame such an attempt; but the propriety, and, if you will, the dignity of good taste, cannot be ignored with impunity. The huge balks of timber employed for the chancel-screen, for instance, are uncouth, and so is the contrivance of the lop-sided chancel under the segment-arch. "Byard" spoils his chances by bad draughtsmanship, whereas his design is quite above the average, if we except the roof of the nave with its hammer-beam treatment. The perspective is too rough and careless. Surely it is not too much to expect "Byard" to do better than this. "Rikki" has a very similar design, only that he has added a south aisle, the use of which is not clear, unless it be to diminish the area of the tower by lessening the width of the nave proper. "Trefriw" draws in a mannered way, and puts his tower at the west end of the church. To this there is no objection; but we do not like the porch under the east window leading to the lower vestry. The belfry porch on the plan under the western tower is ugly; otherwise the arrangement evinces some knowledge of church planning, though not much, perhaps, of ecclesiastical detail. His altar is nearly square. "Jonnie" comes next with a central tower design, and an organ-chamber elevated above the rood-screen level. The Tudor arch over the chancel would shut in the sound very much, and the rose window in the gable of the organ-chamber ill accords with the rest of the composition. In this design the choir vestry is on the same level as the nave, to which it becomes an adjunct. "Bullnose" has a very flat roof over his church, and another peculiarity in his plan is the little pipping sanctuary projected eastward out of the tower in which the chancel is located. "Redlac" has a sanctuary also similarly added on to the church, though in this case it is wider and better. Still, the making of the east-end feature a mere addition to the church proper is a purposeless mistake. The western tower has projecting central-pieces of walling embracing the belfry openings. The rood-screen is clever, and the bandy-legged lectern is in a piece with it, showing more novelty than grace; but displaying, too, that the author ought to do better things. His arches are horrid, with the hoodmoulds cutting the haunches of the arches so hard. "The Old Firm" is old-fashioned, and somewhat ordinary. The per-



spective is poor, and spoils the elevation. The tower is over the S.W. porch.

It is not easy to exactly determine where the first-class end and the second-class begin. "Emma" does not give the name and address of the sender on the sheet at the back as required; but we hardly think the author can be a lady architect. The plan is a churchman's arrangement, and the exterior is distinguished by a massively proportioned tower, with square traceried lights to the belfry. The squat conical roof is similar to Sussex varieties of lowland churches. "Rats" is too fanciful with his traceries, and too careless with his perspective lines in the view.

"Ichthyosaurus" is more commonplace, with coarse detail added to a not very attractive-looking design. "Merlin" is odd. The square windows in the walls of the nave have no other quality to recommend them. "Hope" draws in a thin, wiry way, wasting time on jointing-up the random-coursed walling, and fudging in the tracery. "Vignoria" gives us a terror of a tower, and he, too, puts a porch under the chancel window at the east end. "Per Ardua" is very inky and rough in the view; but his elevations are better. His plan is worse. "Z" make his tower over the sanctuary, and puts a porch under the east window, so that it would be impossible to tell which is the right entrance to the church, looking at it from the outside. "Thyra" is a clever designer, and it is a pity he did not finish his drawings, for there is much merit in his work, showing a knowledge of detail and common sense. The buttresses to the tower are ungainly, and the sprawling arches over the belfry windows are not nice. "Scruton" is out of his depth rather with churchwork; but we give him praise for a serious endeavour to do something out of the common. "Bat" builds a building, and then struts it up. At any rate, that is the effect of his design. The tower is the best part of his proposal, displaying somewhat a Scotch air about it. "The Rotter" comes next, and then "Don't Know," who builds up a design in Late Gothic, which would look more at home in some college grounds, than on the wild moors of a mountain side. He draws with painstaking care, however, and is greatly improving. "Astragal" sends a common-sense design, which would look far better than his perspective here suggests, for the view is so very poor. "Brush" follows with an all-over looking elevation, which is lacking in breadth therefore, notwithstanding the broad tower. "Pup" is vigorous but hard, both in drawing and design. "F," like him, has a squat, bold tower. His design is devoid of beauty, without any attractive detail. "Casual" has a spire rising out of a big tower, the expanse of which has proved too much for him, and so it is peppered all over with windows. The idea of the design is not bad, but it wanted better buttresses, and more recognition of proportion. "Delia" is odd, and puts a deep western gallery under the tower. His masonry is drawn all over like a spider's web or a crackle vase. "Tee-square" is bold and neat with a timber porch. "The Auk" is fanciful with bay-windows along the aisle. The west-end arrangement, with more skill, might have been a success. It is an attempt in the right direction, recalling some churches to be seen abroad. The windows are below remark. "La Poupee" is thin and ordinary. How his vestry chimney would smoke! "Notts" adds his tower on to the north side of the nave, and makes it 26ft. square inside. "Claude," "Alexem," and "Jay" complete the designs classified as second in order of merit.

The third series may thus be enumerated, though it is rather difficult to define their precise positions, and we have no space left in which to particularise. "Philomel," "King Crow," "Souris," "X.L.C.R.," and "First Attempt," "Mancunian" and "Bedouin" both came in too late. The last named, otherwise, would have ranked among the first class, for the plan is one of the best received. The ingenious use of a north transept, through which a communicant's return way is arranged, deserves mention. The position of the pulpit is very bad: hardly anyone in the transept would either see or hear the preacher. "Mancunian" is too unfinished to rank well. This is a pity, as his design, though rough, displays knowledge.

At the parish church of Newington-next-Sittingbourne, a festival service was held on Tuesday week in commemoration of the reopening of the chancel and Lady-chapel after restoration, at a cost of £450.

## THE LONDON COUNTY COUNCIL.

AT Tuesday's meeting of the County Council it was, after some discussion, agreed to adopt a recommendation by the General Purposes Committee that, as a result of the conference between representatives of the Council and of the London School Board, the Council, instead of the Technical Education Board, should express its willingness to undertake responsibility for science and art instruction in London was, after a brief discussion, adopted.

The General Purposes Committee, not having found a candidate whom they could recommend to the Council for the post of superintending architect at £1,500 a year, proposed that Mr. Blashill's retirement be postponed for three months. The recommendation was adopted.

The Housing of the Working Classes Committee submitted a report asking for the passing of supplemental estimates of £950 and £2,030 in respect of the erection of Benson and Abingdon buildings on the Boundary-street area. In the case of these buildings the manager of works declined to accept the original estimates, and, accordingly, tenders were advertised for, but none were received, and the committee now recommended that the work be given to the Works Department at an increased estimate of £2,980. Mr. Bruce (chairman of the committee) pointed out that when these two blocks were completed the Council would have erected on the Boundary-street area 23 blocks accommodating 5,380 persons without there being any charge upon the rates. The recommendation was adopted, but a further proposal as a supplemental estimate of £1,502 in respect of the erection of cottages comprised in the Brook-street Limehouse scheme was rejected, as in this instance the enhanced cost would entail a small charge on the rates. Subsequently an estimate of £13,024 was approved in respect of the erection of Leighton and Millais buildings, Millbank estate, on condition that if the works manager found himself unable to undertake the work at that figure tenders should be invited for it. Tenders to the amount of £24,495 were accepted in respect of the separate items required in the construction of the dwellings to be erected on the Borough-road site, Southwark.

It was resolved to erect, at a cost of £750, nine ornamental ventilating columns on the northern low-level sewer in Cheyne-walk and Chelsea Embankment.

The chairman of the Highways Committee stated that Mr. Baker, who was last week appointed manager of the Council's tramways, had written to say that the Nottingham Corporation had refused to relieve him of his duties for six months. It was hoped that the difficulty would be overcome, and in the mean time the committee had appointed a special sub-committee to undertake the management of the undertaking of the London Tramways Company. It was agreed to seek Parliamentary powers for the use of electric traction on the Council's tramways.

## THE WELSH WATER SUPPLY FOR BIRMINGHAM.

### PROGRESS OF THE WELSH SCHEME.

THE Water Committee, in a report just presented to the City Council of Birmingham, state that the exceptionally fine weather of the past summer has enabled good progress to be made with the works in the Elan Valley, as the following figures with regard to the several dams will show:—Caban Coch: The dam has been built up on the Brecon side over the culvert to a height of 732.5ft. above Ordnance datum—32½ft. above river-level. On the Radnor side the invert half of the culvert has been built, and the wall carried up to 708ft. The crest-level of the dam is 822ft. Careg-ddu (submerged dam): The dam, exclusive of the viaduct which is to be carried over it, will have a total length of 439ft. Of this, 279ft. has been finished up to the crest-level—viz., 782ft.; the remainder is up to 729ft. The right bank abutment and the piers for the viaduct are also well advanced. Pen-y-Careg: This dam is built across the valley up to 852ft. above Ordnance datum, the crest-level being 945ft. Craig Goch: Here the greatest progress has been made. The water was not turned through the tunnel nor the excavation commenced in the bed of the river until February this year, and now the dam has been built across the valley up to 549ft. above Ordnance datum, or 50ft. above the foundation. The crest-level is 1,040ft. Concerning

the aqueduct, the committee report that work is proceeding satisfactorily. Contracts have been entered into with Messrs. Morrison and Mason, Ltd., of Glasgow, for the further sections from Downton to Cleobury Mortimer, and from Cleobury Mortimer to Hagley. The first of these (contract No. 11) covers a length of about 14½ miles, of which 7½ miles is in cut and cover, 6½ miles in siphon, and 1½ miles in tunnel. The amount of the contract is £489,929 18s. 11d. The second of the sections mentioned (contract No. 12) covers a length of 17½ miles. The whole of it is in siphon. In it are comprised eight stream crossings, including the bridges over the Rivers Severn and Stour, and over the Staffordshire and Worcestershire Canal. The amount of the contract is £412,445 19s. 6d. This does not include contract No. 10 for steel pipes, already reported to the council. The whole of the contracts on the aqueduct are now let, with the exception of the short length of about five miles from Hagley to Frankley.

## THE DOGE'S PALACE IN VENICE.

THE Superior Council of Fine Arts at Rome having adopted a resolution formally declining to accept further responsibility for the safety of the Doge's Palace in Venice, the Government telegraphed on Friday night to Signor Boito, the well-known architect of Milan, requesting him to proceed to Venice immediately, hold an inquiry, and submit a report. The report on which the Council of Fine Arts adopted their resolution says the building is in great danger, owing to the extensive subsidence of the walls adjacent to the Bridge of Sighs, and the decay of the timbers supporting the Library of St. Mark, the floor of which was shored up three years ago. The ceilings of many of the other rooms are also much dilapidated, and threaten to fall in, the arches being cracked in every direction. The Palace architects say that the apprehensions entertained are greatly exaggerated, and are partly unfounded, but their declaration is not considered as reassuring, especially when other competent Venetian architects agree with the Report of the Council of Fine Arts.

The *Gazzetta di Venezia* publishes an interview with Signor Berchet, the director, and Signor Rosso, the architect, of the District Committee, who state that the alleged subsidences by the Bridge of Sighs do not exist, and that there is merely a movement of the wall caused by the oxidation of the metal clumps, threatening no immediate danger. They also deny that the timbers are worm-eaten; they are merely in a bad state, and are being gradually renewed. The floor of St. Mark's Library, they add, was shored up because of the weight of the books, which increase in number every day, and should be temporarily transferred elsewhere to permit of repairs being carried out. The present supports, however, are quite adequate to avert all danger. As to the ceilings, they are not dilapidated, and only in the Sala del Maggior Consiglio and some others have a few decorations fallen, the fragments of which have been collected in order to be replaced when funds are available for the purpose. As to the arches, the keystone of only one is missing, and measures are being taken to repair it, the arch being meanwhile solidly propped up.

The Local Committee has at its disposal only fifty thousand francs for the work of restoration. Signor Delzotto, a member of the Council of Fine Arts has declared that cracks have recently appeared in many of the timber supports, and that the woodwork in many places is dilapidated. The settling of the walls, especially near the canal, is quite evident, since the weight of the sinking arch has broken the capitals of the pillars. Signor Delzotto considers that the present state of affairs justifies the gravest apprehension. Signor Rinnovamento shares these views. He points out that the ceilings of five rooms are already shored up, and that the sinking of the walls is evidently making progress. He considers it necessary to remove the statutory collection from the archaeological museum, and the library of five hundred thousand volumes.

Mr. Thomas Blashill, F.R.I.B.A., gave a dinner at the Café Monico, Regent-street, on Wednesday night, to the members of the architectural staff at the London County Council and a few friends. General satisfaction was expressed by those present that Mr. Blashill had acceded to the request of the Council, and had postponed his retirement till March 31st.



## OBITUARY.

The death is announced, at his residence, Westfield, St. Margaret's - road, Bowdon, Cheshire, of Mr. HENRY BRIDGFORD, F.R.I.B.A., practising at Temple Chambers, Brasenose-street, Manchester. Mr. Bridgford joined the Royal Institute of British Architects as a Fellow in 1888, and was also a Fellow of the Manchester Society of Architects.

## CHIPS.

The fifth of the series of lectures on art subjects was delivered on Saturday evening in Glasgow Corporation Galleries, Sauchiehall-street, by the Rev. John S. Carroll, who took for his subject "A Study in Mediæval Religious Art."

At King's College, London, the David Salomons Scholarship for 1899 has been awarded by the Institution of Electrical Engineers to T. R. Renfree, student in the Siemens Engineering Laboratory at King's College.

The Blackburn Corporation, which recently acquired the tramway system of the borough for £77,000, and substituted electric traction, agreed on Monday to join the Darwen Corporation in buying the steam tramways connecting the two towns, and owned by the Blackburn and Over Darwen Tramways Co. The purchase-money is £48,500, Blackburn's contribution being £23,000.

By a printer's error, the figure "2" was omitted from our notice on p. 857 of the new workhouse infirmary at Rochdale, about to be built from plans by Messrs. S. Butterworth and Duncan, of South-parade, in that town. The proposed outlay on the section about to be undertaken is £22,000, and not £2,000, as there given.

The first concrete block for the construction of the Admiralty harbour at Dover was cast last week at the large yard just laid down near the Admiralty Pier. The contractors, Messrs. S. Pearson and Sons, have now ready and are waiting for a favourable tide to drive at the end of the Admiralty pier the piles necessary to form the staging from which the blocks will be lowered. At East Cliffe a portion of the sea-wall, which will reclaim 21 acres under the cliffs, has been built, the small concrete blocks of which it is constructed having been made in a yard at Sandwich. The sloping off of the cliffs above the reclaimed land is also proceeding.

The picturesque ruins of the castle at Luncheon, are to receive attention, the Constable of the Castle, Earl Halsbury, having granted permission to the borough architect, Mr. O. B. Peter, to inspect the same. It is to be hoped that not only the castle proper, but the two grand archways leading to the Castle Green, may receive a meed of attention.

The rural district council of Gwyrfa, sitting at Carnarvon on Saturday, received a letter from the Local Government Board empowering them to borrow £2,000 for the purpose of supplying Portdinorwic with water. Before deciding to advertise for contracts, however, the council decided to consider plans of proposed waterworks for the supply of Saron Bethel, Capel Seion, and Portdinorwic, the total cost of which was estimated at £6,600.

On Saturday a new Presbyterian Hall was opened at Swallow, near Newcastle-on-Tyne. The hall stands directly opposite the old church in Market Lane. The total cost will be nearly £1,200. It has accommodation for 500 people, and is in brick-work with Birtley brick facing and designed in a plain treatment of Renaissance. Messrs. Badenoch and Bruce, of Newcastle, were the architects, and the contractor Mr. H. Atkinson, of Blaydon-on-Tyne.

A sale of work, organised for the purpose of raising funds to provide a suitable pulpit for the Cathedral of Brechin, N.B., when restored, has realised £137 odds. The movement for the restoration of this ancient structure has been progressing steadily for some time, and four-fifths of the £10,000 required has now been subscribed.

There was opened for passenger traffic on Friday the North Sunderland Railway—a light railway from the main line of the North-Eastern Railway at Chatbill to Seahouses, on the Northumbrian coast. The new railway had its first sod cut on May 16, 1896, and is a single line of the standard gauge, a little over four miles in length.

On Friday Mr. E. A. Sandford Fawcett, A.M.I.C.E., (Local Government Board inspector), sat at the town-hall, Chester, to inquire into an application by the town council for sanction to the borrowing of £20,000 for the purposes of electric light extension.

The completion of the purchase of the Yorkshire House-to-House Electricity Company's undertaking by the Leeds Corporation took place on Friday at the company's offices in Whitehall-road. The total amount of purchase money paid by the corporation to the company was £222,957 18s.

## Building Intelligence.

ALLINGTON.—The little church of Allington, near Maidstone, was reopened by the Archbishop of Canterbury very recently, after having been renovated, beautified, and enlarged by the addition of a small transept. The scheme of decoration, embracing walls, roof, &c., has been designed and carried out by Mr. Godfrey Gray, of Cambridge, who spent nearly three months on the work. No stencilling has been allowed, with the exception of a very little where absolutely necessary on the roof partitions. The same artist has executed the carved and painted tryptich surmounting the altar on which our Lord appears in glory, supported by the Martyr Saints Laurence, Alphege (Archbishop of Canterbury), Alban, and Stephen. Mr. Gray also painted the altar panels (removed from the abolished pulpit), and the "Text" windows in the nave, new transept, organ-chamber, and vestry emanating from his studio, together with a little painting of St. Laurence on the south wall. Mr. Hubert Bensted, of Maidstone, was the architect, and the contractors were Messrs. Pryer and Co., of the same town. Among the gifts to the church may be mentioned the memorial west window of three lights, by Mr. R. E. Moore, of Southampton-row, dealing with the subject of the Ascension; a font cover in oak, iron, and brass; two sets of altar and other vestings, a carved credence table, hanging lamps, embroidered altar linen, and two veils and burses in red and violet.

BELFAST.—The foundation-stone of Windsor Independent Church was laid on Saturday last. The building will occupy the corner of Edinburgh-street and Lorne-street, contiguous to Tate's-avenue. The building will accommodate about 450 people, the length being 74ft. and the width 58ft. The material principally used in the walls will be perforated brick, with Dumfries red sandstone dressings, and the style will be Gothic. The wainscotings are to be of pitch-pine, and the sheetings of the ceilings are to be of the same timber. The architects are Messrs. Fraser and Sons, and the builder is Mr. James Kidd.

BRIXTON.—The new Empress Theatre of Varieties, near Brixton Station, is approaching completion, and will be opened on Boxing Day. It is being built from plans by Messrs. Wylson and Long, of King William street, Strand, the contractor being Mr. Green, and Mr. Gillson foreman of works. The electric lighting is by Messrs. Stode and Co., and the decorations, which are French Renaissance in style, by Mr. Bookbinder. The mosaic decoration is by Messrs. Diespecker and Co. The theatre provides seating accommodation for 1,500 people. The auditorium measures some 75ft. by 64ft. in the clear, and is surmounted by a lofty saucer-shaped dome. There are two balconies, or tiers, of fireproof construction throughout, and two boxes on each side. The ground floor is to be divided into the usual stalls and fauteuils, and is designed with a steep rake from the front. The stage, 60ft. wide by 40ft. deep, is cut off from the auditorium by an asbestos curtain, provided by Messrs. Merryweather and Co.

LAMBETH.—On Sunday a font grave for baptising adults by immersion was dedicated as a memorial to Archbishop Benson in the parish church of Lambeth. The new font is in the baptistery immediately behind the one in ordinary use, and is designed after the general plan of one in the ruined church of St. Stephen in the Campagna at Rome. It consists of two concentric semicircles with steps down on each side. The material used is Pavanazzo marble, with a kerbing of Languedoc marble. On an iron rail between the old and new font is an inscription in open copper work, taken from the font at St. Sophia, Constantinople, which reads both ways—NIWON ANOMHMA MH MONAN OWIN. The work has been executed by Messrs. Farmer and Brindley, from designs prepared by Mr. J. Arthur Reeve, of Victoria-street, Westminster.

LEEDS.—A second nurses' home, which has been added to the General Infirmary, was opened last week. It is connected with the older home by a subway; it is of three stories, with basement, and has frontages to Thoresby-street and Sunny Bank-street. The style is Domestic, and the material is red brick relieved with stone dressings from the Morley quarries. Accommodation is provided in the new home for 52 nurses, each having a separate room. On the ground floor are

the day-rooms, a writing-room, a recreation-room, 30ft. by 25ft., visitors' room, and small kitchen. In the courtyard at the back is a bicycle shed, with stalls for 32 machines. The rooms and corridors are lighted at night with the electric light. The heating is effected by low-pressure hot-water piping and radiators. All the bedrooms are cross-ventilated by air-inlets in the outer walls, with valves under control, and hinged fanlights over the doors opening upon the corridors. Fresh, warmed air is also introduced. In the principal day-rooms the vitiated air is extracted by automatic ventilators and extraction-flues. All the sanitary fittings are of glazed ware. The architect is Mr. W. H. Thorp, of Albion-street, Leeds, and the contractors were: Mr. Isaac Gould, mason, bricklayer, and joiner; Mr. J. E. Bedford, plumber; Messrs. Watson and Worsnop, slaters.

LONDONTHORPE.—A faculty has been applied for by the trustees of the late Earl of Dysart for the restoration of the chancel of Loundthorpe Church, near Grantham. This part of the church, which is Perpendicular in style, has fallen very much into decay, so much so that it is imperative to include in the work about to be carried out, taking down the south wall with its traceried windows, sedilia, &c., and rebuilding same; a new roof with moulded and carved principals covered with lead, and new flooring to altar-space in dressed red and white Mansfield stone geometrically arranged. New Mansfield stone steps will lead up to the altar. In addition, the east window, at present rather a poor and uninteresting specimen, is to be reconstructed more in character with the church generally at the request of Earl Brownlow. We understand that the trustees have placed the work in the hands of Mr. C. W. Smith, M.S.A., of Grantham, who has prepared the necessary designs, and the same will be carried out, under his supervision, by Messrs. Nichols Bros., builders, of Oakham.

MORVEN, N.B.—The new parish church of Morven was opened on Sunday by Dr. Norman McLeod. The church has been erected from designs by Mr. P. Macgregor Chalmers, of Glasgow, and has been erected upon the site of the old one, close to the ruins of the Mediæval church, and the tall and beautifully sculptured cross. In taking down the old church a large fragment of a cross-shaft was discovered, as well as other fragments of moulded and enriched stones which belonged to the ancient foundation. These have been carefully preserved. The style of the new church is Norman. It is built of whinstone, rough-cast on the outside, with all the corners, windows, doors, and all interior stonework of red freestone. The design comprises a chancel for the oak Communion table and elders' seats, and a nave seated to hold about 200 persons. The vestry opens off the side of the chancel. A stained-glass window has been placed in the chancel in memory of the late Dr. John Macleod, of Govan.

SHREWSBURY.—The new Theatre Royal in Shoplatch was opened recently. It has been constructed from the designs of Mr. John P. Briggs, of Arundel-street, Strand, W. The two tiers above the pit are supported by cantilevers, so that there is neither pillar nor post to obstruct the view, the stalls immediately behind the orchestra and pit at the rear having a steep slope towards the stage. The dress circle consists of two private boxes and tip-up seats, upholstered in crimson velvet. The upper circle consists of divided seats, upholstered in crimson moquette, and a gallery with raised seats is also provided. The dressing-rooms are heated by hot water, and a supply of hot and cold water is laid on. The principal entrance leads to a vestibule, having decorated ceiling, with paintings representing "Glory," mosaic floor, and fernery, containing palms and glow-lamps. The stone staircase, with decorated ceiling and walls covered with Japanese paper, leads on to the crush-room, and from this the cloak-rooms are reached; also the refreshment room. A suite of rooms is provided for the management, and communication with all parts of the house is secured by speaking-tubes and electric bells. The upper circle is approached by a wide staircase, and in connection with this retiring-rooms and cloak-rooms are provided. The pit has seats upholstered in crimson carriage cloth. The walls are covered with glazed porcelain tiles and filled in above with wall-paper, and the ceiling is formed into panels and scrolls. The stage is separated from the auditorium by a brick wall carried up through the roof, and the opening may be shut



off with a steel and asbestos fire-resisting curtain. The theatre is heated throughout by hot water on the low-pressure system, with American radiators. Hydrants and fire appliances are provided on each floor, and the risk of fire is minimised by the use of electric light for illumination purposes. A supply of gas is installed, however, in case of emergency. The ventilation has been carried out on the Honeyman system. The decorations are French Renaissance in style. The builder was Mr. Thomas Morris, Shrewsbury, and Mr. James Davie was the clerk of works. Other contractors were: steel constructional work, Messrs. Deane, Ransome, and Co., London; fibrous plaster and artistic decorations, Mr. F. de Jong, London; carpets, curtains, &c., Mr. Walter Cobb, London; dress-circle tip-up chairs, Messrs. Shoobrad and Co., London; stalls, pit, and upper-circle seating, Messrs. A. R. Dean, Ltd., Birmingham; hot-water heating, Messrs. Scull Bros., Shrewsbury; electric light, Messrs. Lea, Son, and Co., Shrewsbury; hydrants, Messrs. Merryweather, London; gas arrangement and fireproof curtain, Messrs. Vaughan and Brown, Ltd., London; ornamental stained glass, Messrs. A. Clark and Co., London; canopy, Messrs. McDowal Stevens and Co., Glasgow; mosaic floors, Rust's Vitreous Mosaic Co., London; tiling to pit, Porcelain Tile Co., Cobridge; ventilation, Messrs. Crittal and Co., London; act-drop, Messrs. A. R. Dean, Ltd., Birmingham; stage appliances, Mr. J. I. Lyon, St. Mary Axe, London; sanitary appliances, Messrs. Macfarlane and Co., Glasgow, and the Water Carriage Co., Sheffield.

#### CHIPS.

The opening ceremony in connection with the new reservoir and tower which form part of the Gainsborough water extension scheme took place last week. The total cost of the tower, reservoir, and rising main will be approximately some £7,000.

The purchase of Cathays Park by the Cardiff Corporation, from the Marquis of Bute, has been completed, a cheque of £160,000 being paid over. The area of the park is about 60 acres.

At Owens College, Manchester, last week, two formal presentations of memorials took place. One was a subscription portion of the late Dr. John Hopkinson, F.R.S., painted by Mr. T. B. Kennington. The portrait, a life-size seated figure, was subscribed for by those who had been fellow students of Dr. Hopkinson at Owen's College during the sessions 1864-5, 1865-6, 1866-7. The other was a bust of Dr. Greenwood, the second principal of the College, executed by Mr. Swinnerton.

The Goole Urban District Council held an extraordinary meeting on Friday, at which it was decided to promote a Bill in Parliament authorising them to construct new waterworks at Pollington, and to borrow the money for the same.

The corporation of Shrewsbury have received a letter from the Local Government Board sanctioning the Council's application to borrow £30,463 for the purchase of the Shropshire Electric Light Works.

Mr. Andrew Paterson, district surveyor for Aole District Board on the Norfolk County Council, has received an appointment as surveyor under the Staffordshire County Council.

The town council of Penzance accepted, at their last meeting, the resignation of Mr. Small, the borough surveyor, decided to advertise for a successor at £200 a year, and after some discussion voted £100 to head a testimonial to be presented to Mr. Small.

On Thursday in last week Colonel A. J. Hepper, D.S.O., R.E., conducted a Local Government Board inquiry at Tonbridge as to the application to the urban district council to raise two additional loans for £1,500 and £1,075. Of the first-named amount £1,000 was required for the purchase of the old town-hall, and £500 for the purchase of a slip of land on the south side of the Slade-road, in order to improve and widen it, and also to improve the council's Castle property. The other loan was for works of sewage disposal.

The death took place suddenly on Sunday of Mr. John Tomlinson, painter and decorator, of Batley, at the age of 80 years.

Owing to the near approach of the Christmas holidays, business at the London Mart has considerably fallen off, and the year is practically now ended. Generally throughout last week the market was very good, although the largest lots, comprising an extensive domain in Scotland and a residential estate at Ascot, both failed to attract attention. Small investments, both metropolitan and suburban, sold with freedom, and these sales, together with the prices secured for reversions, policies, and shares, contributed principally to the total of £101,259.

#### COMPETITIONS.

BRADFORD.—CARTWRIGHT MEMORIAL HALL.—A meeting of the Bradford Corporation Cartwright Memorial Hall Committee was held on Thursday in last week, at which the assessor, Mr. A. Waterhouse, R.A., attended to advise in the drawing-up of conditions in regard to the competitive plans, &c., for the new hall. After a lengthened sitting, the committee adopted conditions, ordered them to be printed, and directed that a sketch-plan of the site be prepared, and that advertisements be issued inviting architects to send in competitive plans. The new building is to cost £38,000, and this sum, with the £2,000 architect's commission, will make up the total amount given by Lord Masham. Three premiums of £150, £100, and £50 are to be given for the three best plans. The new hall is to be erected of the finest stone, in the Classical or Renaissance style, with a main frontage to the principal entrance to the park. It is to include a basement for storage purposes, a workroom, a refreshment-room, a public lavatory, and shelter accommodation. The ground floor, which is to have a front and side entrance, will comprise a large central hall, lighted from the roof, and rooms for caretakers, officers, &c., and a museum. The first floor is to comprise a suite of rooms extending along the entire front, which, on the occasion of important civic functions, may be used as entertaining-rooms. They will include a mayor's parlour or drawing-room, a reception, ball, and banqueting hall. The whole will be so arranged that they can be used as art galleries, or so that the whole can be converted into one large room. April 14th has been fixed by the committee as the latest date on which designs may be sent in.

SHREWSBURY.—The corporation received at their last meeting a report from a committee stating that in response to an advertisement for plans for a science and art school to be erected, at a cost of £3,500, on a site in St. Julian's Friars given by the Horticultural Society, five sets of plans were sent in, and the committee had selected two. The plan placed first was signed "Daylight," and that placed second "Sphinx." The report was adopted after a discussion consequent on a proposal, which was defeated, to select another site for the school, but the names of the competitors were not stated. The premiums offered were £20 and £10, and the competition was limited to architects practising in Salop.

#### PROFESSIONAL AND TRADE SOCIETIES.

EDINBURGH ARCHITECTURAL ASSOCIATION.—A meeting of this association was held on the 14th inst. in the Royal Institution, Princes-street, Mr. Thomas Ross, the president, occupying the chair. The chairman referred to the death of Mr. Hamilton Beattie. Since they last met, a notable man, he said, had passed from among them. He was one of the oldest members of the Association, having joined so far back as 1861, and for many years he took an active part in its affairs. He was president for session 1866-67, and though of late years they had seen little of him, he kept up his membership to the end. Mr. Beattie, in his public capacity, had a very difficult duty to perform, requiring tact and knowledge of men. To say that he pleased everybody would be paying his memory a poor compliment; but he (the chairman) had every reason to believe that the difficult services he rendered to the town were highly appreciated by the magistrates and town council. He was making for himself a great name in the profession, and, especially in all questions relating to property, his advice was sought for far and near. There appeared to be before him a long life of professional prosperity and usefulness, when, without a moment's warning, he was taken away, to the grief of all who knew him. He proposed that a letter of condolence should be sent to the family of Mr. Hamilton Beattie, and this was agreed to. Mr. Edwin Forbes then delivered a lecture on a year's work in Galloway in connection with the School of Applied Art Studentship, which had been gained by him. After stating that it was scarcely possible to over-estimate the boon which the School of Applied Art was to those who had chosen architecture as their life-work, he proceeded to describe Dundrennan Abbey, Glenluce Abbey, Lincluden College, Sweetheart Abbey, and Caerlaverock Castle, giving history, traditions, and dates in connection with each of these

buildings. The lecture was illustrated with limelight views.

THE GLASGOW AND WEST OF SCOTLAND TECHNICAL COLLEGE.—The Scotch Education Department have awarded four Queen's prizes, value £2 each, to students of the architectural department of this college—namely, one in architectural design to James M. Alexander, and two in building construction, the one to James A. Ferguson, and the other to Robert Park. These prizes are awarded to those students who do best in the May examinations, and they are competed for by students in all parts of the United Kingdom. A series of most instructive visits have just been paid on Saturday afternoons by the students of this department. The structures visited in course of erection were—Ruchill Hospital, Pollokshaws Town Hall, and Glasgow Bridge. One afternoon was spent at the sewage purification works, another at the cathedral, when Professor Gourlay conducted a special architecture class visit for the study of the vaulting; while on a third the honours stage students joined the Craftsmen's Society on a visit to the weir presently being constructed on the Clyde.

LEEDS AND YORKSHIRE ARCHITECTURAL SOCIETY.—At a meeting of this society, held on Monday evening, a paper was read by Mr. Francis W. Bedford on "Siena and Balthasar Peruzzi." Siena, in Italy, he said, had only a quarter of the population it had in Mediaeval days, but it was full of most interesting buildings. There were palaces more or less in ruins, and a very fine cathedral, built of marble relieved with coloured mosaics. Its statues were by Michael Angelo and Donatello, and its paintings by Raphael and Pinturicchio. The choir-stalls were amongst the finest in the world, whilst the pulpit was a seven days' wonder. Mr. Bedford gave an account of the life and work of Balthasar Peruzzi, a celebrated architect and painter, who was responsible for much fine work in Siena and Rome. Amongst other appointments held by him, he was architect of St. Peter's. Lanzi ranked him amongst the best architects of his age, and said that he might also have been classed with the greatest painters had he coloured his work as well as he designed. As it was, his work was often confused with that of Raphael and Pinturicchio. Mr. Bedford, with the assistance of lantern views, gave detailed descriptions of work executed by Peruzzi, whose death, it was believed, was caused by poison, administered by a rival.

The Vestry at Camberwell the other day, at the last meeting before adjoining for the Christmas recess, in passing the final accounts in connection with the contracts for the South London Art Galleries and Lord Leighton Memorial Buildings, erected in the Peckham-road, also passed the following resolution:—"That the vestry place on record its high appreciation of the services Mr. Maurice B. Adams, the architect, has rendered to this parish by the design and execution displayed in the building of the Passmore Edwards Technical Institute."

Tudor House, Hampstead Heath, was consecrated on Sunday by the Chief Rabbi, Dr. A'der, as Clara, Baroness de Hirsch's Convalescent Home for Poor Jews, in the presence of a large gathering of the Hebrew community. The house was purchased by the Baroness for £16,000, and has been endowed by her with £50,000.

A new board school is being erected at Shepton Mallett, and special consideration is being given to the ventilation, which will be carried out on the Boyle system.

In Tuesday's list of receiving orders the name appears of Everard White, Moscow Mansions, Cromwell-road, Earl's-court, S.W., and Queen Anne's Gate, St. James's Park, S.W., architect and surveyor.

At the last meeting of the city council of Norwich it was agreed to refer to a special committee the consideration of the desirability of erecting a town-hall, the Guildhall in the Market-place now in use, and built five centuries ago, being utterly inadequate for municipal purposes.

A luncheon was held at the Midland Hotel, Bradford, Yorks, on Monday, to secure assistance towards the restoration of the parish church as a memorial of the late Archdeacon Bardley. The proposed works include the removal of the galleries, the cleansing of the stonework from its coatings of plaster, the addition of a transept and vestries, and the reconstruction of the chancel roof, in all estimated to cost about £10,000. The outcome of the meeting was that fresh promises of help were received amounting to £1,220, raising the total given from £5,740 to £6,960.



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## ILLUSTRATIONS.

THE OLD BELL INN, HOLBORN.—THE GEORGE, DORCHESTER—ON-THAMES.—SECOND PREMATED DESIGN FOR THE LEEDS MARKET AND ABATTOIRS.—"THE FIRS," EPSOM, SURREY.—DESIGNS FOR A MOUNTAIN CHURCH.—FURNITURE FROM THE COLLECTION OF MISS C. L. VICKERS.

## Our Illustrations.

## THE OLD BELL TAVERN, HOLBORN.

THIS old inn, another interesting link with the past, was swept away some few months ago. The whole house, with its kitchens and coffee-room, surrounding its galleried courtyard and bedrooms opening off it, was in use until the day of its demolition, and for many years was a well-known point of departure for the old mail-coaches.

E. GUY DAWBER.

## THE GEORGE INN AT DORCHESTER, OXON.

THIS sketch, taken from the entrance gateway, shows the remains of the gallery and stabling round the inner courtyard. The whole building is a very picturesque and interesting relic of bygone days, when almost every village boasted its inn, and before railways drove the coaches from the road.

E. G. D.

## LEEDS MEAT MARKET AND ABATTOIRS.

THIS design, by Mr. Percy Robinson, Albion-street, Leeds, was awarded the second premium of £50 in the recent competition. The main building, shown in the illustration, abuts upon York-street, and is partially returned along Harper-street. It forms a large open apartment, 46ft. wide, with a row of stalls on either side and a roadway down the centre. A gallery runs along either side over the stalls, on which are placed small offices. The principal entrance at the junction of York-street and Harper-street is roofed over by an octagonal dome, this treatment being suggested by the shape of the corner. Adjoining the entrance and overlooking the whole of the market is the superintendent's office. The abattoirs and lairs are placed behind, and parallel to, the market, from which they are separated by a cart-road 18ft. wide. The basement to market is arranged to be used for cold-stores, freezing-room, &c., and is connected with the lift. The elevations are brick, with stone dressings; the internal walls are lined with glazed bricks, and the floors concrete on steel girders. This illustration is reproduced from the original drawing submitted in the competition.

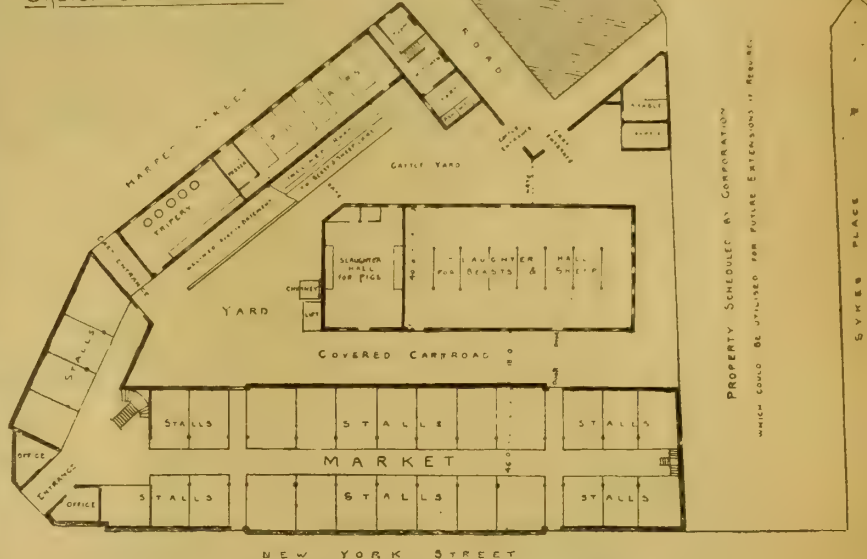
## "THE FIRS," EPSOM.

THIS house occupies an elevated site overlooking the Downs. The walls are faced with local red bricks, the upper part being covered with weather tiling. The roofs are tiled; the whole of the external woodwork is of oak. The entrance-hall is panelled with Oregon pine. All other internal joinery is of the same material, stained and beeswaxed. The house was erected by Messrs. J. and J. Ward, from the designs and under the superintendence of Mr. J. Hatchard Smith, F.R.I.B.A., of Moorgate-street, E.C.

## FURNITURE FROM THE SALE ROOMS.

THESE sketches were made at Messrs. Christie, Manson, and Wood's sale rooms, and selected

## SKETCH OF GROUND PLAN



## LEEDS MEAT MARKET AND ABATTOIRS.

from the many examples belonging to the collection of the late Miss G. L. Vickers, late of Chester-street, Grosvenor-place. The graceful little Table is gilt, with open scrolls and carved Indian masks at angles, the top being a veined pink marble slab. The Italian Settee and Chair are also in gilt, with high backs, carved, with borders of flowers, foliage, and shell ornaments; the seats and backs stuffed and covered with salmon and white flowered damask, the whole having a very rich and effective appearance. The oak Hall Chair, with high back, is pierced and boldly carved with lions and foliage, surmounted by a crown. The stand is carved with grotesque masks and drapery.

## "BUILDING NEWS" DESIGNING CLUB: A MOUNTAIN CHAPEL.

(For description and awards see p. 891.)

A massive mausoleum of red polished granite and white marble is being prepared by Mr. Siliffant for the tomb of the late Lady Phear, wife of Sir John Phear, of Marpool, Exmouth.

At Monday's meeting of the Morecambe Urban District Council, a large number of plans for new buildings were submitted and approved, and, as an evidence of the activity of the building trade in the town, the plans committee reported that they had found it necessary to hold two meetings to dispose of the business before them. Tenders amounting to £4,480 were accepted for electric-lighting plant.

In consequence of the sudden death of Mr. J. Gibbons Sankey, M.A., F.R.I.B.A., of 104, King-street, Manchester, who has carried on an extensive practice as an architect in Manchester and London, and for whom Mr. John Cubbon has acted for some years as manager, an arrangement has been made by which the practice has been entirely assigned to Mr. Thomas W. Cubbon, of Birkenhead, and his brother, Mr. John Cubbon, Associate-elect R.I.B.A., who will continue the practice under the name of Messrs. Sankey, Cubbon, and Cubbon. Mr. Thomas W. Cubbon will continue to reside in Birkenhead, and practise in Birkenhead and district, independently of the Manchester firm.

At Manchester Town Hall on Friday, a portrait of Mr. Alderman J. Foulkes Roberts, who served the office of lord mayor in 1896-7, was presented to the city, with the request that it might find a permanent home in the town-hall. The portrait, which has been subscribed for by the Welsh trading residents in Manchester, was painted by Mr. Tom Mostyn. It is full-length, the alderman being represented in Court dress and wearing the scarlet robes and gold chain of his office of chief magistrate. It corresponds in size and framing with the pictures of other civic dignitaries already hung in the town-hall, amongst which it will shortly take its place.

## CHIPS.

The new offices for the Norwich Board of Guardians, in St. Andrew's, Broad-street, were opened on Tuesday week. The offices are the result of the transformation of the buildings of the Old Museum, and the work has been carried out at a cost of £1,000 from plans by Mr. J. Bond Pearce, of Norwich.

The corporation of Congleton are about to build technical school premises, and have appointed Messrs. Wm. Sugden and Son, F.R.I.B.A., Leek and Hanley, to be their architects.

At Gravesend, the Borough Market, which has been entirely rebuilt, was opened on Saturday by the Mayor. The walls of the market inclose a space 135ft. by 48ft. It has a floor space of 7,000ft., in addition to 1,600sq. ft. available for fish sales. Its main roof is formed by 16 wrought-iron principals, resting on 32 iron standards, one long skylight forming a ridge of the roof. The cost of the building, including municipal offices at the side, was £3,000. Accommodation is provided for 59 general, 9 meat, and 16 fish stalls.

New Greyfriars' parish church, Edinburgh, which was recently decorated and fitted with electric lights, has now its large west window filled with stained glass. The central design is the Resurrection, and is composed of a large group of the two angels at the sepulchre, while the figure of the risen Lord occupies the arched space above. On either side of the central light are large lights, which contain figures of Mary, the mother of Jesus, and John, the beloved disciple. The artists are Messrs. Ballantine and Gardner, of Edinburgh.

A cenotaph memorial to Bishop Butler is in course of erection in Durham Cathedral, alongside of the monument to Bishop Hatfield, with the episcopal throne above it.

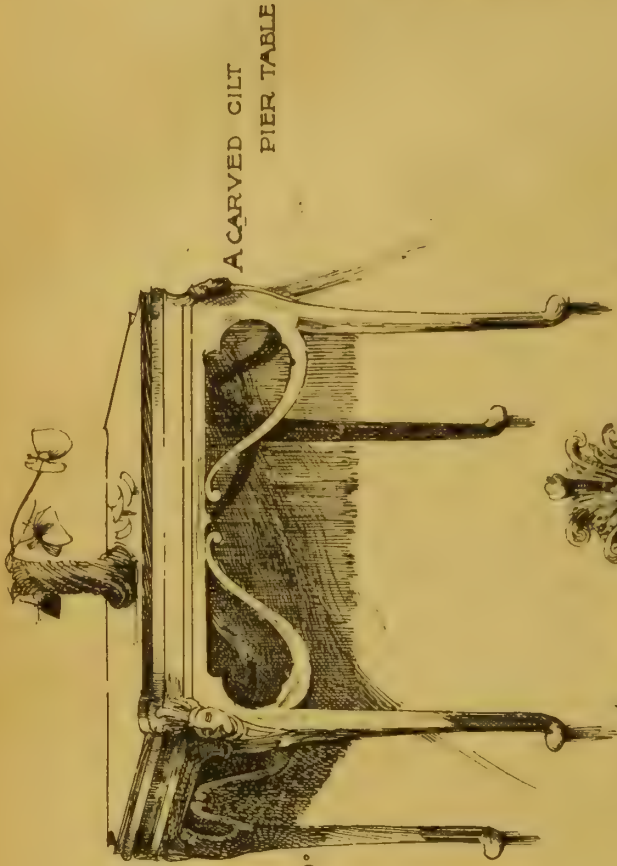
The corporation of Ipswich have agreed to extend and relay the sewers in various outlying parts of the town, in accordance with plans prepared by the borough surveyor, Mr. E. Buckham, at an estimated cost of £3,000, and also to widen Short-lane, St. Helens, and St. Clements at a further cost of £1,445. A scheme for the widening of the narrow portion of the main thoroughfare known as the Butter Market at an estimated cost of £8,000 was referred back to the committee.

Messrs. Christie, Manson, and Woods concluded yesterday the five days' sale of the collection of Japanese metal work, ivories, wood-carvings, lacquer, arms, porcelain, &c., of the late Mr. Ernest Hart, 651 lots realising a total of only £1,500.

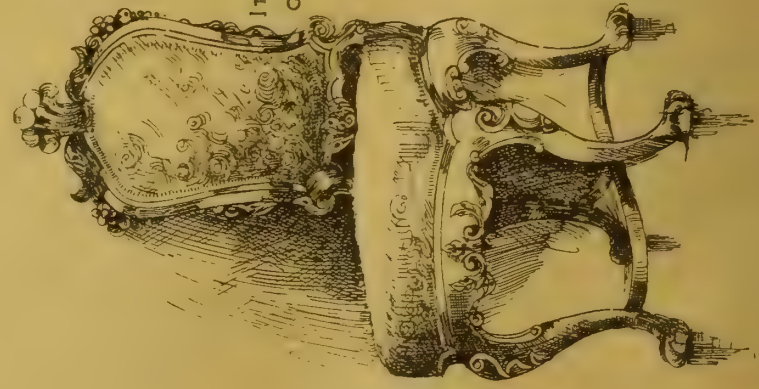
The convalescent home, Barnhill, near Dundee, is being warmed and ventilated by means of Shorland's patent Manchester stoves, with ornamental tiled sides, and with descending smoke flues, the same being supplied by Messrs. E. H. Shorland and Brother, of Manchester.



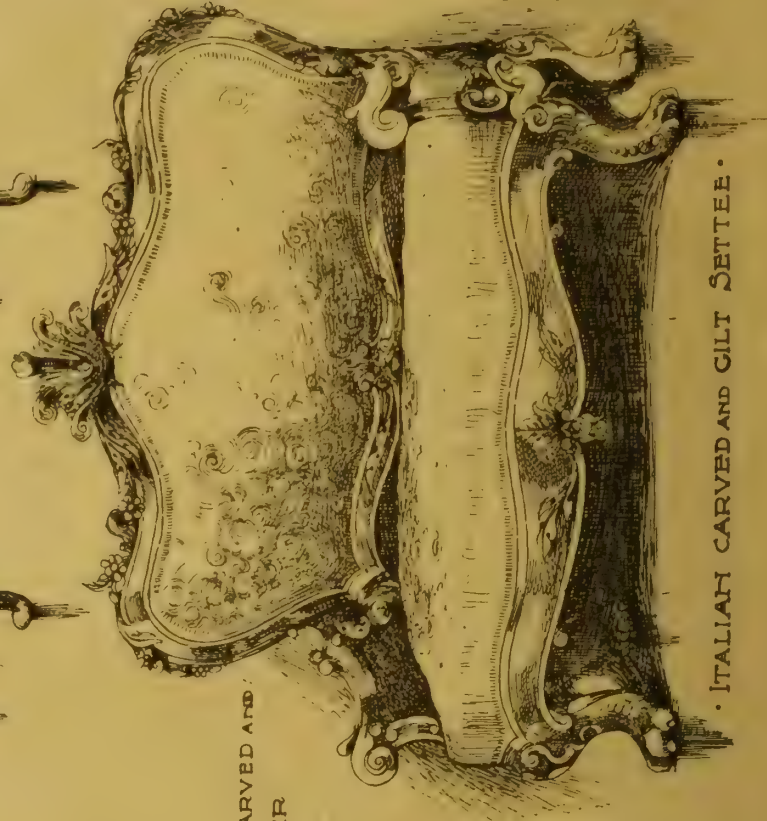
**FURNITURE** SOLD BY  
 Messrs CHRISTIE MANSON & WOOD  
 FROM THE COLLECTION OF Miss G. L. VICKERS  
 DECEASED.



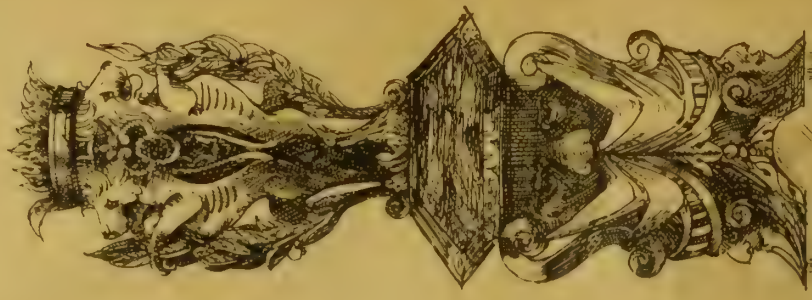
A CARVED GILT  
 PIER TABLE



ITALIAN CARVED AND  
 GILT CHAIR



ITALIAN CARVED AND GILT SETTEE.



OAK HALL CHAIR.

WALTER J. WILLS.









SECOND PREMIATED DESIGN FOR THE I.  
PERCY ROBINSON



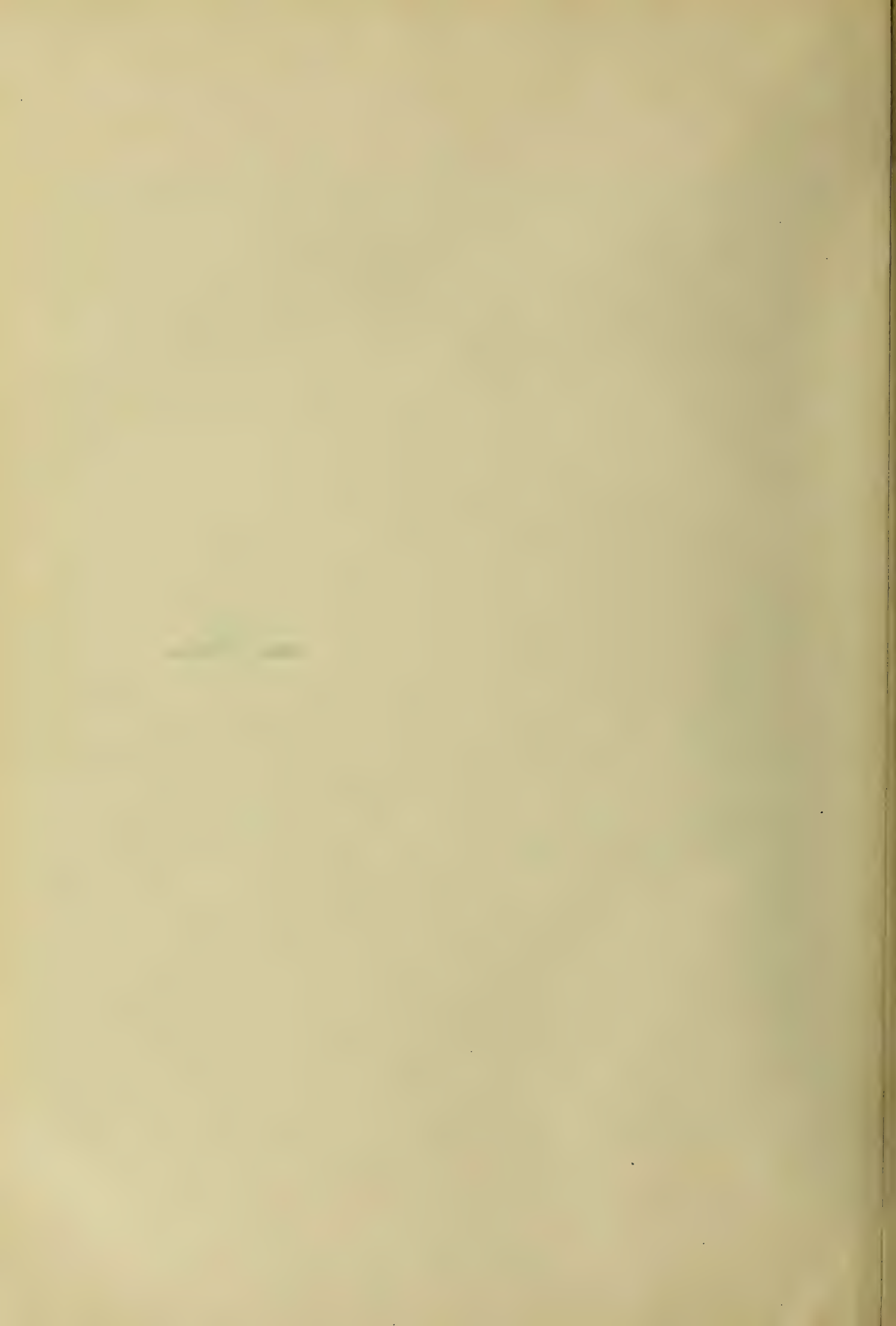
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OLDS MEAT MARKET AND ABBATOIRS.  
ARCHITECT.

*Photo Process Block by J. A. Marshall & Co., Sydneyham.*







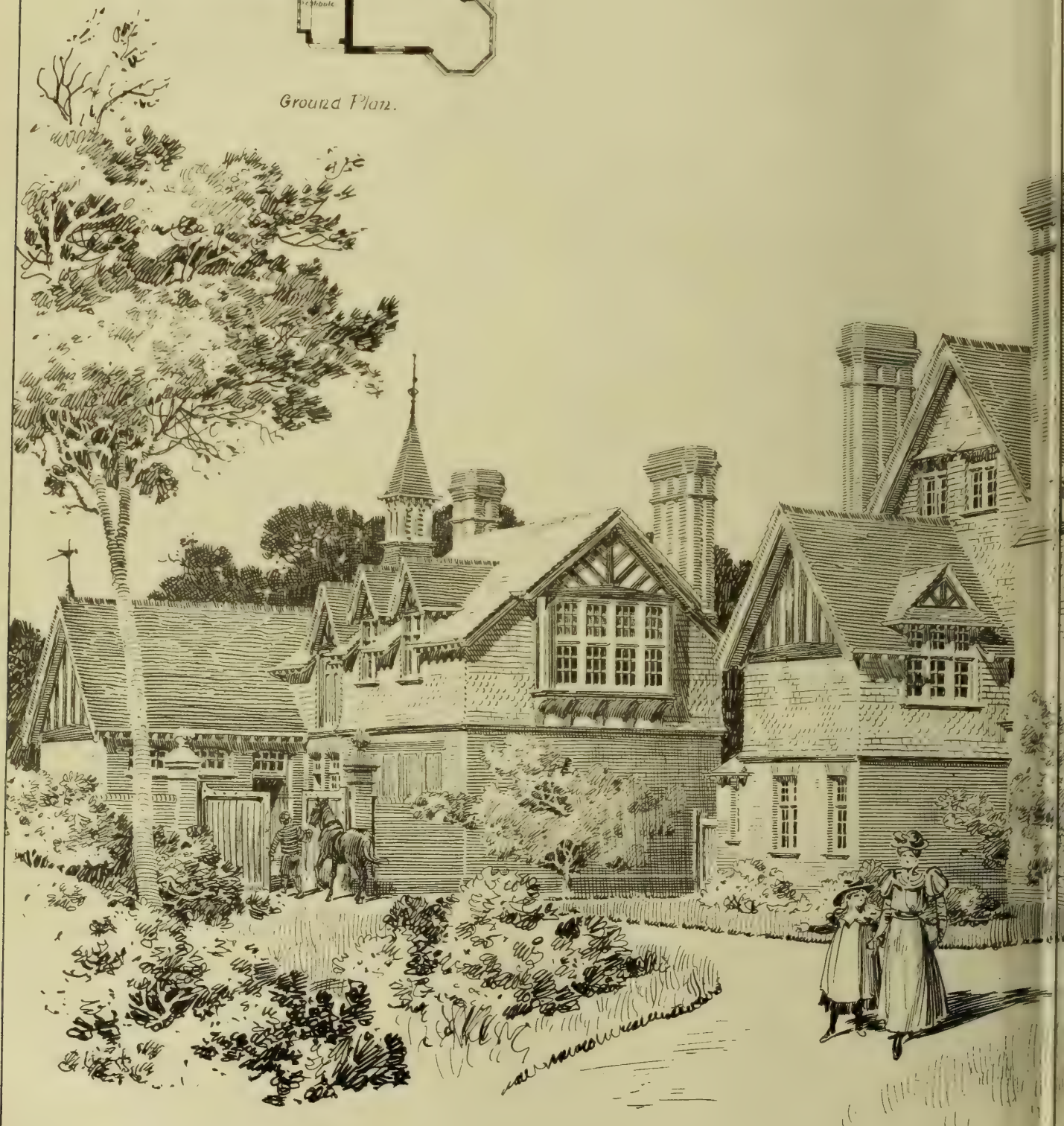




THE FIRS, EPSOM, SURREY



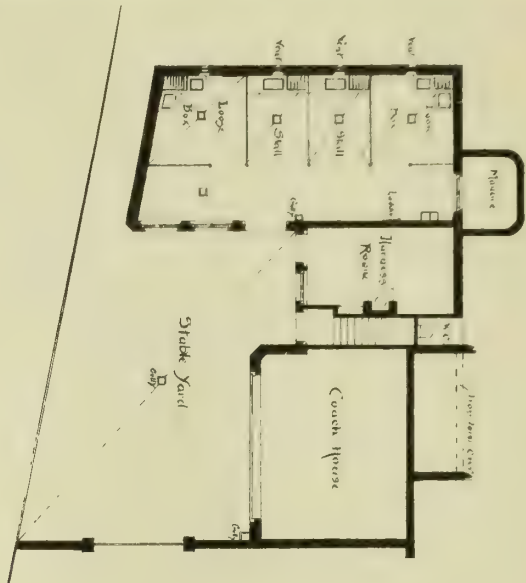
Ground Plan.





WS. DEC. 23, 1898.

J. HATCHARD SMITH, F.R.I.B.A. ARCHITECT.



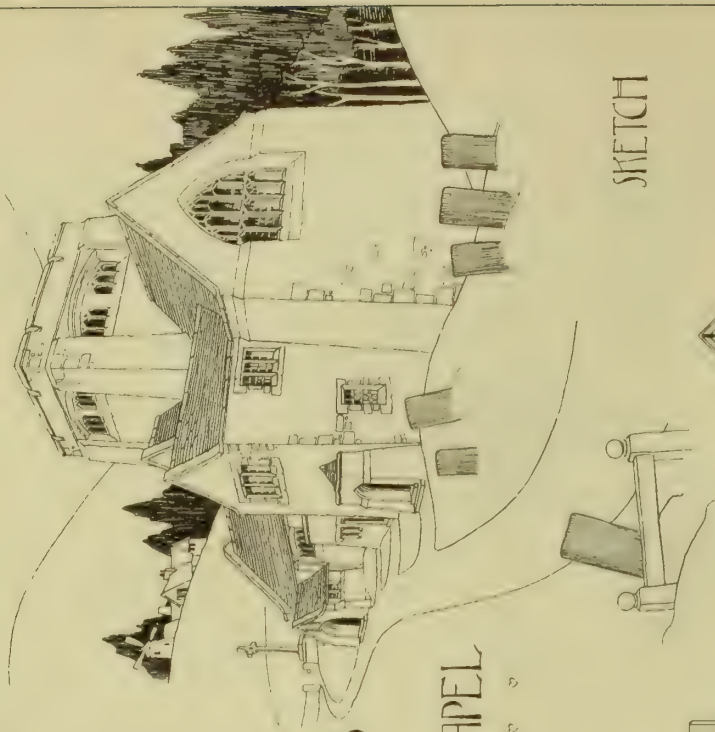
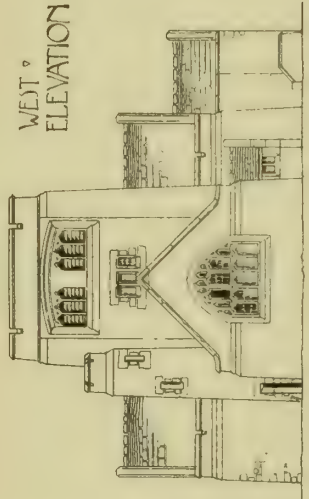
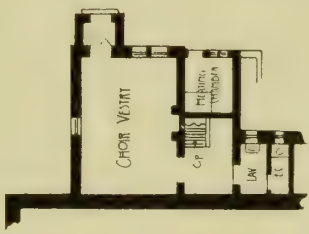
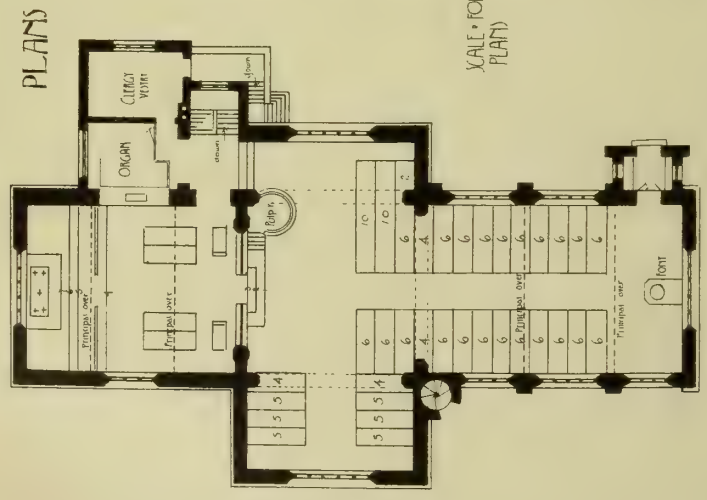






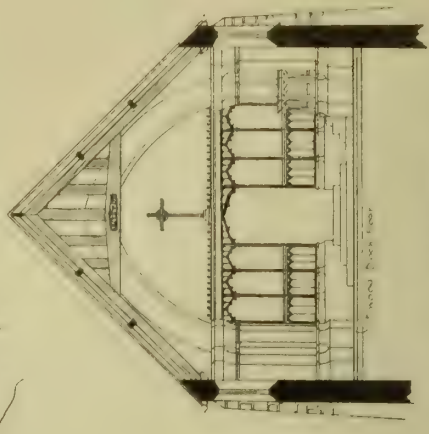
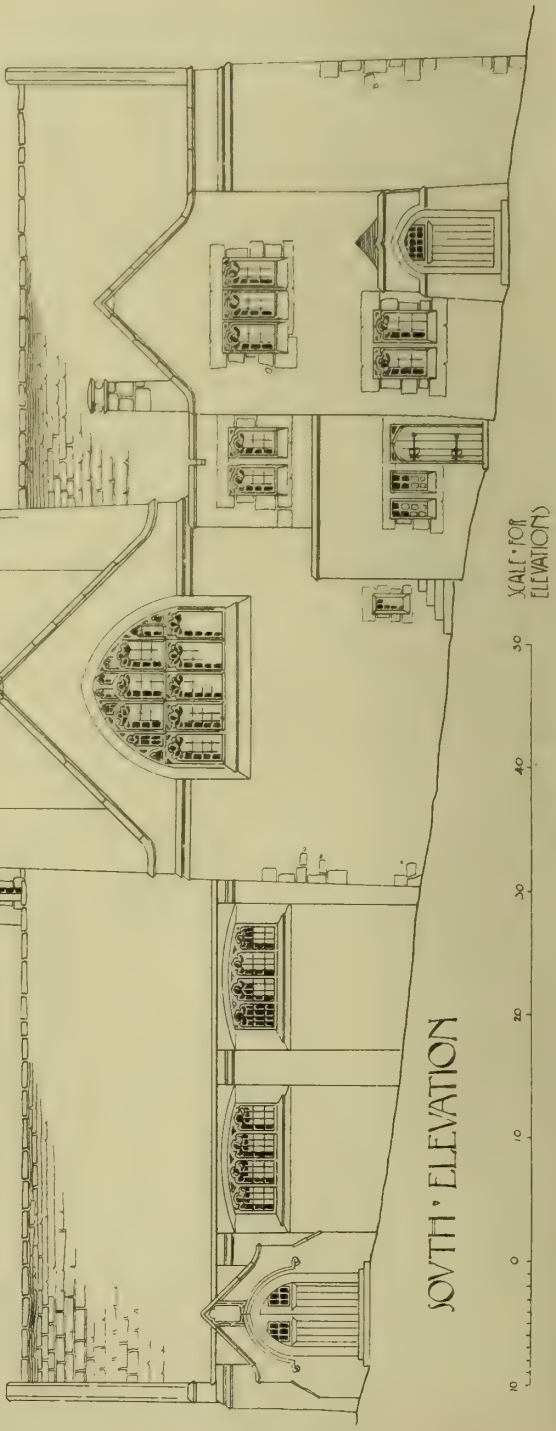






SKETCH

BUILDING NEWS DESIGNING CLUB  
A MOUNTAIN CHAPEL  
BY MCGILLICHAH & CO  
PLACED FIRST



SECTION









*Photo Process Block by J. A. Marshall & Co., Sydenham.*

THE OLD BELL INN, HOLBORN.

DRAWN BY F. GUY DAWELR.





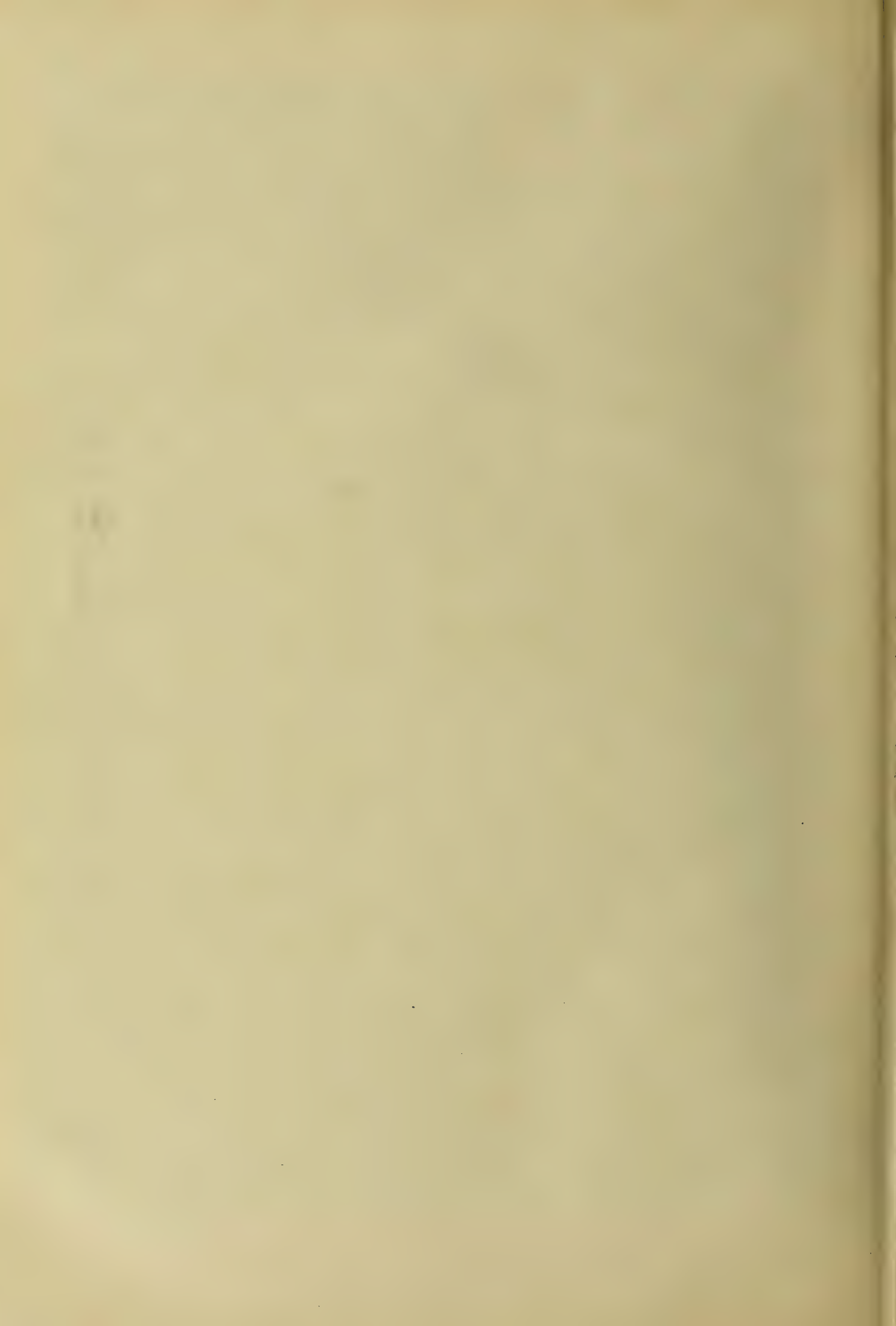
THE GEORGE,  
DORCHESTER  
F. C. D.

*Photo Process Block by J. A. Marshall & Co., Sudenham.*

THE GEORGE, DORCHESTER.

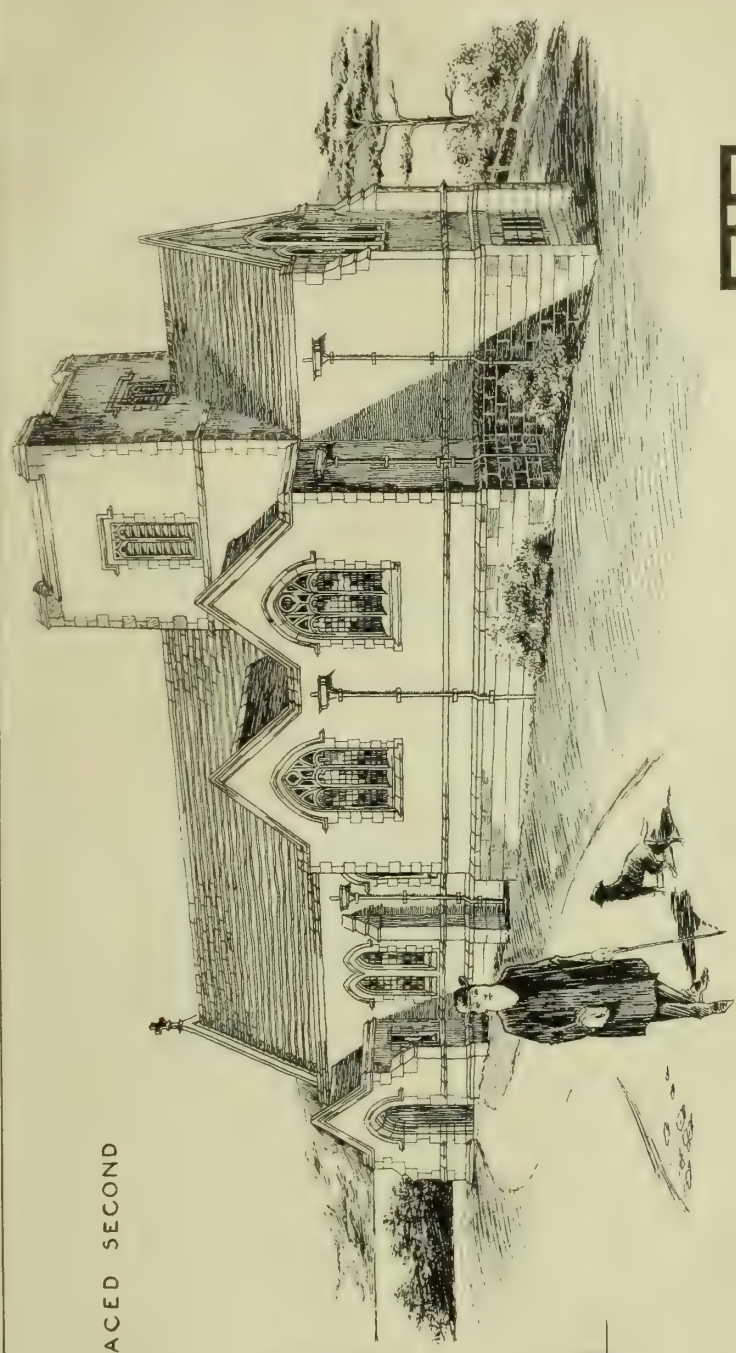
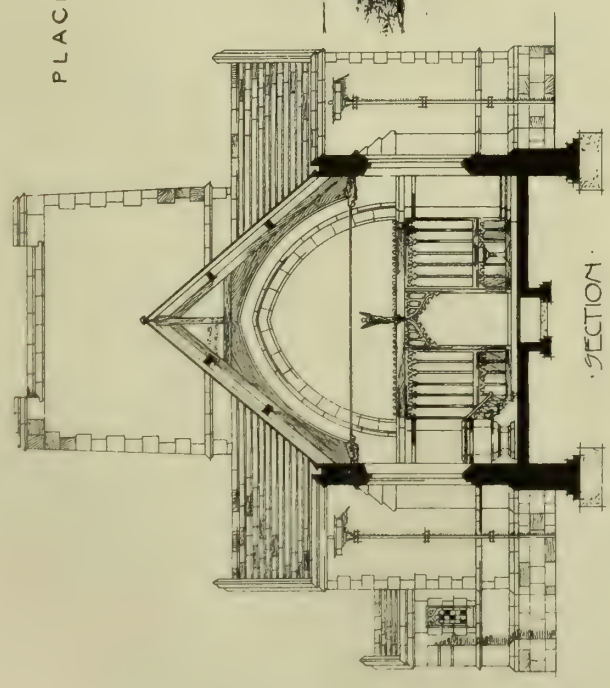
DRAWN BY F. GUY DAWBER.



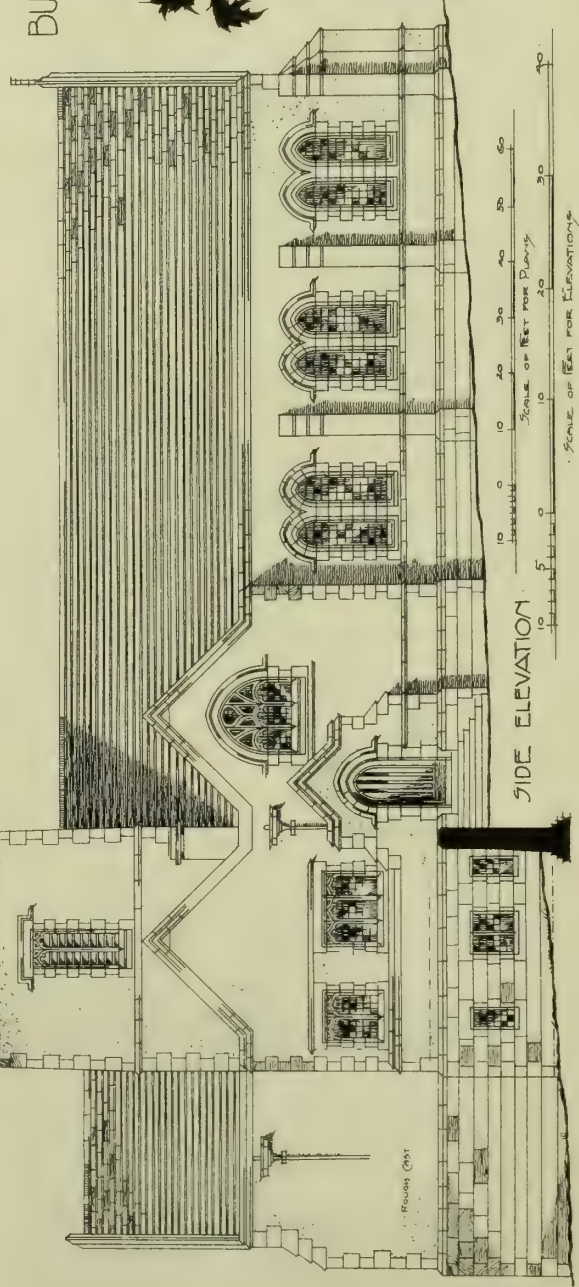




PLACED SECOND



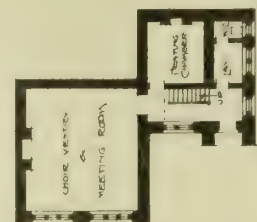
SECTION



SIDE ELEVATION

SCALE OF FEET FOR PLANS

SCALE OF FEET FOR ELEVATIONS

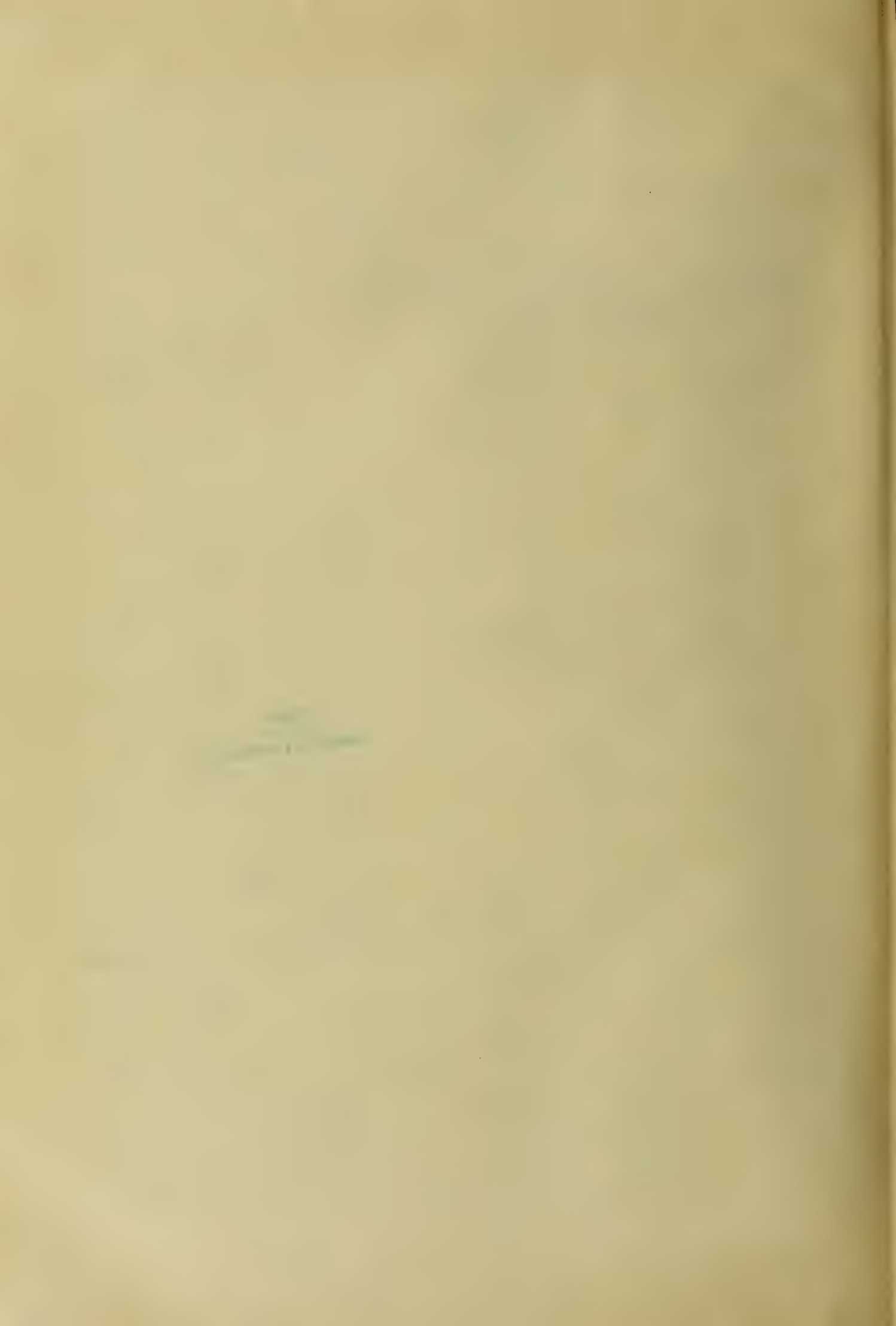


PLAN

BUILDING NEWS DESIGNING CLUB  
A MOUNTAIN CHURCH  
BY "THISTLE"

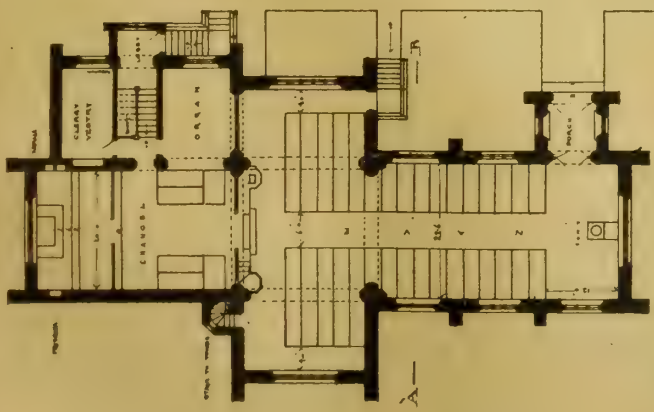
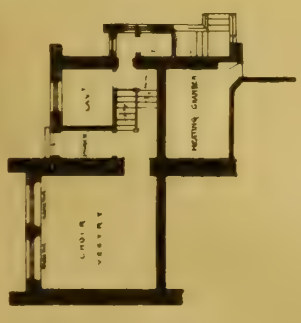




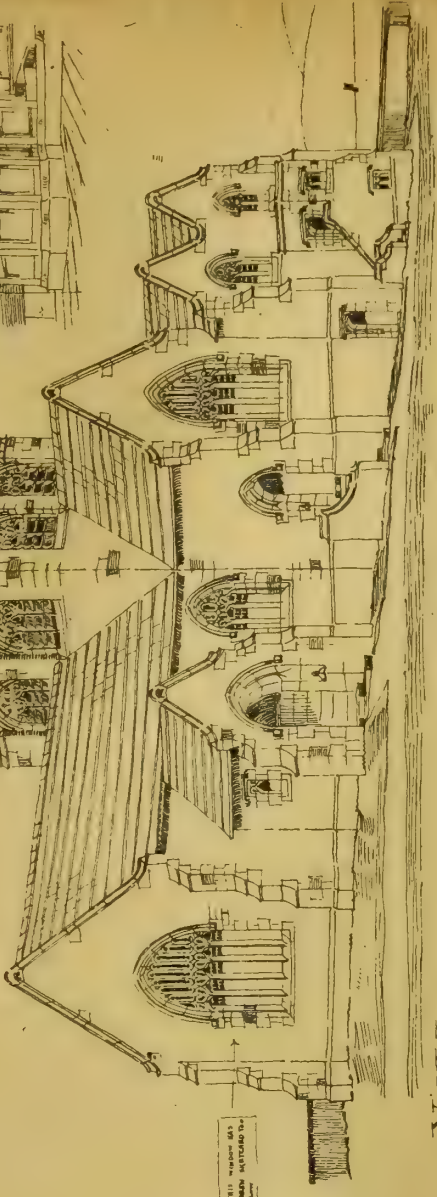




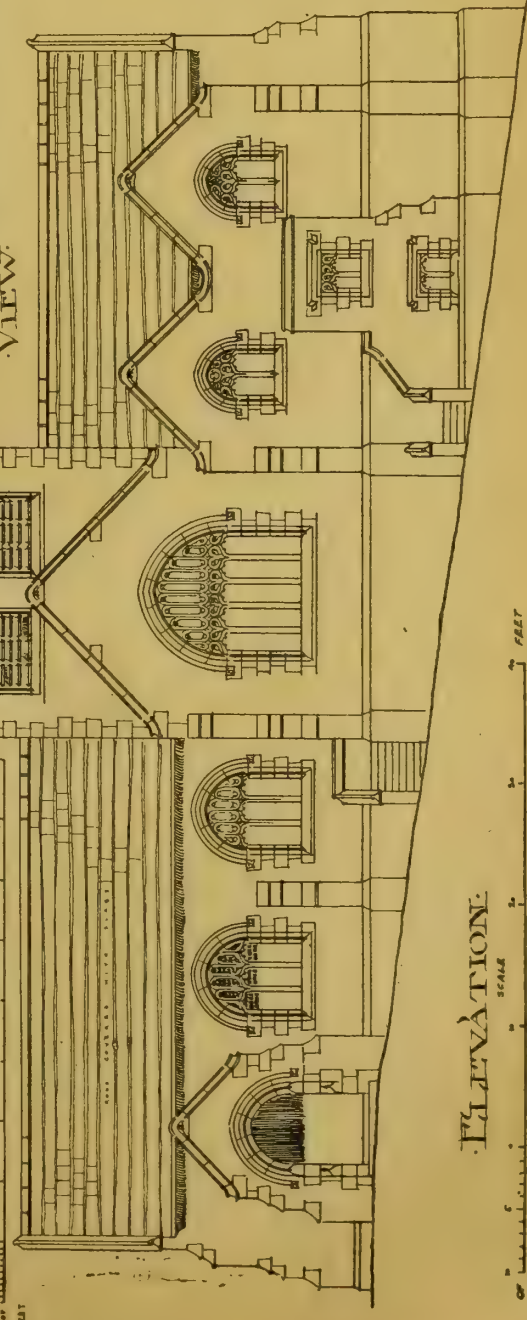
B.N.D.C.  
A MOUNTAIN CHAPEL  
BY  
"TOKIO"  
Placed Third



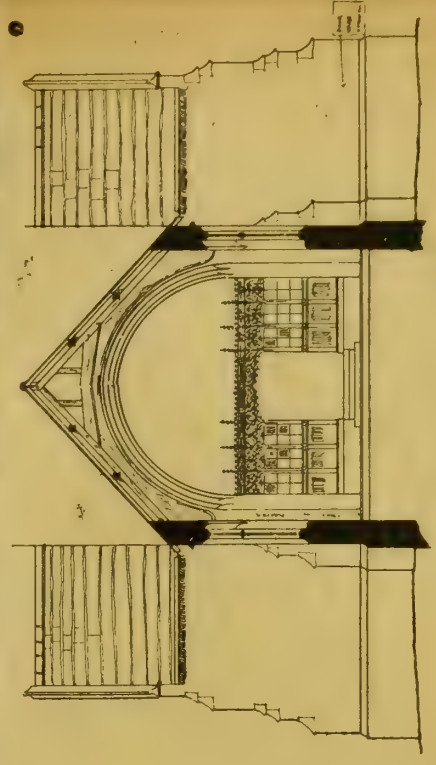
GROUND PLAN



VIEW



ELEVATION



SECTION A.B.

SCALE  
0 1 2 3 4 5 6 7 8 9 10 FEET



## Correspondence.

### BRADFORD FIRE BRIGADE COMPETITION.

To the Editor of the BUILDING NEWS.

SIR,—Some time ago the Bradford City Council issued conditions for competitive designs for a new central fire brigade station. Those conditions were so obviously unfair to the profession that the society named below, after careful consideration of them, decided to suggest to the city council that considerable amendment of the conditions was necessary in order that the best class of professional men could take part in the competition, and I was instructed by my council to convey their recommendations to the town clerk, which I did in a letter dated Nov. 16.

In consequence of those recommendations the city council have materially amended the conditions. The council of our society considered that the matter might be of interest to the profession generally, and I was therefore instructed to forward you a copy of the correspondence which has passed between myself and the town clerk. As I cannot forward you a copy of the original and amended conditions, I will shortly explain that paragraph 4, referred to in my letter to the town clerk, provided that "if the works be carried out under the supervision of one or more of the competitors whose designs have obtained the premiums, then the said premium or premiums shall be merged into and become part of the architect's commission."

It would appear from this condition that the works might have been divided amongst some of the competitors; but in the amended conditions this has been entirely abandoned.

Paragraph 7 in the original conditions provided that "the corporation do not bind themselves to carry out any of the designs submitted, and reserve the right, either alone or with the advice of any professional expert they may see fit to employ, to decide as to any design which shall be carried out." This has so far been modified, as you will see by the town clerk's letter of Nov. 23, that the city council, although they do not pledge themselves to call in an assessor, yet if they do so he shall be an expert nominated by the President of the R.I.B.A.

Paragraph 5 of the original conditions provided that "a commission of 5 per cent. on the total cost of the building will be paid to the architect for carrying out the work, including preparing and printing bills of quantities. No charge of any kind shall be made by the architect against any builder or contractor, or other person, for supplying quantities."

In the amended conditions the commission arranged for is now 5 per cent., plus  $1\frac{1}{2}$  per cent. for quantities.

The date for the sending in of designs has been extended to Feb. 1, 1899, the previous date being Jan. 2, 1899, and the date of issue of the original conditions Oct. 25, 1898, and the city council have also agreed to give a 10 per cent. margin over the £15,000 proposed to be spent.

The conditions as originally drafted were altogether objectionable and unsatisfactory to the professional men in this district, and although the amendments are not everything that could have been desired, my council think the alterations obtained are satisfactory.—I am, &c.,

JAMES YOUNG, Hon. Sec.

Bradford Society of Architects and Surveyors,  
December 20.

[COPY OF LETTER TO TOWN CLERK.]

### FIRE BRIGADE STATION COMPETITION.

DEAR SIR,—The conditions issued in connection with the above competition have been brought under the notice of this Society, and have received their careful consideration.

The Society, which is fully representative of the architectural profession in the City, considers that certain amendments in the conditions are desirable, and I am directed to forward you a copy of the Society's recommendations, and to ask if you will be good enough to bring the same before the council who have the matter in hand as early as convenient.

Proposed amendments of conditions referred to above:—  
(1) With reference to the 7th and 4th paragraphs, the Society would strongly urge that an independent assessor, or assessors, should be appointed to adjudicate upon the designs sent in; that his or their award of the several premiums should be final, and that the competitors who may be awarded the first premium should be solely employed to carry out the work. The name of such assessor should be made known to competitors before the date fixed for sending in designs.

(2) The rate of commission fixed in paragraph 5 is inadequate, and is not in accordance with the ordinary practice in the profession. Commission should be at the

rate of 5 per cent., exclusive of preparation and printing of quantities.

(3) The period allowed for preparation of designs is insufficient, and should be considerably extended.

The Society believe that the amendments suggested above would have the effect of attracting a better class of competitors, and would bring the conditions more into accordance with the recognised practice in all important competitions.

Yours truly,

JAMES YOUNG, Hon. Sec.

George McGuire, Esq.,

Town Clerk of the City of Bradford.

[COPY OF TOWN CLERK'S REPLY.]

### PROPOSED NEW FIRE BRIGADE STATION.

SIR,—I have submitted your letter of the 16th inst. to my Fire Brigade Committee, with the result that, after further consideration of the conditions of competition as originally drafted, the Committee have agreed to alter the same in manner shown by the print of Revised Conditions inclosed herewith.

The material alterations are as follows:—

Five per cent. commission will be paid to the architect engaged to carry out the work, the Corporation paying  $1\frac{1}{2}$  per cent. (being the local rate) for quantities.

The Corporation do not pledge themselves to call in an Assessor, as they and their officers are so well qualified to judge as to the extent to which the arrangements shown on plan will be suitable for a Fire Brigade Station; but they say if they do call in an expert they will accept the nominee of the President of the R.I.B.A.

If it is considered desirable to construct the buildings shown on the first premiated design, the Architect submitting that design will be engaged to carry out the work; but the premium must merge in the commission, and no allowance will be made to any Architect residing or carrying on business outside the City for travelling expenses.

No design will be regarded as complying with the conditions unless a tender from a contractor of standing can be obtained for carrying it out within a 10 per cent. margin of £15,000.

The time for submitting designs is extended to the 1st February, 1899.

Yours faithfully,

GEORGE M. GUIRE, Town Clerk.

James Young, Esq.,

Hon. Sec. Bradford Society of Architects and Surveyors, 62, Market-st., Bradford.

### AUTOMATIC GAS-METERS AND COOKERS.

SIR,—As a side issue to the engineering world, the rapid development of the penny-in-the-slot system, which has astonished the millions, demands something more than a passing notice. Perhaps one of the most surprising adaptations is that for gas distribution. The enormous success of this system is possibly due mainly to the reasonable desire of the public for knowing what they are buying, the cash payment, and also to the immense popularity of the pennyworth.

To such a state of perfection have automatic gas-meters been brought, it is impossible to foresee to what extent they will be ultimately extended. It is probable in the near future that different rooms, workshops, offices, &c., of the same institution will control the consumption of what is required for lighting and heating purposes by automatic interception meters, rather than allow an indefinite quantity of gas to be used without regard to cost, as in many cases existing at present. Such waste not only affects the cost of production of materials, but also the health of the workers, which is of the first importance. It may be found advantageous, where rooms are let as apartments in houses or hotels, to allow each tenant to be responsible for their own amount of gas, in preference to the unsatisfactory fixed charges so generally made. For internal arrangements in workshops slot meters might be employed by a mutual arrangement with the head of the department and the employes. Of course, in such a case the meter would be the property of those directly concerned. The meters being fixed in a passage or landing can easily be available for examination and collection from time to time. In cases of illness, the ready check afforded upon the consumption of a bedroom stove is a satisfactory element. Applications for automatic meters are so numerous that few gas undertakings can afford to be independent of the assistance afforded by them. It is not so much the financial side of the matter as revenue earners that has to be considered, as the popularising of gas in every home, office, or workshop. It has recently been pointed out that for city and town offices a gas-fire is perhaps as useful a system of heating as can well be used, no attention being required from the time the stove is lit in the morning to when it is turned off at night, thus saving not only time in this, but avoiding annoyance of too large or too small a fire, and other attendant inconveniences. For bedrooms gas-fires are becoming increasingly popular. Where properly fixed and connected by a flue direct into the chimney, this method of heating is peculiarly suitable. The temperature of a room can be maintained most evenly night

and day, which in several cases of illness is of immense importance, while the necessity for making the fire up and thereby disturbing a patient are dispensed with. There is, moreover, the additional important consideration that the fire is always available. To those affected with asthmatical, bronchial, or kindred complaints this cannot afford to be disregarded, especially considering the liability of a sudden attack, which often occurs in the middle of the night, when some hours must frequently necessarily elapse before a coal fire can be got ready. If this notice were from a medical point of view instead of from an engineering one, much might be said upon this subject. The omission of reference to the convenience obtainable in cases of illness would, however, render any notice of gas-fires incomplete.

Many gas undertakings are now recognising the importance of giving every facility for supplying gas-fires, are fixing them free of cost, and only making a nominal annual charge for the stove. The undertaking of which I have the honour to be the engineer is doing this with good results. In consequence of what has become to be known as the "fixed free" stove business, the numerous stove and meter makers have been inundated with orders, the delays occasioned in consequence being vexing alike to the consumer and the gas officials. The method of calculating the desirability of adopting this penny-in-the-slot system is most simple. My experience is that for an ordinary automatic meter for lighting purposes only, the annual gas consumption therefrom equals 10,000c.ft., and where a small cooker is supplied, this consumption is doubled. This quantity of gas at the profit of cost on manufacture per thousand will furnish the income available as interest on the small original outlay, depreciation, and the extra cost of collection. From 20c.ft. to 35c.ft. of gas for 1d. is the general charge. An ordinary flat flame burner consuming 5ft. per hour will thus last from four to seven hours, or, where an incandescent burner is used, consuming from 3c.ft. to 4c.ft. per hour, the time the pennyworth will last is proportionately longer. Generally speaking, gas undertakings supply fittings, burners, meter, and stove free of cost, so that the consumer's maximum liability is only one penny. The addition of a small cooking stove is as great a convenience comparatively in small-class property as in large, where gas cooking stoves are considered well-nigh indispensable.

Such a development in one of the branches of the great engineering profession is truly astounding.—I am, &c.,

EDWARD A. HARMAN.

Corporation Gasworks, Huddersfield.

### CHIPS.

The partnership heretofore subsisting between A. Oliver and J. C. Hudson, architects and surveyors, Bedford-row, W.C., and Leman-street, White-chapel, E., under the style of Wigg, Oliver, and Hudson, has been dissolved.

The markets committee of the Leeds Corporation gave instructions on Monday to the city engineer, Mr. Thomas Hewson, to prepare a ground plan of the new market hall which it is proposed to erect in Vicar-lane, with the view of the committee advertising for competitive designs from architects.

The town council have accepted a portrait of Sir William Henderson, ex-Lord Provost, painted for a body of subscribers by Sir George Reid, P.R.S.A.

Sir James Szlumper, M.Inst.C.E., has announced his award in the dispute between the Lynton Railway Company and the contractor, Mr. J. Nuttall. It is stated that the amount of the award is £27,500. Mr. Nuttall claimed £40,000. It is probable that litigation will arise out of the disputed claim.

The winter exhibition at the New Gallery, which will be opened to the public on Saturday in next week, the 31st inst., will contain the major portion of Sir E. Burne-Jones's easel pictures. No fewer than 125 canvases have been lent, including the whole of the "Perseus" series and the "Avalon" painting. There will be also exhibited a supplementary collection of some 200 drawings and studies.

New branch premises have just been completed on the site of St. Michael's Church, Wood-street and Gresham-street, for a London Joint Stock Bank. The building has been erected from plans by Messrs. Davis and Emmanuel. The internal fittings have been designed by Mr. Harrison, architect to the company. Mr. John Greenwood built the substructure, and Messrs. Ashby and Horner the upper portion of the premises, which are Italian Renaissance in style, and are faced with Portland stone. The iron and steel construction and flooring were executed by Messrs. Dennett and Ingle.



# Intercommunication.

## QUESTIONS.

[12134.]-**Lime-Kiln.**-I am thinking of starting a lime-kiln. Would some reader furnish me with a few particulars as to rough cost of erecting, say, one kiln? And what would be about burning capacity per week, size of kiln, heights, &c., and what consumption of coal per week? And, generally speaking, do you think it worth going in for? There is a good demand for lime for building purposes in the district.-E. BOLSON.

[12135.]-**Bank Fittings.**-Can any correspondent give me any information as to bank fittings-viz., width required for each clerk, depth of clerks' desks from front to back, space required behind counter to front of clerks' desks, space behind clerks' desks (1) when all facing one way, (2) when back to back?-FRED MITCHELL.

[12136.]-**Architect's Responsibility.**-Is an architect to be held liable for scamped plumbers' work, such as the siphonage of closets through having no ventilating pipe, also the connection of waste with soil-pipe, the proper weight of lead specified? Is it his duty to cut out pieces of lead and see that they are of right weight? If there is no clerk of works, can he be held to have neglected his duty in matters of this kind? A careful inspection of these details would be out of the question in a large building.-DOUBTFUL.

[12137.]-**Ceiling Decoration.**-I should like to be informed whether fibrous plaster ceilings or papier mâché can be fixed to ordinary plastered ceilings. Is it necessary to have nails or screws? I think the "Asbestos Salamander" decoration can be fixed without, by means of a composition. Perhaps someone will kindly inform? -A READER OF "B.N."

[12138.]-**Kitchen Range.**-Will anyone conversant with the law of landlord and tenant say whether a landlord can be called upon to put in a new kitchen range for an old one quite worn thin and very shaky. The tenant has been in the house several years. The agreement is the usual "three-year agreement," and he has remained on the same terms since.-A TENANT.

[12139.]-**Wash-Down Closets.**-Which of the many "wash-down" pedestal closets can be recommended for ordinary houses? A reply will oblige.-A. L.

[12140.]-**Castings in Plaster.**-Is there any work treating on casting ornament-such things as keystones, consoles, centre flowers, &c.?-LEARNER.

[12141.]-**Depreciation of Property.**-What compensation would be fair to be paid to the owner of houses in a suburban neighbourhood for the depreciation caused by the erection of a board school? It is generally admitted that a large public school and playground attached are detrimental to private residential property; in fact, quite recently a case was decided in the Queen's Bench, in which the Court ruled in the affirmative. The owner is the unwilling vendor under compulsory purchase.-FAIR PLAY.

[12142.]-**Damp Cellar.**-Is there any remedy that can be applied to a cellar which is always damp, in clay soil? The walls are 14in. brick and solid. Can I line the inside of walls with some composition? A correspondent of your valuable journal may be able to suggest a remedy.-ANXIOUS.

## REPLIES.

[12128.]-**Red Deal Doors.**-My opinion is that the time given by Laxton is not excessive where hand-labour alone is employed. Of course, if machinery is used, the time can be greatly lessened.-LOUIS EAWOLD.

[12129.]-**Floor Boards.**-Boards with sap on the edges ought not to be used for flooring, and if the floor is well ventilated, probably the white deal will last quite as long as sappy yellow stuff.-L. E.

[12129.]-**Floor Boards.**-I should prefer the ordinary red flooring-either red Norway or Swedish, if good. Of course, a well-ventilated ground floor is necessary to resist decay. For this purpose a good supply of air-bricks in opposite walls is required, and well-drained subsoil.-G. H. G.

[12130.]-**Roof Construction.**-“R. S. J.” does not consider that 10ft. or 14ft. apart for principals is a convenient distance. It often corresponds with the window bays, and architecturally it is much more satisfactory than a distance of 20ft. or 25ft. would be. There are, however, no practical difficulties in having steel purlins with wood bolted on each side; but for purlins of this weight, and the load of roof on them, very much stronger principals would be necessary. I can hardly understand what “R. S. J.” means when he says: “One has seen principals dispensed with in house roofs where steel purlins 20ft. span have been used.” Personally I should not like to construct such a roof; but where such purlins are found, the principals have been replaced by brick walls or some direct support.-G. H. G.

[12130.]-**Roof Construction.**-I see no reason why the roof should not be constructed on the principle of “R. S. J.’s,” except that where the purlins showed, if cased in wood, they might look extremely weak for the weight they had to bear, which hardly adds to the effect of an otherwise good piece of design.-L. E.

[12131.]-**Fibrous Slab Decoration.**-Screws hold the fibrous plaster slabs better than nails, and the hammer is likely to injure the slabs by cracking them; whereas, a hole made with a Bradawl will allow of a screw being put in so as not to injure the most delicate pieces of fibrous plaster. The joints can be made with plaster of Paris, and in panelled ceilings they are generally arranged so that the moulding covers the joint. Full particulars can be obtained at any manufacturer's.-L. E.

[12131.]-**Fibrous Slab Construction.**-I should fix the slabs with brass screws to battens. In some kinds of ceiling decoration a strong glue is used, but in this case the slabs are thin.-G.

[12132.]-**The Slide-Rule.**-I do not think many architects use the slide-rule in their calculations, but

engineers do. A certain degree of expertness is necessary in using the rule; many have given it up because they have not mastered it. Besides the ordinary rules of arithmetic, the slide-rule can be used in finding the sines and tangents of angles, areas and volumes, mechanical problems, strength of beams, their stiffness, struts, hydraulic calculations of head and pressure, rate of flow, &c. A certain theoretical knowledge of logarithms is necessary, but it is slight, and I can recommend “A Novice” to a little book by R. G. Blaine, M.E., just published by Spon, called “Quick and Easy Methods of Calculating,” which contains an explanation of the theory with numerous examples worked out.-G. H. G.

[12132.]-**Slide-Rule.**-Architects and engineers use the slide-rule to check the calculations they may have to make. A small pamphlet is usually sold with the slide-rule, from which full particulars as to the working can be obtained. The rule is worked out by the aid of logarithms, but it is not necessary to have a knowledge of them to be able to use the rule.-L. E.

[12133.]-**Plumbing.**-There are several works on plumbing containing details that “Architect” requires. Messrs. Crosby Lockwood and Co. publish some works on plumbing, as also do Messrs. Spon and Co., Ltd. Write to these publishers for a descriptive catalogue.-L. E.

## CHIPS.

The joint hospital committee for Bromsgrove, Droitwich, and Redditch have adopted plans by Mr. H. T. Hare, F.R.I.B.A., of London, for a hospital of 36 beds, with administrative block, mortuary, &c., and have appointed Mr. Hare joint architect with a local professional man. The estimated cost of the building and furnishing is £9,000.

The new Theatre Royal, Barnsley, was opened on Monday night. It has been built from the plans of Mr. Walter Emden, P.S.A., of London, carried out under the superintendence of Mr. H. Crawshaw, Barnsley, and has sitting accommodation for 1,200 spectators.

In the Trades' Hall, Glasgow, on Monday, the portrait in oils (publicly subscribed for and painted by Mr. John P. Downie) of Dr. John Burns, a well-known practitioner in the West of Scotland, was presented to the corporation. It will be hung in the Corporation Art Gallery.

The corporation of Glasgow have recently been experimenting with a view of discovering some better material for street paving than the ordinary sett stones. In furtherance of this scheme, a portion of Buchanan-street has been laid with Alcatraz asphalt and another portion with Seyssel asphalt.

In the case of the application made on behalf of Thomas Edward Irish Channing, Gibson-square, Liverpool-road, Islington, builder, the order of discharge has been suspended for five years ending Nov. 23, 1903. In that of Alice Maria Sage (trading as A. M. Sage and Co.), late Cranburst-road, Willesden Green, N.W., builder, she being a married woman, trading separate and apart from her husband, and having separate estate and assets, the order of discharge has been suspended for two years ending Nov. 22, 1900.

The memorial to the late Right Hon. Sir A. B. Forwood, M.P., will take the form of a statue to be erected at Liverpool.

The old oak screen in Armitage Bridge Church has just been restored; the carving has been made good and the eight panels have been decorated. The figures in the panels have been designed and executed by Messrs. Powell Brothers, of Park-square, Leeds.

The demolition of the houses on the western side of Parliament-street, which has been proceeding for some months, is now nearly complete, and the formation of the site into a carriage-way has been commenced. The new roadway will be made and paved with wood before the meeting of Parliament. An uninterrupted view of Westminster Abbey can now be had from Whitehall, and Parliament-square is now seen to advantage.

A memorial tablet is about to be erected by a committee of eminent engineers and Lady Bazalgette to the late Sir Joseph W. Bazalgette. The tablet will be attached to the wall of the Victoria Embankment, at a point facing the end of Northumberland Avenue, and near the Charing Cross pier.

An interesting memento of the early days of the railway in this country was sold at Mr. J. C. Stevens's rooms, King-street, Covent Garden, on Monday. This was Robert Stephenson's plan of the railway from London to Birmingham, scale 4in. to the mile. The survey was commenced in 1830 and finished in 1832, and the actual work of the railway started on June 1, 1834. The copies of this plan, deposited when powers were applied for, were burnt in the great fire at the House of Commons Private Bills Office in 1834.

The prizes awarded to students in the Trades Training School in Great Titchfield-street, W., were distributed at Carpenters' Hall, London Wall, last (Thursday) evening by the Duke of Fife. The certificates and medals gained at the Carpenters' Company's examinations in sanitary building construction and in carpentry were also given by the Duke.

## LEGAL INTELLIGENCE.

**TRADE UNIONIST "EXTORTION."**-At Leeds Assizes, on Tuesday, before Mr. Justice Channell, Billington Firth, 37, plasterer, on bail, was charged under the 3rd section of Lord Campbell's Libel Act (6 and 7 Vict., c. 96) (1) with threatening to publish, touching John William Longbottom and Frederick Furniss Longbottom, certain matter with intent to extort money; and (2) with indirectly offering to the same persons to prevent the publishing of the same matter with the like intent at Huddersfield on August 1, 1898. The prosecutors had some time ago in their employment two men named Johnson and Whitehead who were members of the National Association of Operative Plasterers, the prisoner being the secretary of the Huddersfield branch of that association. In January last these men resigned their membership of the association, whereby a letter was sent to their employers with a view to compelling them to induce the men to return to the union, and to pay their back subscriptions. No notice was taken of the letter and, in consequence, a second letter was written to the prosecutors stating that unless the two men "cleared their cards" the society's men would cease to work for them, and the union men were subsequently withdrawn from the prosecutor's employment. Eventually, on August 1, 1898, a letter was written to the prosecutors in the following terms:—"Dear Sir.-At a special meeting of the above branch (National Association of Operative Plasterers, Huddersfield District) it was passed that no society men be allowed to work for your firm. Also that a fine of £5 (five pounds) be laid against your firm, and the same be posted in our report till the fine be paid," the letter being signed by the prisoner. This was the "matter" complained of, and it was contended that it came within the mischief aimed at by the statute. The facts were not in dispute. In giving evidence, the prisoner stated that the firm was "blacklisted," that was, reported for the benefit of the society, and in cross-examination he added that when the fine was paid the firm's name would be struck out of the report. Defendant's counsel argued that there was no threat, and that there had been no infringement of the law, as all that had been done was to give notice to the prosecutors of a resolution which had been properly passed. The jury returned a verdict of Guilty, but recommended the prisoner to mercy, as they thought he had acted in ignorance of the law. The learned judge said that it was a very strong measure for a trade union to improperly claim a right to impose a fine on the prosecutors and then to tell them that unless it was paid their name would be published in the "black list." The sooner it was known that this was unlawful the better. At the same time, he did not wish to send a respectable man like the prisoner to gaol. He accordingly sentenced him to a fortnight's imprisonment dating from the commencement of the assizes, the result of which was that the prisoner was immediately discharged.

**RESPONSIBILITY FOR SEWER OVERFLOW.**-JONES V. BARKING URBAN DISTRICT COUNCIL.-[Court of Appeal, Dec. 9, before Lord Justice A. L. Smith, Lord Justice Rigby, and Lord Justice Collins.] This was an appeal from the decision of a Divisional Court (Mr. Justice Wright and Mr. Justice Darling) reversing the judgment of the County-court Judge at Romford in favour of the plaintiff. The action was brought to recover damages for injury to a wall belonging to the plaintiff, by the overflow from a sewer. The plaintiff was the owner of certain houses in Loxford-road, at the bottom of which ran a brook. A sewer, which was vested in the defendants, ran along Loxford-road, having a dead end next the brook. In May, 1897, a heavy fall of rain occurred, and the storm-water filled the sewer and forced the water up a branch drain and flooded the plaintiff's land and washed away part of his wall which separated the land upon which his houses were from the brook. There had been a previous overflow in 1896, and the wall was damaged, and complaint was then made to the defendants. Since the last overflow the defendants had put in storm openers in their sewers. The plaintiff contended that the defendants were negligent in not "keeping" the sewer in a proper condition under sections 15 and 19 of the Public Health Act, 1875, by reason of their not having storm-openers therein. The jury found that the defendants were not negligent in not having sufficient sewers to carry off the sewage; that the overflow arose from an extraordinary storm, which overflow could have been relieved by ordinary care, and that the defendants should, after the accident in 1896, have had storm-openers put in the sewer. The County-court Judge, upon these findings, entered judgment for the plaintiff for the amount claimed. The Divisional Court entered judgment for the defendants. The plaintiff appealed. Mr. Rentoul, Q.C., and Mr. G. M. Cohen, for the plaintiff, said that this was not a case like "Robinson v. Mayor, &c., of Workington" (1897, 1 Q.B. 619), or "Peelies v. Oswaldtwistle Urban District Council" (1897, 1 Q.B. 625), where a new sewer or a new system of sewerage was required. Here there was only a question of a very small expense-about



£5 or £6—for putting in a storm-opener in the sewer. The defendants did not "keep" this sewer in proper order within the meaning of section 19 of the Public Health Act, 1875. They had full knowledge of the danger likely to arise from the condition of the sewer, and did not put in storm-openers. They referred to "Stretton's Derby Brewery Company v. Mayor, &c., of Derby" (1894, 1 Ch. 31, at p. 440); "Hamond v. Vestry of St. Pancras" (L.R. 9 C.P. 316). Mr. Bartley Dennis, for the defendants, said that four storm-openers in different parts of the sewerage system were necessary to prevent the overflow of storm-water. It was a question of an alteration of the system of sewerage, and no action lay in respect of that. The Court dismissed the appeal. Lord Justice A. L. Smith said that the question was whether the action was maintainable. Instead of the proposed work on the sewer being, as was suggested, a matter of merely a few pounds—even if that would have made any difference—the facts, when ascertained, showed that what was necessary to be done in connection with the putting in of four storm-openers in the sewers amounted to an alteration of, and an improvement in, the system of sewerage of the district for the purpose of carrying off the storm-water. The case, therefore, came within the decisions in "Robinson v. Mayor, &c., of Workington" and "Peebles v. Oswaldtwistle Urban District Council," and the only remedy was by complaint to the Local Government Board under section 299 of the Public Health Act, 1875. That was the view of the Divisional Court, and in his opinion that view was correct. Lord Justice Ryghy and Lord Justice Collins concurred.

**COMPULSORY POWERS OVER LAND OUTSIDE LIMITS OF DEVIATION.**—DONALDSON V. THE SOUTH SHIELDS CORPORATION.—This motion, heard by Mr. Justice North, on Dec. 9, was to restrain the defendant corporation from proceeding with steps to take under compulsory power property abutting upon the intended frontage of a street the corporation was widening under their Act of 1895, which Act empowers them to make several improvements, including the widening of a number of streets, and the construction of a new street. The practical question between the parties was whether the corporation was entitled, in addition to the land actually required for widening a street, to take land adjoining and resell it at a profit, and thus recoup themselves part of the expense of carrying out the authorised street works. The defendant corporation had given notice to the plaintiff to take premises belonging to her which were delineated in the Parliamentary plans, and described in the book of reference which had been deposited, in accordance with standing orders, previously to bringing in the Bill which subsequently ripened into the corporation's Act of 1895. The property in question abutted on the line of frontage of Fowler-street as intended to be widened under the powers of the Act, but was outside the limits of deviation allowed for the widening of the street itself. Mr. Rawlins, Q.C., and Mr. Waggett contended that this came within the class of cases where railway companies and similar undertakers have been held not entitled to take compulsorily land outside their limits of deviation. Mr. Cripps, Q.C., and Mr. O. Leigh Clare, for the corporation, contended that the case came within the decision "Galloway v. Corporation of London," and that a corporation authorised under such words as were used in the present Act for the benefit of their public to make improvements were entitled to the more liberal construction and to exercise the wider powers. Mr. Justice North held that on the construction of the particular words of the Act before him, the corporation were not entitled to take land outside the limits of deviation, and granted the injunction asked for.

**A MILE END ARBITRATION.**—Mr. Under-Sheriff Burchell and a special jury heard at Red Lion-square, Holborn, last week, the case of "Hale v. the School Board for London," a claim for compensation in respect of four houses, Nos. 32 to 38 (even), Albion-street, Mile-end, required for the purposes of a school. The property was held for a term of 90 years from March, 1889, at a ground-rent of £16 per annum, and the houses we let on a weekly tenancy at rentals amounting together to £98 16s. On behalf of the claimant it was submitted that the premises were underlet, and that they were worth about £130 per annum, representing a net income of £70 a year after paying ground-rent, rates and taxes, and repairs. Capitalised on the 6 per cent. table, 16½ years' purchase, this amounted to £1,171 10s., to which the customary 10 per cent. for compulsory sale should be added, making a total claim of nearly 1,300. Mr. Alfred Moore (C. C. and T. Moore) and Mr. Shephard (Newbon, Edwards, and Shephard) were the principal experts for the claimant. On behalf of the School Board, Mr. Freeman contended that the existing rental indicated the true value of the property, and that the net income derived from it was about £53 15s., which should be capitalised on the 7 per cent. table, 14½ years' purchase, or £765, to which the usual 10 per cent. should be added. The experts for the Board were Mr. Samuel Walker (S. Walker and

Son), Mr. Mark Liell, Mr. W. S. Cooke, and Mr. J. A. Tharp. The jury awarded the claimant the sum of £1,210, inclusive of 10 per cent. for compulsory sale.

**SINGULAR CHARGE OF STEALING AND WIREWORKING HOUSES.**—George H. Richards, 45, described as a plumber, of Vartney-road, Stamford-hill, was charged on remand at North London Police-Court on Friday with stealing the materials of two houses, Nos. 27 and 28, Clapton-square, valued at £300. The evidence was that Mr. C. W. Matthews, of Albany-road, bought the freehold of the houses in September, but did not visit them for a month, when he was surprised to see that they had been demolished, and the materials taken away without his permission. He communicated with the police, and the prisoner was arrested. Mr. George Eyles, a builder, of Brixton, who is erecting some new houses in Clapton, was called to say that he had bought a quantity of old building materials of the prisoner, and paid him a fair price for them (the receipts were produced). Detective-sergeant Nursey, who apprehended the prisoner, said the latter had given an address which was not correct; but prisoner's counsel said the address on the cards in the prisoner's bag was an old one. As a fact, the prisoner was a respectable man, engaged in large pulling-down jobs. The prisoner—whose defence was that he had bought the right to demolish the houses and dispose of the materials of a man representing himself to be Mr. Matthews—was again remanded, and has been committed for trial.

**LIABILITY FOR PRIVATE STREETS WORKS.**—TWICKENHAM URBAN DISTRICT COUNCIL V. MUNTON AND OTHERS.—Mr. Justice Stirling gave judgment on Dec. 10, in the Chancery Division, on a summons claiming a declaration that the plaintiffs were entitled under section 13 of the Private Street Works Act, 1892, to a charge on certain houses and lands vested in the defendants, and situate in Montpelier-road, Twickenham, for the apportioned amount of expenses incurred by the plaintiffs in executing private street works under section 6 of the above-mentioned Act, together with interest, and for consequential relief. The Private Street Works Act, 1892, was duly adopted for the district of Twickenham, and came into operation on February 22, 1893. On June 27, 1895, the plaintiffs resolved, with respect to Montpelier-road, to do the various street works mentioned in section 6 of the Act, with the exception of lighting. On July 25, 1895, the plaintiff passed the following resolution:—"That the specifications, plans, sections, estimate, and provisional apportionment prepared by the council's surveyor with reference to the making-up of Montpelier-road, Twickenham, be and they are hereby approved." The specifications, &c., mentioned in the resolution related to the whole of Montpelier-road. The resolution was duly published, and copies thereof served, in accordance with section 6 subsection 3 of the Act, on the defendants and other owners of premises affected thereby. The defendants gave no notice of any objection; but another owner did give such notice, and on January 1, 1896, the justices held that a part of Montpelier-road was a street repairable by the inhabitants at large, but that the remainder was a private street within the meaning of the Act, and they amended the plan, estimates, and apportionment so as to limit the operation thereof to the latter portion of Montpelier-road. The justices did not direct any fresh notices to be served, and no further notices were served either on the defendants or on any other persons. The defendants were willing to pay the sums mentioned in the summons provided the whole of Montpelier-road was repaired; but they objected that the repair of the portion to which the scheme of the plaintiffs had been limited by the magistrates was detrimental to them so long as the rest of the road remained unrepaired; and for this reason they resisted the summons. Mr. Justice Stirling, in giving judgment this morning, said it was first contended that the justices had exceeded their jurisdiction by taking upon themselves the duties of the urban authority, with whom rested the determination of the question whether the whole or part only of a street was to be repaired. Undoubtedly section 6 subsection 1 of the Act gave the urban authority the right to decide whether the whole or part of a street was to be repaired, and in the present case the plaintiff council did by resolution determine that the whole of Montpelier-road should be repaired. Subsection 2, however, provided that the specification, estimate, and provisional apportionment of the proposed works should be submitted to the urban authority, "who may by resolution approve the same with or without modification or addition as they may think fit." In this case the approval was without modification or addition. Subsection 3 provided for due notice of the last-mentioned resolution being given to the owners of the premises shown as liable to be charged, anyone of whom might, under section 7, take objection to the proposed works on the following, amongst other grounds:—(a) That an alleged street or part of a street is not or does not form part of a street within the meaning of the Act. (b) That a street or part

of a street is (in whole or in part) a highway repairable by the inhabitants at large. Section 8 provided that such objections should be dealt with by a Court of summary jurisdiction, and also provided that such Court might quash in whole or in part or might amend the resolution, plans, sections, estimates, and provisional apportionments, or any of them, on the application either of any objector or of the urban authority. Here the Court did not quash the resolution, or the plans, sections, estimates, and provisional apportionments, but amended the plans, estimates, and apportionments without touching the resolution, which, however, was so framed as not to require verbal alteration. The jurisdiction of the Court of summary authority to amend a resolution, &c., appeared to his Lordship to exist in a case where the objection taken was that a street or part of a street was a highway repairable by the inhabitants at large no less than where the objection was of any other nature specified in section 7; and where the jurisdiction had been exercised, his Lordship could find nothing in the Act which rendered it necessary that the urban authority should begin their proceedings *de novo* or pass a resolution limiting the works to the part of the street which was not repairable by the public. He thought that the amended resolutions, plans, &c., were meant to take effect as if they had been duly passed by the urban authority itself. In his Lordship's judgment, therefore, the justices did not exceed their jurisdiction. Secondly, it was said that the defendants had been deprived of all opportunity of taking objection to the works now proposed to be executed. That was true, but it lay with the Court of summary jurisdiction to say whether or not further notices should be given to the defendants and the other owners. The justices had a discretion on the subject, and they had exercised that discretion. There again they acted within their jurisdiction, and that objection also failed. For these reasons his Lordship thought that the plaintiffs were entitled to the order for which they asked.

**THE HEIGHT OF LADDERS.**—EMPLOYERS' LIABILITY ACT.—At the Brompton County Court, last week, before his Honour Judge Stonor and a jury, the case of Green v. Kilby and Gayford was heard. The plaintiff, a bricklayer's labourer, claimed £227 10s. damages under the Employers' Liability Act for personal injuries sustained through the alleged negligence of the defendants' foreman, Robert Fome. The plaintiff, who had only been nine days in the employ of the defendants, a firm of London contractors, was attending a bricklayer named Richards on a building in Earl's Court. The ladder which the plaintiff had to ascend with his hod only reached 3ft. above the scaffold stage on which he had to land with mortar. It should have been at least 6ft. above the landing in order to be safe. The plaintiff ascended with his first hod, and when he reached the top he put out his hand to catch the next round, but grasped vacancy instead of the ladder. He fell, hod and all, to the bottom, was severely injured in the knee, and would never again be able to work on a building. The plaintiff bore out in detail the opening statement of the learned counsel. Cross-examined: The foreman had grumbled at him an hour before the accident occurred. Witness was certainly not intoxicated. John Viney, the bricklayer whom the plaintiff was attending, gave evidence as to the sobriety of Green, and declared that it was the duty of the general foreman to see that the scaffold ladders were a proper height above the scaffold stage. Christopher Griffiths, an architect and surveyor, said it was the universal practice in the building trade to have ladders at least 6ft. above the landing-stage, so that workmen ascending could hold on till they safely landed. Two doctors described the plaintiff's injuries, stating that his knee and eyesight were injured. Robert Fome, the general foreman, was called for the defence. He declared that he gave the plaintiff an hour's notice before the accident happened, because he considered him drunk. He "sacked" the bricklayer half an hour after the accident, because he was officious. The jury gave a verdict for the plaintiff for the full amount claimed, and judgment was accordingly entered, with costs on the higher scale.

**LAMBETH VESTRY AND STREET WATERING.**—At the Lambeth Vestry Hall, yesterday, Mr. A. A. Hopkins, one of the stipendiary magistrates for Lambeth, resumed the hearing of the summons issued by the Lambeth Vestry against the Southwark and Vauxhall Water Company to revise the price to be paid by the vestry for water supplied by the company for the purpose of watering streets. It appeared that in 1883 the price for water supplied was fixed by Mr. Chance at 8½d. per 1,000 gals., the price to continue for five years. The vestry had continued to pay that sum, but in view of the improved position of the company, and the fact that the water was supplied to the public baths and the vestry at 6d. per 1,000 gals., the vestry now asked that the price should be revised. Mr. H. J. Smith, clerk, and Mr. J. P. Norrington, engineer to the Lambeth Vestry, proved the facts of the case, and evidence was given as to



the price charged by other companies in the Metropolis. Mr. Claude Baggallay, Q.C., contended that in the face of the increased obligations placed upon the company the price charged should not be reduced. Their capital expenditure had been increased on a greater ratio than their income, and the new storage reservoirs had involved a large amount of unproductive expenditure. Mr. J. W. Restler, engineer, and Mr. Arthur Newton, accountant of the water company, Sir Frederick Bramwell, Mr. Ernest Collins, engineer of the New River Company, and Mr. Willis, of the West Middlesex Company, gave evidence that the present price was moderate, and that the cost of a supply for road watering was always more costly than that to baths. Mr. Hopkins said he would give his decision some day next month. It was agreed that a summons against the Lambeth Water Company in a case identical with the present should be adjourned until the decision in the present case was given.

**WALSINGHAM HOUSE HOTEL AND RESTAURANT, PICCADILLY.**—At the Marlborough-street Police-court on Wednesday last, Baron Walsingham was summoned by the London County Council for having erected two structures at these premises beyond the general line of buildings, without having obtained the consent of the Council. Mr. Chilvers, from the Solicitors' Department, represented the Council, and Mr. H. S. Clutton, solicitor, appeared for the defendant. Mr. Chilvers, in opening the case, stated that defendant was proprietor of the Walsingham House Hotel, and in August last an application was made to the Council for permission to erect two porches or shelters at the entrances to the Walsingham House Hotel, Piccadilly. On Sept. 6 the Council's surveyor discovered that the shelters which projected 10ft. beyond the general line had been erected, and the Council, subsequently on the matter being brought before them, declined to grant their consent, notifications of which had been sent to the defendant, but the structures had not been taken down, and he, Mr. Chilvers, therefore asked for an order on the defendant to remove them. Mr. Clutton stated that his client desired it to be known that he was not aware but that the proper consent had all been obtained, as the contractor who erected the shelters undertook to obtain them, and his client was quite prepared to submit another application to the Council. The Magistrate said the contractor should not have put up the shelters before the matter had been considered by the Council; but he thought the best course would be for him to adjourn the case for six weeks in order that Lord Walsingham might submit a further application. Mr. Chilvers said the Council desired it to be known that owners cannot leave these matters entirely to the contractors, but must themselves see that the necessary consents are obtained. The summonses were adjourned accordingly.

**SKYLIGHT-REGULATOR PATENT CASE.**—**ADAMS v. STEVENS.**—Judgment was delivered by Mr. Justice Kennedy on Wednesday in this case, which was an action brought in respect of the alleged infringement of a patent, dated December 22, 1884, and numbered 16,817. In delivering judgment, Mr. Justice Kennedy said that the action was brought to recover damages for the infringement of a patent and for an injunction and other relief in respect of the alleged infringement. The patent consisted in improvements in the method of opening and closing fanlights, skylights, ventilators, and analogous articles, and in the fittings and appliances in connection therewith. The defendant denied the alleged infringement, and denied that the plaintiff was the true and first inventor; he also denied the novelty and the usefulness of the alleged invention, and that it was the proper subject of valid letters patent, and the defendant alleged disconformity between the provisional and the final specifications. His Lordship was of opinion that the plaintiff was not entitled to succeed in his action. The arrangement called the "regulator" for the alleged infringement of which the defendant was sued, was not new. The alleged invention, in all its essentials, had been published by the plaintiff himself at Birmingham in the Bingley Hall in April-May, 1882, and in the erection by the plaintiff of fanlight openers at the Yorkshire Grey public-house and at Anderton's Hotel. The principle of the "regulator" was one in common use prior to the date of the plaintiff's patent, and there was nothing in the plaintiff's application of it which deserved the name of invention. The distinction which the plaintiff sought to draw between that which he previously exhibited and his present invention was—(1) that the present construction had adjusting bearings which the old one had not; (2) that the speed at which the new construction worked was much greater than that of the old one; (3) that the new construction was "a worm working on a worm," whereas the old one was a worm working on a worm-wheel. It appeared to his Lordship that there was no substance in those alleged points of difference. There was no invention as regards the adjustments; there was nothing in the distinction between worm

and worm and worm and wheel; and the question of speed was a question of pitch, which had long been recognised and acted upon in constructions of a similar kind. His Lordship was also of opinion that the plaintiff's patent was claimed for contrivances which had already been the subject of patents. Further, it was an invalid claim because it claimed too much. It claimed not merely the construction of the parts or any two or more of the parts described and shown in the drawings, but the application and use of any one of them. Several of those parts, such, for example, as a ratchet and pawl arrangement, a slotted lever, an eccentric grip appliance, were not the inventions of the plaintiff. Finally, his Lordship thought that the plaintiff had not successfully met the case of disconformity put forward by the defendant. The would be judgment for the defendant with costs.

**A MARGATE ARBITRATION.**—Mr. W. H. Elwell sat as umpire on Monday at the Surveyors' Institute to hear the claim of Captain Hatfield against the London, Chatham, and Dover Railway Company for land, forming part of the Hartsdown estate, proposed to be acquired by the Company for the purpose of forming an approach road to their up-platform at Margate. Mr. J. Green was arbitrator for the claimant, and Mr. Robert Vigers for the Company. The claimant owns an estate of between 500 and 600 acres, the road to which is only 24ft. 9in. wide. The South-Eastern Railway own the land on the east side, and the London, Chatham, and Dover Railway now proposed to acquire the land on the west, rendering it impossible for the road to be widened. A portion of the land taken abuts on Marine-terrace; but a considerable portion of the claim was for the consequential damage to the estate. Mr. Charles W. Willoughby, a partner of the firm of Weatherall and Green, estimated the two areas of land required at £10,944, and the general depreciation at £3,750, a total of £14,694. This valuation was supported by Mr. Humphreys Davis, surveyor, of London; and Mr. Albert Latham, the town surveyor of Margate. Mr. John Reeve, auctioneer and estate agent, of Margate, valued the land at £10,585, and the depreciation he estimated at £3,750, a total of £14,335. The proceedings were adjourned till the 25th January.

#### CHIPS.

At the public hall, Trefriw, near Conway, on the 14th inst., Mr. E. A. S. Fawcett, on behalf of the Local Government Board, held an inquiry touching the application of the Betts-y-Coed Rural Council to borrow £205 for sewerage work, and £94 for works of water supply in the parish of Trefriw. Mr. M'Intyre, engineer, gave evidence.

Shortly before midday on Saturday a fire broke out in the belfry tower of St. Nicholas's Church in the parish of Strood, within the city of Rochester. The flooring, ceiling, and other woodwork soon got well alight, with the result that the peal of bells fell, and the roof collapsed. The tower was completely gutted. The Rochester Volunteer Fire Brigade prevented the flames from spreading to the main structure, but not before the greater part of the edifice had been considerably damaged by smoke and water. The tower was Norman in date, being the only ancient portion of the church. The main structure was rebuilt in 1812.

At Saturday's meeting of the Metropolitan Asylums Board a letter was read from a firm of solicitors forwarding statement of claims amounting to £34,444 19s. 7d., made by Messrs. Kirk and Randall, contractors, against the managers in respect of increased cost caused by delay in the supply of drawings, &c., on the part of the architect in connection with the erection of the Grove Hospital. It was stated that further claims were in course of preparation, and would be sent in due course. The letter was referred to a committee with instructions to take the advice of the board's solicitors.

A mural tablet, subscribed for by members of the congregation of St. Matthew's Southampton, in memory of their late vicar, the Rev. R. Hughes, has been placed in the church, and was unveiled on Wednesday by Canon Durst. The tablet has been executed by Messrs. Dacombe and Son, of Southampton.

An inquiry was held at the Salford Town Hall on Friday by Mr. H. H. Law, of the Local Government Board, with respect to the application of the Corporation for permission to borrow £2,500 for technical instruction purposes, and £1,903 for the widening of Oldham-road. The borough engineer, Mr. J. Corbett, produced the plans.

There has just been placed in the new chapel of Cheltenham College a painting by Sir W. B. Richmond, K.C.B. It is on three mahogany panels, and forms part of the altar given by Mrs. Southwood, in memory of the late Rev. T. A. Southwood, one of the former masters of the college. The subject is the boy Christ disputing with the doctors in the Temple, the moment being that in which His mother and Joseph came to find Him.

#### WATER SUPPLY AND SANITARY MATTERS.

**LONDON WATER COMMISSION.**—At the sitting of this Royal Commission on Monday, Mr. Hawksley, member of the Council of the Institution of Civil Engineers, gave estimates as to the growth of population and of the daily consumption of water in the Metropolitan area, generally in accordance with the findings of Lord Balfour's Commission. He estimated that the population in 1941 might be 13,231,000 and the daily quantity of water required 463,085,000 gallons, and was decidedly of opinion that the Thames could supply all the additional water required, and considerably more. It would not be necessary to go to Wales for at least 100 years. He approved of the proposal for the extension of the Staines storage scheme. He held that the present powers of the companies should not be restricted, inasmuch as restriction would cause unnecessary expenditure without any commensurate benefit. The witness gave figures as to what he calculated would be the excess of cost of the Welsh over the Thames Valley scheme, and in reply to further questions, expressed his strong preference for management by companies as compared with management by public bodies. The commission adjourned till January 9, when Mr. Hawksley will be cross-examined on behalf of the London County Council. The commission have decided to appoint an assistant commissioner to render them aid in their inquiry with respect to the estimated cost of the Welsh and Thames schemes which have been laid before them. It is likely that the appointment will be offered to Lieut.-Colonel Rathborne, commanding the Royal Engineers at Gibraltar.

**CALCUTTA.**—The new works of drainage under construction consist of three sections—the improvement of the storm water and sewage outfall of the city proper, for the drainage of the suburban area south of Tolly's Nullah, and the drainage of that part of the suburban area which lies between the canal and the circular road. The contracts for the first two sections were let out to Messrs. Martin and Company, and it is reported that the work was vigorously pushed on, and satisfactory progress made during the year. In the third area greater difficulty was experienced. This contract was let out to Messrs. Burn and Company, but for various reasons operations could not be commenced till October, 1897, when the work of pipe crossing under Tolly's Nullah was taken in hand. The south dam was successfully completed on the 15th. Two days later, however, the Port Commissioners represented that a sufficient water supply could not be obtained for the docks. This necessitated the cutting of the bunds and the stoppage of the work, which cannot be attempted again until the cold weather.

**WERRINGTON.**—The Great Northern Railway has recently obtained a successful result in some artesian boring operations they have had carried out at Werrington, near Peterborough Station, by Messrs. Le Grand and Sutcliffe, of London. At a depth of 132ft. an overflowing spring has been struck which rises to the height of 20ft. above surface, and the flow is at the rate of 300,000gal. per diem, which would suffice to supply a town of over 10,000 inhabitants. An interesting feature of the boring is the various geological formations which have had to be passed through—viz., the Oxford clay, corn-brash, great oolite clays and stone, the upper estuarine beds, and finally terminating in the Lincolnshire limestone, from which the supply is derived.

The Rugby Urban District Council having applied to the Local Government Board for sanction to the borrowing of £2,323 for works of private street-improvements, Mr. G. W. Willcocks, M.Inst.C.E., Local Government Board Inspector, held an inquiry at the council chamber. The surveyor (Mr. D. G. Macdonald) detailed the work it was proposed to carry out, and there was no opposition.

It was reported to the town council of Sunderland at their last meeting that the Local Government Board had, after delaying the matter for some considerable time, eventually issued an order confirming the Hat Case area improvement scheme, so that now the corporation would be allowed to erect dwellings for 325, instead of 190 persons, as originally proposed, and also permitting them to demolish the whole of the buildings before any of the new dwellings being erected.

The contract for the construction of main drains throughout Portishead has just been completed for the urban district council. Mr. Moss Flower, C.E., late surveyor to the council, designed and superintended the execution of the works, and Messrs. J. and T. Binns were the contractors.

The Liverpool Corporation have appointed Mr. Jonathan Roberts Davidson an assistant engineer in place of the late Mr. R. T. Martin, late superintendent of the Rivington Water Works, at a salary of £208 a year, with the use of the corporation house at Horwich, coal, and light.



## Our Office Table.

CANON GREENWELL, of Durham Cathedral, has just finished the curious task of piecing together the coffin of St. Cuthbert. The shrine of the great Saxon saint was despoiled by the Commissioners of Henry VIII., and the body, which was found to be intact, was reburied in its original coffin in the nave of the church. In 1827 it was again dug up by Dean Hall, who was anxious to verify the condition of the body. On this occasion the outer coffin was broken up and thrown aside. The fragments were, however, eventually saved, and have for many years been preserved in the Episcopal Library. Canon Greenwell has now put these hundreds of pieces together, with the result that it is now possible to decipher rough drawings representing St. Cuthbert, the Four Evangelists, the Virgin and Child, St. Michael the Archangel, and the Crucifixion, which were rudely but deeply carved upon this interesting relic of Saxon art in the year A.D. 860.

AN important part of the archaeological collection of the late Rev. S. M. Mayhew, F.S.A., has been added to the Guildhall Museum by purchase from the executors. Living in South London, the deceased availed himself of every opportunity of enriching from time to time his collection of the relics of Old London unearthed in and near the city during the last thirty years. The antiquities include some fine specimens of Roman, Venetian, and Mediæval glass-work, all in a more or less good state of preservation, and of beautiful shape and colour; a large assortment of cinerary urns from the Church of St. Martin Outwich, which was destroyed some years ago; a portion of a setting of a manstrainer in beaten metal, which retains much of its decoration; and two ingots of Ancient British bronze, which were found in Bishopsgate-street.

SATURDAY night was the latest time for depositing in the office of the Clerk of the Parliaments copies of private and local Bills which it is proposed to introduce when the two Houses assemble in February. Plans in connection with those Bills requiring them were deposited at the Private Bill Office at the end of last month, and it was the measures themselves, some of which do not require plans, and were, therefore, not included in the former list, that were handed in on Saturday. The Bills of interest to London include the London County Council (General Powers), London Improvements (Holborn to Strand, Southampton-row, widening High-street, Kensington, and other works), London Water (Welsh Reservoirs and Works), London Water (Aqueducts and Works), London Water (Purchase from Companies), London Water (Finance), City and Brixton Railway, Harrow and Uxbridge Railway, London, Brighton, and South Coast Railway (Pensions), South-Eastern and London, Chatham, and Dover Railway Companies, and also the New Lines Bill of the same companies, West Metropolitan Railway, Great Northern and Strand Railway, Thames Ferry (Greenwich to Millwall). The total number of Bills handed in was 267, as compared with 249 last year.

The prizes and certificates gained by students in the evening classes and day technical school of the Carpenters' Company's Technical Institute, took place on Monday night at the Stratford Town Hall, the large building being crowded with the students and friends. Mr. Alfred Preston took the chair, and the giving away of the awards was performed by Mr. J. C. Preston, Master of the Company, and Mrs. Preston. In opening the proceedings the chairman referred to the fact that England had been behindhand in technical education; but much was now being done towards bringing up the country to the level of Continental nations in that respect. He hoped, as regards the day school, that parents would let their boys remain for three years, so that in the first year a portion of their time might be devoted to carpentering, in the second to plumbing, and in the third to smith's work. The Master of the Company gave a sketch of the history and progress of the Institute, which arose out of the development of the estate of the Company in the neighbourhood, and stated that there were now 200 students in the day school, and 420 in the evening classes. A large building of two floors had been added during the past year, at a cost of £2,500, so as to extend the good work carried on there.

The Lord Provost and a number of the members

of the Edinburgh Corporation paid a visit to the galleries of the Royal Scottish Academy on Friday afternoon, to inspect the work of the students in the School of Applied Art, to which yearly they make a large money grant. They were received by Dr. Rowand Anderson, hon. director of the school, and the members of the Scottish Board of Manufactures and of the joint committee of Management. At the close of the inspection of the work, which was hung on the walls, Dr. Rowand Anderson made a short speech, in which he mentioned that the school had now been six years in existence. He was sure that all who had watched its progress would admit that the school had this year excelled all previous years. He hoped, considering the good work the school was doing, that the town council would revert to the original grant, and that they might see their way to put the school in a position of permanency. As things stood at present, they were not able to develop and to progress as they might do, because they could not enter into engagements—not knowing what their financial position might be. Edinburgh was very well supplied with science teaching; but it was distinctly deficient as regards art. The Lord Provost explained that the money that was given to the school from the town council came from the residue grant, and as long as the town council got that grant, he thought he might say with confidence that the School of Applied Art would get a share of it. Mr. Scott Morton, of the Tynecastle tapestry factory, bore testimony to the good influence the school had had upon the young designers in his employment, and the same, he was sure, was being felt in all the artistic crafts in the city.

MR. ALFRED GILBERT, R.A., M.V.O., has been elected to, and has accepted, honorary membership of the Society of Designers, in the place of the late Sir Edward Burne-Jones. The other honorary members are H.R.H. the Princess Louise (Marchioness of Lorne) and Sir E. J. Poynter, President of the Royal Academy. The election of honorary members can only be made by the unanimous vote of the council. The Society of Designers has progressed in a remarkable way since its formation in 1896, and now numbers upwards of a hundred members. The headquarters is at Clifford's Inn, Fleet-street. Membership is open to all professional designers whatever their style of work; such a broad basis as this should prove a sure foundation for a healthy society.

At a meeting of the Royal Society of Edinburgh held on Monday night, Lord Kelvin, president, in the chair, Mr. R. G. Alford, C.E., read a paper on "Crane Scaffoldings—their Mathematical Calculation and Probable Theoretical Deficiencies." The author referred to the accident at the Waverley Station in March last, when a scaffolding over 60ft. in height was overturned by the wind. Another one of similar height stood at the Royal Infirmary, and it remained uninjured. Mr. Alford had measured the latter erection, and had obtained photographs of both. Views of these were thrown on the screen, and a comparative inquiry was instituted into the varying construction of the two to show why one remained stable and the other was overturned. Certain rules of construction were then deduced, which the mathematical conditions seemed to imply as necessary to safety, with a view to aiding contractors in the calculation of future examples and to the prevention of accidents. Some remarks were made upon the paper, one member suggesting that the defect of the Waverley Station structure was that the diagonal braces were not bolted, but only nailed. Mr. Alford said that the cause of the failure of the structure was not collapse owing to its being too weak. In the evidence given at the inquiry before the sheriff they read that the scaffolding gave way not on account of the weight upon it. Had it given way in consequence of too much weight being placed upon it, the nailing of the diagonals might have been the cause. His assumption, however, from the evidence, was that the structure had been overturned by the wind, and that the cause was not the weight put upon it. He agreed with the president that a greater weighting of the legs would have prevented the accident.

SPEAKING on Tuesday night at the distribution of prizes by the Duchess of Westminster to the students in the Chester School of Science and Art and Technical School, the Duke of Westminster emphasised the importance of architectural

training, remarked that how people could be content to live in villas with 9in. walls and bow-windows facing north, with perhaps nothing to look at, was beyond his ability to conceive. He feared that some of our descendants would never know what really old England could show in the way of architecture. In some of the older parts of the country—Hampshire and Wiltshire—there were to be seen very simple and beautiful buildings that had stood the test of time, but were now getting old, and perhaps our descendants would miss what we had been able to enjoy in the sight of beautiful buildings, not very expensive, but suited to their purpose.

AN effort is to be made by the persons interested in lake transportation between Canada and the United States to have the Anglo-American Commission take up the project of a canal joining the Great Lakes and the Atlantic. This subject has been favourably reported upon by a deep waterway commission authorised by the U.S. Congress and appointed by the President. While this established the practicability of the canal, the present movement contemplates the devising by the commission of a plan of joint action by which the work will be actually commenced. It is suggested that the proper route will be by way of the St. Lawrence River and Lake Champlain a cut of twenty-nine miles being sufficient for that length of canal. Another cut of twenty-four miles would carry the canal to the Hudson River, thus connecting the shipping of Chicago and New York by way of the lakes, the Welland Canal, the St. Lawrence River, Lake Champlain, and the Hudson River. The projectors claim that the cut between the St. Lawrence and Lake Champlain can be made for three or four millions, the topography being particularly favourable to canal digging.

THE last issue to hand of the *Bulawayo Chronicle*, a well printed journal, with a good display of local advertisements, that gives a promise of permanency and success to the enterprising sheet, mentioned that Mr. W. Douslin, the architect to the British South African Company, has a memento in his possession in the shape of the drawing-board on which the plans of the gaol were drawn out. This was in the old days, in May, 1894, when the few inhabitants were living for the most part in the old township in huts and tents. Owing to the fact that at that time there was no timber in Bulawayo, the rough wood of a packing case had to be requisitioned for constructing the drawing-board. Composed of three pieces of wood, fastened together, planed smooth on one side and bearing on the back the legend "J. T. Morton, preserved provisions manufacturer, London and Aberdeen," this drawing-board has certainly a pioneer look about it, and when a museum is started in Bulawayo it ought to be honoured with a place there, as it was used for the plans of all the principal buildings first erected in the town, the market hall, Tattersall's Hotel, Mashonaland Agency's offices, the gaol, court house, civil commissioner's offices, &c., for all of which Mr. W. Douslin, who was the pioneer architect in the country, was responsible. Another curiosity is a little model of the drop of the gaol gallows, which the same architect designed, and which works very neatly indeed.

The ivy-clad Elizabethan mansion, Wamil Hall, about half-way between Mildenhall High Town and West Row, was the scene of a disastrous fire on Tuesday week, when the west end, the older part of the house, was gutted.

A three-light stained-glass window has just been placed at the east end of the north side of Butter-shaw Church, Bradford, the work of Messrs. Powell Brothers, of Park-square, Leeds.

Colonel Durnford, R.E., an inspector of the Local Government Board, held an inquiry at Taunton on Friday in reference to an application by the town council for sanction to a loan of £18,000 for sewage disposal works on the septic tank system.

The window now in progress for erection in the north-end transept of St. Paul's Cathedral is the gift of the Duke of Westminster. Sir W. B. Richmond, R.A., has executed the design, the subjects being the Archbishops and Bishops under whom the new faith was introduced or restored during the Saxon Heptarchy, including Archbishop Theodore, of Canterbury. In the south-end transept window, given also by the Duke, are representations of the Kings of the several kingdoms of the Saxon Heptarchy, in whose time Christianity was introduced or restored after lapse.



# THE BUILDING NEWS AND ENGINEERING JOURNAL.

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## PRACTICAL EQUIPMENT.

WHAT was once deemed a fair, all-round qualification for the architect is no longer sufficient. To his other professional duties he has to add a practical knowledge of sanitary science in its wider sense, a general knowledge of materials and inventions, electric lighting, and various other industries. Archaeological research was at one time a very necessary part of a cultured architect's education; in its place we have a score of practical subjects which have no direct relation to architecture as an historical art, but a very intimate connection with the craft of building as we now understand it. The distinction between the two forms a very important line of demarcation between the past and present conception of architecture. To some sensitively-artistic minds this change in the ideal is destructive to all the higher qualities of art. They ask, How can the architect give us good architecture, when his study and time are absorbed by such detail as pipe-laying, iron and steel construction, heating or electric lighting—in testing materials, complying with building regulations, and the like? These details require almost specialists to adequately deal with them, and the architect's education in art must be very seriously hampered or curtailed if he has to give so much time to matters which cannot be brought into line with architecture. No doubt these details are by no means inspiring or congenial; they are also, to some extent, hindrances to original thought and the design of interior details. With the plumber and his host of appliances and fixtures; the sanitary or ventilating engineer with his inlets and trunks, and cowl, fans, or exhaust arrangements; the heating engineer with his system of circulation and apparatus, and now with the electrical lighting specialist, whose wiring and casings have to be brought into harmony with the internal decoration by some means, the architect has not a free hand in his building. He has to think of lines of piping and conductors, the position of heating apparatus and lamps in his design of interiors, both in walls, and ceilings.

If the conception of architecture is to be found in the definitions of Ruskin, who calls it a "science of feeling more than of rule"; or in that of Fergusson, who speaks of it as "ornamented construction," we can quite understand the terrible hiatus there is between it and construction. On the other hand, if we base our ideas of architecture on the definitions laid down by L. Eidlitz or Viollet-le-Duc, who say that architecture is the result, construction the means—in short, a development of structural forms, we get a very different view of the architect's real work, which is to develop every kind of structural use and appliance. There is no doubt that the teaching of men like Eidlitz, shown in his able work on the "Functions of Architecture," is beginning to bear fruit with lecturers on design or architecture. A paper read the other day at the Architectural Association, by Mr. E. T. Hall, F.R.I.B.A., emphasised this view, and may be summed up by saying that we cannot learn architecture by mastering "styles." One of the consequences of this position is that we can only copy a "style." We can hardly be said to design in one; yet we repeatedly hear of Mr. So-and-So having designed the building in the Flemish Renaissance, or the Queen Anne, or Moorish style. No doubt careful and learned versions of the style in which the plans of a new bath, or bank, or theatre

are "done into" one of these modes, or are decorated in the period then in vogue—is a meaning which Fergusson had in his mind when he said architecture was "ornamented construction," something added to construction, and which expresses very fairly this idea. But as well may it be argued that a knowledge of the principal geological formations or rocks explains the evolution or science of the earth, or that biology can be learned by collecting a few specimens of life, as to imagine that the learning of styles will make an architect. No doubt there is some art in adopting a style for a particular building in such a manner as to apply the principal details with taste, whereas the mere literal copyist has no claim to any. If, as Eidlitz says, rules of proportion existed by which any architectural building could be designed, it would be no longer an art, but a trade; so it is easy to apply a certain ratio to a room, or to draw a column by a certain law, but the result would not be architecture in its true sense. Rules may constitute a very useful part of the theory of architecture, but they cannot teach design. Probably there is no time when definite rules are less followed than now. Few architects trouble to apply Vitruvius's rules to columns or intercolumnar spaces, or those given by Vignola, Palladio, and other masters on the proportion of rooms, yet at no former time since the Revival of the Arts has the spirit of architecture been better understood than it is now. The growth and vitality of architecture can only subsist with a true appreciation of modern requirements and structural necessities, with a proper study of materials and new inventions, in all of which the architect must endeavour to transform them to his purpose. The art of adapting the various trades has not yet been undertaken, the plumbing, engineering, hydraulic apparatus, electric lighting, &c., are left to each tradesman or expert. All these things are added, not incorporated.

The practical equipment of the architect of to-day comprises, amongst other things, electrical lighting, and Mr. Bernard Drake's useful paper—read at the Institute, and reported on page 885—ought to suggest to the architect how he can make such artificial light effective in interiors. One of the points he touched upon was the importance of distributing the electric lamps so that the light should be restful to the eyes, that there should be light and dark portions in the room, instead of an equal diffusion of dazzling light which causes a tired feeling by the involuntary contraction of the pupils of the eyes. Mr. Drake said, truly enough: "The secret of a restful light is the illumination of a large surface with an absence of any dazzling spots of small area. To get this result, either the rays must be diffused by transmitting them through a large shade, or reflection must be resorted to, and the directed rays be projected on the walls and ceiling from some hidden source." He mentioned the value of a combined shelf and picture-rail containing a row of hidden lamps for reflected light; or small lamps concealed in the overmantel and in china cabinets. Many effective results are obtained by reflecting the light from overdoors and friezes of rooms. There are many crude and inartistic arrangements to be seen in buildings. Naked incandescent lights are arranged nearly on a level with the head, causing blinding light to the eyes, besides destroying the effect of any wall decorations or pictures. Or the lamps are placed in clusters on the ceiling, causing very dark shadows on people's faces, without any shade to moderate the brilliance of the light, which is lost on the ceiling. The arrangement of lamps and use of shades to reflect the light on walls or floor are matters that may be well left to the architect, who is often not consulted by the electrician. There are

also details of design, such as brackets, chandeliers, and other modes of carrying the lamps. Many of these are very elaborate, but inartistic, devices, intended rather as specimens of metalwork than to assist the light, and representing clusters of flowers and leaves. The way, too, many of these hanging lamps are placed in ordinary commercial buildings—as restaurants—proves that the architect is seldom consulted. The wooden moulded casings for wires are placed at random, dividing the ceiling into irregular panels, and often sadly cutting across ceiling decorations, and these are arrangements that must be left to the architect. Many useful hints on electric lighting are given by the author of the paper: the economy of shading the front of lamps placed against a wall, and it was stated a 8c.p. lamp will take the place of a 16c.p. lamp if inclosed. We make these remarks as an example of one of the many subjects which the architect has to consider, and in what direction he may further the interests of his art. A particular and technical knowledge of lighting by electricity is not absolutely required; but he should know so much of the general principles of the science that will enable him to give definite instructions to the engineer. And so with regard to matters like heating by hot water and steam plumbing details, the use of motors, hydraulic lifts, and mechanical appliances, such as those used in many buildings, theatres, baths and washhouses, and the like. Without such equipment he has to be contented to hand over these works to men who have only a commercial interest, and who do not trouble to study the design. Their work is added to the building without any attempt to incorporate or adapt it, and we find, as a consequence, a strange mixture of skill without coherency of purpose.

## MODEL SPECIFICATIONS.—XLV.

### PLUMBER'S WORK.

INSTEAD of soldering the ends of gutters, hips, &c., bossing is preferable—i.e., beating the lead to the required shape. The returned ends of drips, gutters, are better done in this way. For forming gutters to roofs, cesspools of lead about 9in. square and 6in. deep are used, and the lead should be bossed to shape of cesspool. In joining lead, rolls, seams, and welts are used, parallel to the current or fall of a flat, and laps and dips across the current. Sketch 10 is a roll showing the sheet of lead dressed round the roll and well into the angles, one sheet going about half-way round, and the other sheet going all round, and forming an overcloak. Hollow rolls without a core are made by welts, as the edges of lead are turned up at the joints along a row of copper or lead tacks, and is then turned round, and forms a roll; but this kind of roll does not bear walking over. Flat welts or seams are similarly made with copper tacks about 2ft. apart, the edges of sheets being turned up about 1½in., and then turned down flat.

Hips are covered with lead by different methods. The simplest plan is to dress a piece of lead over a roll, letting it fall over on each side of roof about 6in.; this is fixed by bossing it over each end of roll first fixed, so that the lead cannot slide down. The next and subsequent pieces are lapped over and are supported by lead tacks. Sometimes the hip may be made of "soakers," or pieces of lead of 4lb. to the foot, cut to shape of angle slates (see plan 8). These soakers may be fixed over the hip roll, as shown. Valleys are often covered with lead to form a small gutter, the bottom row of slates are tilted by fillets, as shown in sketch 9.

We represent in sketches 1, 2, 3, and 4 the step-flashing of a chimney, and the manner the upper gutter behind the stack is formed, as in 2. The lead is turned up 6in. against chimney and an apron of 6in. is



placed over it; on the other edge the lead is dressed over a tilting fillet. Plan 3 shows the centre ridge and falls on each side, with the 6lb. lead side flashings, and section 4 is a section of one side of gutter. Here the lead flashing is 6in. wide, and is slightly tilted. The lower side of stack has an apron piece let into joint of brickwork, and secured by lead wedges and tacks. Figs. 5 and 6 are two forms of drip. The first is a 3in. drip placed about 7ft. apart, with copper nail fixing at top edge; the second is for a 2in. drip, which has a check, or groove, to resist capillary attraction. Figs. 7 and 11 show two forms of finishing the angles between two slopes of roof. The nosing to moulding secures the edges of the lead sheet and allows freedom for expansion, the upper sheet of lead being dressed round the nosing.

When surfaces of roofs are covered with lead, as on the sloped parts of turrets, the sheets of lead should be laid between rolls, the upper sides being turned over edge of boarding and nailed, so that the top edge is secured, which prevents the lead during alternations of heat and cold "crawling." The lower edge of upper sheet should also lap over the under sheet about 6in. Another and simpler way is to fix the vertical sheets of lead by secret tacks (see sketch 13). A lead tack is soldered to the back of sheet, and its free end passed through a slot in the boarding, turned over stud framing and down inside, and fixed with copper nails to studwork. This holds the outer covering in its place at certain points, and the tacks may be so fixed into grooves of the framework that they will admit of slight expansion or contraction of the lead. In covering Mansard roofs having different slopes, the joints between two inclinations may be effectively managed by a wooden moulding or nosing fixed to the boarding at the top of lower slope of roof, and a lead covering dressed over the moulding, secured by nails at the top edge under slates and by lead tacks below (see sketch 11).

10. *Lead Gutters.*—Form the lead gutters of valleys with 7lb. milled lead, 9in. in narrowest part. The lead to be turned up 9in. under slates, and dressed over 3in. tilting fillet on each side.

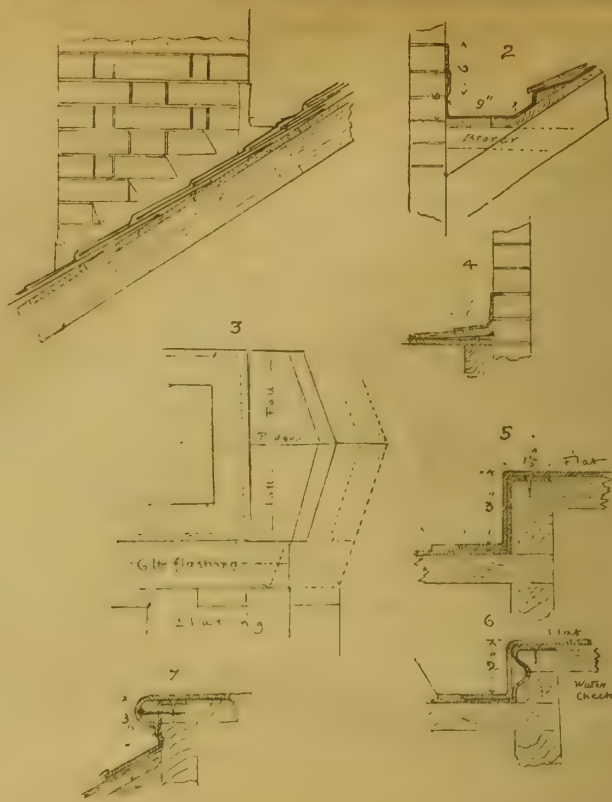
11. *Chimney Gutter.*—The gutter behind chimneys to be 6in. wide at narrowest part, and to slope both ways from centre ridge, and to be of 6lb. lead, dressed over tilting fillet, and laid 6in. beneath slates, the end turned up 5in. against wall, and dressed 3in. round returns of chimney, covered with apron of 5lb. lead, dressed 4in. over flashing, and stepped to brick courses over lead soakers.

12. *Pediment Cornices.*—Cover the stone pediment with 6lb. milled lead, dressed over top fillet of moulding, and the lead on top of weathering fastened with lead dowels and dots, and turned up against face of wall with a 5lb. lead covering, or apron securely wedged into wall and cement filleted.

13. *Cornice.*—Cover the stone cornice with 6lb. milled lead, dressed against face of wall 3in., and tucked into mortar joint (or built into mortar joint). The lead on the upper side to be dressed over weathering and turned down over fillet, and to be further secured against wind, by lead dowels or dots. Fill up raked joint in brickwork with cement, and leave work perfect. (See sketch 4).

14. *Dormer Cheeks.*—Cover the cheeks of dormers (or sides of turret) with 6lb. lead; the sheets of lead to be secured by 7lb. secret tacks soldered to sheet; the loose ends passed through slots of the boarding, turned down, and fixed with copper nails inside of the studding; or the cheeks to be secured by 3in. soldered dots with screws to the framing. See sketch 13.

15. *Covering Sides of Turret.*—The sides of turret base to be covered with 5lb. or 6lb. milled lead, fixed between 2in. rolls, the upper edges of the sheets being turned over edge of boarding and nailed, and the lower edge of upper sheet made to lap over top edge of the sheet below 6in. with lead tacks; or the lead to be close copper-nailed at top and to have secret nails for supporting the lead; the lead to be cut to the rake of roof and to be brought down and dressed over roof in front 6in. secured by lead tacks. Along the top of base of turret a lead covering is to be dressed round a wood nosing, as shown in sketch, copper-nailed



along upper edge; or nail a 4in. or 6in. round nosing of wood over top edge of lead, and the lead covering of flat or turret is to be dressed round nosing and secured by lead tacks.

16. *Wood Cornice, &c.*—The mouldings of wood (or cornice) round turret to be covered with 6lb. milled lead dressed round members, and over top to be covered with 4lb. lead flashings or lead roof.

17. *Cupola.*—Cover the cupola with 7lb. milled lead, according to details, with 1 1/2 in. rolls; the lead to be dressed round angle ribs secured without solder to boarding by copper or lead tacks, with all proper bossed ends; the rolls to be spaced as shown in drawings, or not to be more than 27in. apart.

Numerous patterns of closets are in the market, and the architect is advised before specifying to look through the sanitary catalogues of such firms as Messrs. Doulton, Jennings, Hellyer, Twyford, Duckett and Son, Young and Marten, and other well-known firms whose advertisements appear in these pages. As every water company has its own regulations as to service-pipes, cisterns, baths, &c., the architect should consult the instructions of any particular company as to diameters and weights of pipes and cocks before writing his specification. The connection of each supply-pipe with the main has also to be done by the company. Regulation patterns ought to be specified as to such things as cocks. We refer the reader to these regulations and to special works on plumbing.

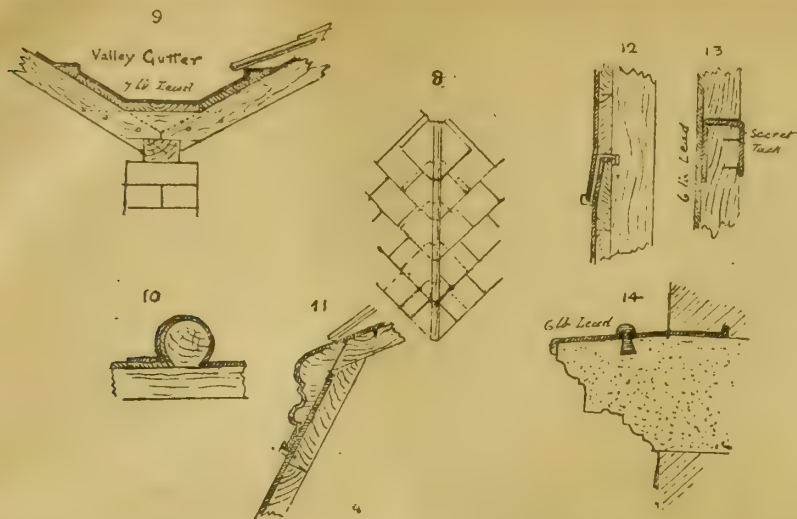
Various kinds of closet apparatus are to be met with, and it is necessary to bear in mind a few essential points in making a selection; first, that the basin, trap, and soil-pipe shall be thoroughly scoured with each flush of water; that the pan should hold a large body of water, and that there should be a good seal; that the working parts are easily accessible; that the construction should be simple. Now many kinds of hopper closets comply with the latter conditions, but are certainly condemned as regards the first condition; the large area of earthenware is exposed to soiling, the water does not reach the basin during flushing, or in a very trifling degree, and the flush is inadequate. Again, the connection of trap and soil-pipe is often imperfect, and these defects are aggravated in the long hopper. The "pan" closets are almost obsolete, and for good reason, as the container generates gas without any means of escape.

The valve, "wash-down," and "wash-out" are the principal types. The valve is used for superior houses; it should have a flushing rim, and the overflow should be on the side the valve is hinged. In this form of apparatus, the water exposed is distinct from that in the trap, and a double check is thus formed. There should be a good volume of water in the basin. "Wash-down" closets also vary much: some contain little water in the basin, and they are open to the objection of the "hopper," mentioned above, and easily foul; but "wash-out" closets expose a large area of earthenware to fouling, and are, therefore, still more objectionable.

Several points are necessary to be considered in the form of trap; to avoid the trap being rendered useless by the rapid discharge of water or "momentum," the trap should have a good seal and an abrupt outgo. "Siphonage" is apt to occur if the "seal" is small, and there is no air-pipe from top of trap to the outer air, to supply the vacuum created by the rush of water.

Although the "wash-out" closets are simple, they have many defects. The standing water in the basin is often too little to cover the excreta. The flush is often scarcely sufficient to cleanse the basin, and its action is not direct, tending rather to stir up the contents instead of scouring the trap out. The 1 1/2 in. flush-pipe cannot flush a 4in. trap and soil-pipe: hence the arm between basin and trap often remains foul. The joint between the earthenware trap and the lead soil-pipe is defective, and if of red lead, it often cracks with any jar. The "wash-down" is very superior: the "seal" is better, and there is more water in the basin. The inlet of trap is enlarged, and forms the lower part of basin, there is no fouling of the sides, the flush is more direct, there is no change of direction in its action as in the wash-out; the trap can be seen, the standing water forming the water seal of the trap. An authority thus sums up the relative values of valve, wash-down, and wash-out closets:—"The valve closet is superior to any w.c. yet known, for the following reasons: the outlet of basin is covered with clean water, preventing the air of room becoming contaminated by any foul water that might be in the trap, so that, in addition to the ordinary trap, there is a second valve covered





with clean water, to prevent any possibility of gas escaping into the house through evaporation or siphoning of the water out of the trap. The sealing water covers that part of the basin where the soil falls, preventing adhesion. When the closet is operated, the sealing water, weighing about 20lb., is suddenly dropped into the trap, carrying everything with it. The regulation two-gallon flush is then discharged into the basin, flushing it at all parts as well as the trap, which it leaves full of clean water. The water is discharged in the direction of the outgo, so that the force of the flush is unchecked. The 'wash-down' closet is superior to any closet of the wash-out pedestal and others of that class for the following reasons: The force of the flush is exerted directly on the water remaining in the trap without any change of direction; there is no cup in which the flush-water is broken up, or the soil washed about, &c. The use of closets called 'wash-out' (but for which 'wash-about' would be a more correct term) is objectionable for the following reasons: The force of the flush is nearly destroyed by the change of direction necessary to remove the water and the soil from the basin or cup over the weir. The force is still further spent against the front wall of the basin. The current being thus broken up, the soil follows the various eddies, and adheres to the walls of the approach to the trap, where it is unsightly, and contaminates the air. The power of the flush being destroyed by two changes of direction, is insufficient for clearing the trap at each discharge. . . .

#### INTERNAL PLUMBING.

18. *General.*—The internal plumbing to be done to the satisfaction of the architect, and in accordance with the regulations of the water company and local authority; any variation between these and the specification to be brought to the architect's notice. Give all necessary notices to the company, and pay all charges for making connections, and provide for lighting and protection to public during the same, and make good to road and footway to satisfaction of vestry or local authority.

19. *Testing.*—The work to be tested at the contractor's expense at such time and in such manner as the architect shall direct.

20. *Pipes.*—The lead pipes to be of equal thickness throughout, jointed with wiped solder joints, and to be "extra strong," of the full bore throughout, and of the weights required by the regulations of water company; all supply pipes to cisterns and pipes from them to be extra strong, and all service-pipes to be "strong," and overflow-pipes to be of "midding" quality.

21. *Incasing and Fixing.*—The supply-pipes exposed to cold or frost to be incased in tarred felt, or packed in slag-wool with canvas backing. All lead waste, soil, and other pipes to be supported on bearers or by strong lead tacks, according to weight and length. Provide to hot-water pipes of bath, &c., expansion joints, soldered flange joints to soil-pipes in chases, bearing deal blocks, &c.

22. *Hot and Cold Supply.*—All hot and cold water-pipes to be "extra strong," hydraulic drawn, and of equal thickness, fixed to walls entirely free from the plastering, and, as far as practicable, to be taken along the walls side by side, their course to be arranged, or as shown in plan. All pipes to be easily accessible for repairs, and no pipe to be placed in a draught or exposed part without proper casing of slag wool or tarred felt, or in deal casings fixed with brass cups and screws.

23. *Water Supply.*—Lay on water from main in road with  $\frac{1}{2}$  in. strong (No. 30) lead piping to upper cistern, with ball-cock complete, and pay all fees in connection. Or—

Lay on water from the main of the — Company with  $\frac{1}{2}$  in. strong cast-lead pipe to the cistern of upper closet, with ball-cock complete (or according to the regulations of the water company); also lay on to lower water-closets and to other cisterns with ball-cocks complete, and pay all official fees.

24. *W.C.*—Fit up the w.c. with approved patent wash-down pedestal apparatus, with water waste-preventer, with two-gallon flush, and  $\frac{1}{2}$  in. strong lead flush-pipe to pan, and  $\frac{1}{2}$  in. lead overflow taken through wall with copper flap. The apparatus to have a hinged seat. Or—

Fit up w.c. with Doulton's wash-down pedestal closet (or Duckett's "Clencher"), with hinged flap, to cost £ — net. p.c., or No. — in catalogue.

25. *Valve Closet.*—Supply and fix on first floor a patent and approved valve closet, with enamelled cast-iron conductor and vent arm, white flushing-rim basin, with  $\frac{1}{2}$  in. supply valve, patent regulator, &c., No. — in catalogue p.c. The sight overflow to be trapped and taken into the vent-pipe above the discharge through the conductor, the vent-pipe to be  $\frac{1}{2}$  in. inclined upwards, and to be taken through wall with copper-wire protector end. The closet to have a  $\frac{3}{4}$  in. "anti-D" trap of 9lb. lead, connected to valve-box with flanged brass ferrule, with wiped joints to  $\frac{3}{4}$  in. soil-pipe.

26. *Cistern.*—Fix over valve closet an intermediate cistern to hold six gallons, of wrought deal, dovetailed, lined with 6lb. lead, soldered and nailed, with  $\frac{1}{2}$  in. overflow,  $\frac{1}{2}$  in. branch service pipe,  $\frac{1}{2}$  in. lead flushing pipe from cistern to closet valve, copper ball, &c. Or—

27. *Wash-down Closets.*—Supply and fix Duckett's wash-down pedestal closet, white inside and out, "The Clencher," with flushing rim and channels connected with fall-pipe, as advertised; a trap with 2in. seal and outlet  $\frac{1}{2}$  in. above floor, hinged mahogany seat, hung on polished brass side-hinges, with S (or P) trap of stoneware; or describe number in catalogue of firm. Or—

Provide and fix on ground floor a white ware wash-down pedestal closet, with stout mahogany hinged seat and brass hinges, No. — in catalogue, or to cost p.c. 25s. Connect trap to socket of stoneware drain above floor in cement in a proper or workmanlike manner, and fix above a three-gallon galvanised iron valveless and noiseless siphon water waste preventer of approved pattern, supported on iron brackets, with hardwood pull and brass chain, ball-valve and ball complete (state name or number of preventer in catalogue), with  $\frac{1}{2}$  in. union for service pipe,  $\frac{1}{2}$  in. union and overflow,  $\frac{1}{2}$  in. lead flushing-pipe and union, fixed to wall, and connect to flushing-rim. Or—

28. *Wash-Down Pedestal Closet.*—Provide and fix Twyford's, Ltd., "Orion" (or other) wash-down pedestal closet, made in "Vitrina" ware to the requirements of L.C.C., for brass socket or

detachable screw cone-joint, with County Council S-trap (or centre-outlet S-trap).

29. *Sink.*—Line sink in scullery and in butler's pantry with 6lb. milled lead, and fix a 2in. waste-pipe with brass bell-trap complete, to be carried outside on to a grating.

30. *Cistern.*—Line kitchen cistern with milled lead, bottom 9lb. and sides 6lb. to the foot, and properly solder and provide same with  $\frac{1}{2}$  in. waste-pipes. Line kitchen sink with 8lb. lead, to turn well over the woodwork, with 2in. strong waste-pipe to lead to drain, with brass bell-grate complete; also a  $\frac{3}{4}$  in. service-pipe and brass cock from cistern, and the same for hot water.

[Correction.—In our article on "Model Specifications" which appeared in our issue of Nov. 11, the name of Musgrave and Co., the well-known stable fitting manufacturers, of New Bond-street, was used in connection with the name of the St. Pancras Iron Work Co. in a manner calculated to cause confusion in the minds of our readers. At the request of Messrs. Musgrave we willingly explain that the two firms mentioned are not in any way connected. The error was simply due to a printer's transposition of a parenthesis.]

#### CONCRETE AND STEEL BRIDGE CONSTRUCTION.

AMONGST the many new forms of bridge construction, that in which steel and concrete are combined promises a new departure for the bridge builder. We have from time to time noticed the introduction of concrete in arches and tunnels, the manner it can be moulded to suit arches of different curves, and the greater expedition it affords. One of the latest examples of the use of concrete for bridge construction is that of the Franklin Bridge, Forest Park, St. Louis, Mo. Mr. John Dean, the engineer of the Park Department of St. Louis, prepared a design for a concrete arched bridge of 60ft. span; his experience in concrete work enabled him to apply this material to the spandrel walls and other parts of his design. The Milan Arch Construction Company of New York were consulted, and their system of inserting I-steel beams in the concrete arch ring, and thus reducing its thickness, was applied to Mr. Dean's design, which effected a great saving in concrete, and a contract was undertaken at a price of several hundreds of dollars less than the sum appropriated.

A description of the bridge appears in the *Engineering Record*. The section of the arch shows a solid abutment of concrete of 10ft. thick, from which a graduated thickness of arch-ring springs to about 11in. at the crown. At about 5ft. from each springing the centres were loaded at the crown with about seven tons to prevent deformation, which load was gradually removed as the ring advanced. The arch-ring was composed of Alsen's Portland cement 1 part, sand  $2\frac{1}{2}$  parts, and broken stone 4 parts. For the spandrels 1 part of cement to 3 parts of sand and 5 parts of broken stone were used. The arch has a rise of 15ft. 6in., the ring of arch focussed to three centres being 30in. at springing to 11in. at the crown. The steel beams are 8in. deep, spliced at the crown, and spaced 3ft. from centre to centre. The bridge is 32ft. wide and 92ft. in length. The structure is another good exemplification of the value of cement stiffened by metal ribs. These steel beams are imbedded in the concrete, and, while preserving the form of the arch, also give it a certain rigidity. The "line of pressure" is really contained within these beams, which assist to transmit the load to the abutments. A coating of mortar  $\frac{1}{2}$  in. thick covers the outside of the concrete arch. The concrete and steel arch thus forms a homogeneous shell supporting the earth filling and roadway. The base and coping of balustrade were cast in wooden boxes in place; the balusters were cast in three iron moulds, and took some time to complete, the external surface being coated with about 1 to 2 of mortar put in place at the same time as the concrete and rammed together. After removal of moulds the surfaces were rubbed down with wooden and cork floats, little mortar being used. The construction is practically the same as that of a flat concrete floor with steel joists embedded in its thickness, with the further advantage which the arched form gives in point of strength. We may now soon hear of other applications of metal to concrete in bridge building; the iron channel or Lindsay construction of floor-building may be used, or we might have steel I-beams, as in the Franklin bridge, strengthened by cross steel beams, the whole being formed to the curve of arch, and the square



spaces between the iron filled in with concrete. By this kind of construction we may dispense largely with the cost of timber centring, and a large percentage of lateral thrust may be saved. The concrete arch ring, with its ligamental structure of steel, becomes a compact shell like a piece of earthenware, and we may almost conceive an arch of these materials floated *en masse* to the abutments and set up in place. A valuable covering to the extrados of such an arch would be a layer of asphalt, or such a bituminous material as Callender's bitumen dampcourse, which would prevent the percolation of moisture, so detrimental to most brick and masonry bridges.

#### IRON CONSTRUCTION IN DRAINAGE WORK.—V.\*

By T. E. COLEMAN, F.S.I.

**D**RAIN-PIPES may also be suspended from a basement or sub-basement ceiling, as indicated in Figs. 51 and 52. When the level of the drain occurs about midway between the floor

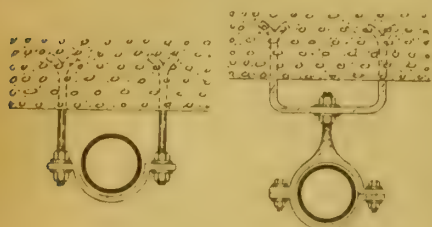


Fig. 51.

Fig. 52.

and ceiling of the basement, the necessary support is obtained by the use of cast-iron brackets built into the wall.

The efficient ventilation of the entire drainage system should receive careful attention. As far as possible, all drains should be so arranged that a current of fresh air is constantly passing through them. Long drains having "dead ends" should be avoided, as they practically form reservoirs for the accumulation of stagnant sewer air. Each soil-pipe must be continued well above the eaves of the building, to serve the purpose of a high-level foul-air extracting shaft. The top of all ventilating or foul-air extracting shafts should be placed well away from any windows, chimneys, or ventilators appertaining to the building, and in such a position that the wind may blow freely

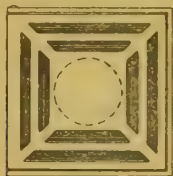


Fig. 54.

across the open end, so as to assist in inducing an upward current by exhaustion of the air within the pipe.

Fig. 53 is the sketch of a high-level foul-air extraction shaft suitable for fixing in situations where the ventilating shaft cannot be secured to the side of a building. A cast-iron ornamental base provided with a "rust-pocket" is securely anchored to a block of concrete and connected to the drain. The remaining portion of the column consists of a welded steel tube fitted with an iron cap and perforated hemispherical grating to prevent birds building therein. Welded steel tubes varying from 6in. to 12in. in diameter, and of any length up to 25ft., may be readily obtained. For shafts of greater length two or more tubes may be joined together. Columns of this description are largely used in streets and thoroughfares for the ventilation of public sewers.

It is desirable to place the fresh-air inlet to the house drains approximately near the surface of the ground, so that every advantage may be taken of the difference in level between the air inlets and outlets in the production of a current of air within the drains. Where circumstances permit, the fresh-air inlet should be so designed as to provide an unrestricted passage for the admission

of fresh air, whilst at the same time taking precautions to prevent the possible entry of sticks, stones, dirt, &c.

Figs. 54 and 55 are the plan and section of a

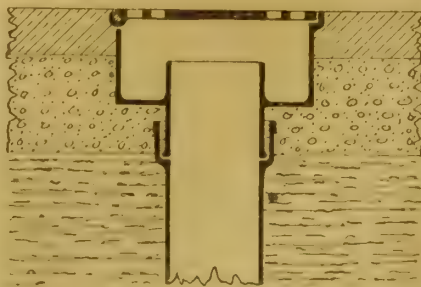


Fig. 55.

fresh-air inlet of this description. A number of perforations are arranged on each side of the cover, but the centre portion (immediately over the inlet-pipe) is made solid, so that any dirt or debris cannot enter the drains, and is retained within the tray or dirt-box formed around it. A

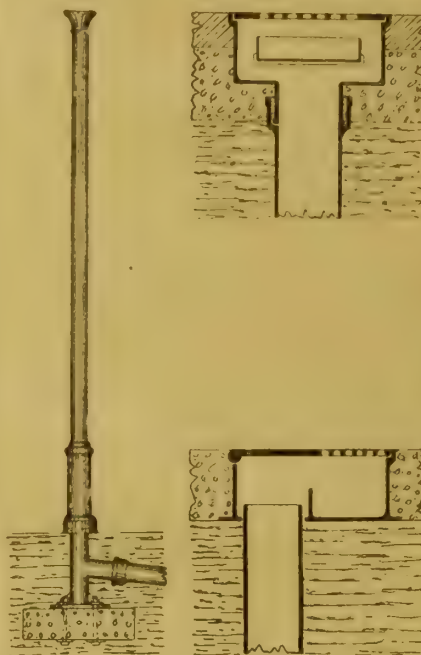


Fig. 56.

Fig. 57.

modification of this arrangement is seen in Fig. 56, where a movable dirt-box is provided. Fig. 57 also illustrates another form of fresh-air inlet of the same type, whilst Fig. 57A is the sketch of an arrangement in which the fresh air is admitted into the drains by means of an air inlet placed in

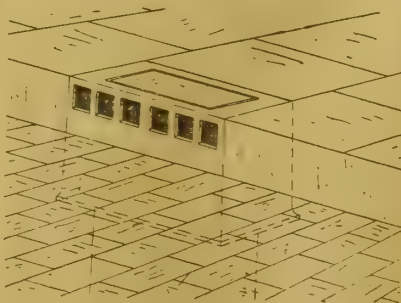


Fig. 57A.

a line with the pavement kerb. A hinged cover with lock is provided at the pavement level for periodical cleaning and inspection purposes.

When the fresh-air inlet must be placed in a confined situation, or near the doors and windows of occupied buildings, the inlet is generally

arranged so as to allow the admission of fresh air into the drain, but should a reverse current of vitiated air occur the opening is automatically closed. Fig. 58 is the sketch of a fresh-air inlet ventilator provided with lightly-balanced mica flaps, and is similar to that already indicated in section in Fig. 37. The flaps are so hung that they remain open to allow the continued entry of fresh air, but close immediately the air current is reversed. The air inlet ventilators are generally made of galvanised cast iron with brass fronts, and in various sizes suitable for pipe 3in. to 6in. in diameter. Mica flap inlet ventilators, similar to that shown in Fig. 59, may also be obtained

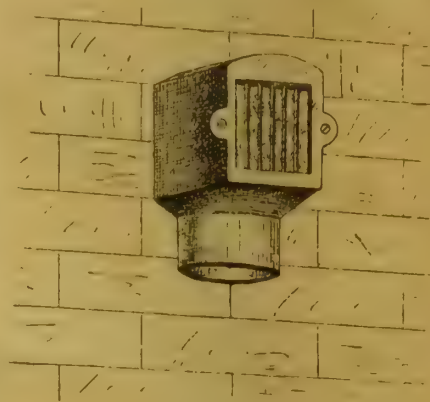


Fig. 58.

for building into a brick or masonry shaft when an inlet of larger area is necessary.

Where deep trenches are required in drainage works, it is essential that the sides of the excavation shall be adequately supported by temporary sheeting and timbering, to avoid any risk of damage or accident by a fall of earth. The shoring should be fixed by experienced timber men, who are accustomed to this class of work. The sides of the trench must be trimmed to a vertical plane, and the planking firmly and solidly strutted against the faces of the excavation. Fig. 60 illustrates a method of timbering frequently adopted when the lower strata are of a loose and yielding nature. After fixing a series of short poling boards (P) to the upper portion of the excavation, the trench is slightly reduced in width, and the sides of the narrower trench supported by means of long lengths of boarding (called "runners"), and which are driven vertically down-

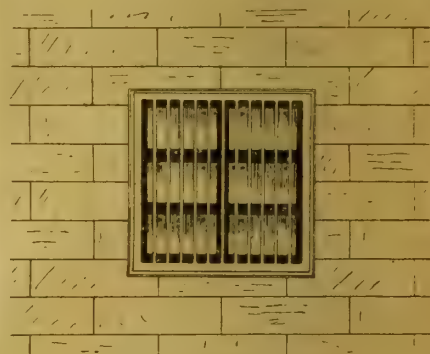


Fig. 59.

wards with a wooden "maul" as the work proceeds. The "runners" (R) are held in position by the walings (W) and the struts (S). Ordinary runners consist of boards about 9ft. or 10ft. long, 1 1/2 in. thick, and having their lower end roughly axed to a chisel point, so that they may be more readily driven into the ground. When the trenches have been partially filled in, the runners are withdrawn by means of an iron chain and a long wooden lever.

All inspection chambers and manholes should be provided with a substantial cast-iron cover and frame for convenience of access to the drains at any time. The selection of a suitable cover must be governed by the particular circumstances in which it is to be placed. They may be obtained of various sizes, and in an almost endless variety of pattern.

Figs. 61 and 62 show the plan and section of a

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rectangular cover and frame. The cover is arranged with a series of openings so as to admit fresh air to the drainage system. Immediately below the apertures a movable iron tray or dirt-box is placed for the purpose of preventing sticks, stones, dirt, and other *débris* entering the drain below. The cover is hinged, and to afford greater security it is also generally provided with a lock or other fastening.

Illustrations of a circular ventilating cover and frame are seen in Figs. 63 and 64. The outer

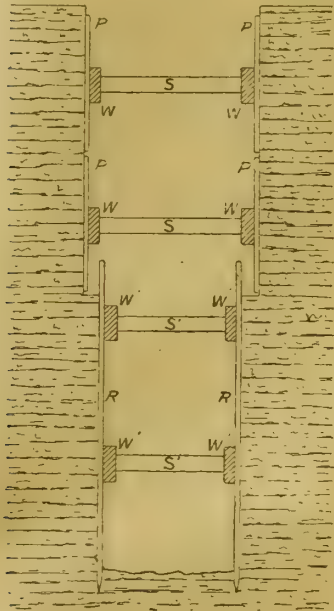


Fig. 60.

portion of the cover is fitted with elm blocks, and a movable dirt-box is provided underneath the ventilating openings. Covers of this description are well suited for fixing in situations where heavy traffic is likely to occur.

Fig. 65 is a section through a solid cover of a similar description to that just mentioned. The top of the cover is provided with elm blocks, which affords a better foothold to horses, and also deadens the sound of traffic passing over them.

A modification of this cover is shown in Fig. 66. The frame is arranged with an annular groove, and run with lead. A yielding metallic seating is thus formed for the projecting knife-edge

Fig. 61.

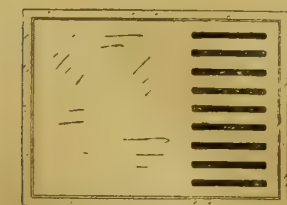


Fig. 62.

bottom of the cover, so that an air-tight joint is practically obtained at this point. When the seating becomes worn at any time, it may be readily restored by running fresh lead into the groove.

Fig. 67 shows a solid manhole cover with sunk top. The surface of the cover is brought level with concrete, wood blocks, tiles, or other materials which are similar to the surrounding paving. A grooved and tongued joint is made between the cover and frame, whilst the joint is "sealed," or made air-tight, by filling the groove with oil, soft-soap, or specially prepared plastic composition.

Fig. 68 illustrates Durrans' patent metallic-

jointed cover and frame, the lid being circular on plan. The upper portion of the joint at A is accurately turned and bevelled, so that a close metallic contact joint is obtained. A vertical

Fig. 63.

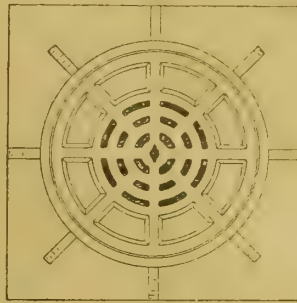


Fig. 64.

face joint is formed at B, and the lower portion (C) arranged with a groove and tongue. Before fixing the cover, the groove is filled with oil, soft-soap, or other luting material, so as to provide increased security against the escape of vitiated air from the drains.

A section through Dyer's patent cover is given

Fig. 65.



Fig. 66.

in Fig. 69. The joint is formed by means of an indiarubber tubing fixed in a groove on the underside of the cover, which forms a seating for the inner edge of the frame.

Many solid manhole covers are provided with an inner lid, in order that a separate and independent seating may be obtained. Covers of this type are usually known as "double" covers.



Fig. 67.

A sketch of Smeaton's patent cover is seen in Fig. 70. The groove on the underside of the inner plate is fitted with a band of indiarubber. This is firmly compressed against the side of the frame by means of four screws, which pass through the corners of the plate. The outer lid is hinged and secured with a suitable lock.

Drains discharging into the sea or tidal rivers

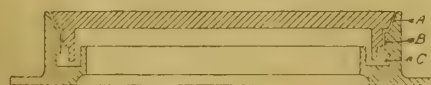


Fig. 68.

below high-water mark should be provided with a tide-flap or valve at their outfall. Fig. 71 is the elevation of a single-hung tidal-flap, whilst Figs. 72 and 73 show the section and elevation of a double-hung tidal flap. The double hinges seen in the latter illustration are each formed by means of a short connecting link, so that the action of the flap in opening or closing is rendered much more sensitive. The hinges should be

bushed with gunmetal bolts, or provided with gunmetal bolts, in order to prevent the working parts rusting together. The face of the flap and its seating should be carefully finished, so that

Fig. 69.

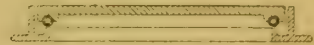


Fig. 70.

when pressed together a watertight joint is obtained. When the faces of the tidal flap are of iron, they should be properly planed to true surfaces. It is, however, preferable to use a

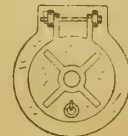


Fig. 71.

tidal flap with planed gunmetal faces, or one in which the edge of the iron flap takes a V-shaped form, and arranged to close upon a soft lead seating. A suitable seating of this description is obtained by means of an annular and dovetailed



Fig. 72.

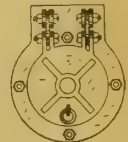


Fig. 73.

groove formed on the face of the outfall pipe and run with lead.

Similarly, when a drain discharges into the public sewer at a point where it is periodically tide-locked or subject to heavy floods the outfall

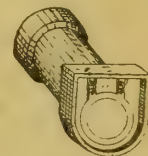


Fig. 74.

of the drain should be provided with a sensitive flap or valve. For ordinary drainage work, tide flaps of the description shown in Fig. 74 are frequently used. These consist of a stoneware pipe arranged with a small recess at the end, and

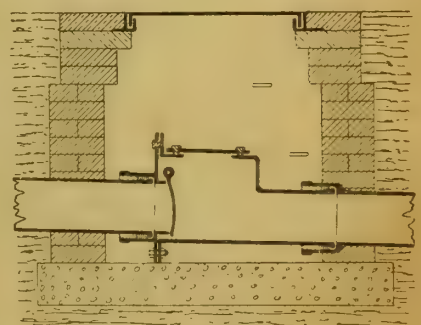


Fig. 75.

fitted with a light galvanised-iron flap, hung with gunmetal links. Aluminum flaps are also manufactured for the same purpose. The latter are much more sensitive to the action of flowing sewage, owing to the comparative lightness of the metal, and are not liable to be rendered unserviceable through rust.



An access-pipe provided with a hinged flap is seen in Fig. 75, and may be used with advantage in certain situations. It is so arranged that the flap can be readily removed and refixed at any time.

Fig. 76 illustrates a type of check-valve used

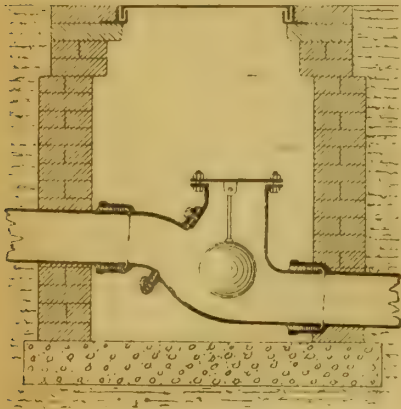


Fig. 76.

for the prevention of flooded basements, &c., occurring from the back-flow of water or sewage in the drains. The buoyant and loosely-hung ball-valve is immediately carried to its seating by any abnormal rising or back-flow in the lower portion of the pipe, and the opening automatically closed. The valve-box itself is placed within an inspection-chamber for convenience of access.



Fig. 77.



Fig. 78.

It is sometimes desirable to provide one or more regulating or flushing valves for the purpose of controlling the flow of sewage if necessary. Fig. 77 is the sketch of a "disc" flushing valve. The hook fastening is constructed in a wedge-shaped form, so that the act of shutting down the disc forces the valve-faces tightly together, and a watertight joint is thus obtained. Provision is also made for adjusting the opening to any required size by means of a fixed pin and a series of holes in the handle-bar.

Another form of regulating valve known as a

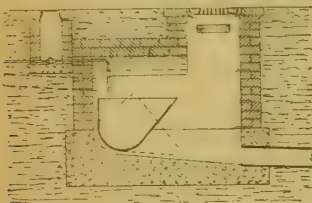


Fig. 79.

"penstock" is illustrated in Fig. 78. The penstock valve is raised or lowered by means of a rack and revolving worm-gear. The valve-faces may themselves be wedge-shaped, or adjustable "wedge-blocks" may be provided in order to obtain a perfectly watertight joint. Both disc-valves and penstocks are obtainable with planed iron or gunmetal faces according to requirements.

Arrangements are now frequently made for the periodical and automatic flushing and scouring of drains by means of a flushing chamber or cistern.

When the head of drain to be flushed is near the surface of the ground, a galvanised iron automatic flushing-tank—carried on brackets or brick piers—is generally used; but when sufficient depth is obtainable, it is more convenient to provide an underground flushing-chamber or tank. In most cases the contents of the cistern or chamber are automatically discharged by siphonic action; but the same result can also be obtained by means of a tipping-tank, as indicated in Fig. 79. The "tipper" is supported on pivots so placed that immediately the vessel is full the weight of the accumulated water within the container causes it to overturn; but directly the water is discharged the vessel regains its normal and horizontal position. The smallest dribble of water will suffice to set the tipper in action, so that the supply of water is capable of being regulated to the greatest nicety. The storm-water may also be arranged to discharge into the tipping-box (as indicated by the dotted lines) for the purpose of flushing the main portion of the drainage system.

#### THE RESTORATION OF MALMESBURY ABBEY.

**A**N influential meeting was held in the Town Hall, Malmesbury, last week, with the Duke of Beaufort in the chair, for the purpose of receiving a report prepared for the Society of Antiquaries on the state of the fabric of the abbey and on the work necessary to preserve it. Six of the nine bays of the Norman nave are used as the parish church; the three western bays and the great west front are in ruins; to the east there are some remains of the great central tower, also in ruins.

The Bishop of Bristol read many letters, including one from the Bishop of Salisbury, stating that the project had his hearty sympathy, as he hated a ruin; and he hoped they would be able to rebuild the nave. The Bishop proceeded to point out the claim which Malmesbury had through its early history on the interest and sympathy of the Church and the nation, giving an interesting historical survey of the abbey and those whose names have been associated with it. He felt they could fairly appeal in Aldhelm's name—to say nothing of the historian William of Malmesbury—not to Wiltshire only, but to the nation, for help in making their abbey church safe, and in preventing such parts as were ruined from going to further decay. He did not himself think it was necessary to rebuild the three western bays of the nave. Besides, to do that would sacrifice the present west window, a very fine and interesting example. If, however, there was really a strong wish in the county for it, backed by sufficient funds, he would be ready to accept the money and see the work carried out. The other parts of the scheme he regarded as absolutely necessary.

Mr. W. H. St. John Hope (secretary of the Society of Antiquaries) gave some particulars of the abbey. A little time before the suppression of the abbey they learned from William Wycestre and Leland that the abbey church then consisted of a presbytery or eastern arm with Lady-chapel beyond, a nave of nine bays, with south porch and western tower. In 1539 the abbey was suppressed, and in 1541 permission was given by the Archbishop of Canterbury to use the nave as a parish church. The license stated that the nave was handed to the parishioners. All the rest of the church had been previously reserved to the king. It was clear that the east end was walled up at the suppression of the abbey as it was now and taken from the western part of the church. The walls of the west end were of a different character, of little stones—a mere filling-up of a breach caused by the former fall of the tower. The date of that wall could not be very long after the suppression, about the middle of the 16th century. The abbey was an historical monument as well as a church for the worship of God, and what they should do must not be to destroy the history of that interesting monument, but to continue it; and whatever scheme was eventually adopted and carried out should continue that history for posterity to read. There were certain points absolutely necessary to be done, and there were other things that might wait a while. There was the rebuilding of the three ruined bays of the nave which he would leave out, but would deal with what was absolutely necessary in the way of repair. At the east end there were certain ruined walls which if left to go on as they were now would be pulled to bits with ivy; but

ivy was pulling the stones apart from the top, and let in all the wet and frost to the upper parts of the walls, and year by year those abutments at the east end of the church were weakened. All that ought to be stopped, and that would keep up the strength of the east end which at present it possessed. Taking the structure as it was in a general way, it was sound, the foundations were good, and the walls showed no cracks which meant settlement, and the vaulting and windows were in a fairly good state of repair. But there were certain things very bad indeed. One thing done in the 14th century was to put a stone roof on, as the first covering was merely a wooden ceiling. Over each of the walls of the church were flying buttresses, and on the south side several of these were in an extremely dangerous condition. The repairs must be put in hand at once and they would be very anxious, and would swallow up a large amount of money, and not show when they were done. There was another equally necessary thing that must be done now: there was a great amount of damage done to the building every week through the high roofs. They were not very old roofs, the woodwork was only deal or pine, and it was perfectly sound; but upon the top of those rafters there were tiles hanging, and the tiles had slipped out of place, and the rain came through in bucketfuls. They would see green stains on the walls as the consequence of the roofs not being repaired. Then there must be repairs of the leaden gutters, and the gutterings and down-spouts would require to be made good. All those were absolutely necessary repairs which would swallow a lot of money, and for which there would be nothing to see. At the west end of the church all that was required was the removal of that pernicious parasite, the ivy. That must be taken in hand and dealt with. He had gone into the matter with those competent to discuss it, and they had come to the conclusion that the best way of treating those ruined bays would be to rebuild what had gone on the south side. To go back to the continuity of history they might copy details of one of the other bays, and build up the bay destroyed; but that would be to commit a forgery and pretend that their work existed in the middle of the twelfth century. The right way was to build similar work which should harmonise, and tell clearly to posterity that it was a repair made in the nineteenth century, and there was no reason why in some inconspicuous place the date of the year in which that was done should not be recorded. If that was skilfully done the work would lock together the revived part and ensure its stability. A roof should be put upon it in continuation of the other roofs, and the work continued as if it was a piece of the other work. Some day it might be necessary to extend the nave westward, and that would become part of the work, it being then only necessary to take down the temporary walls. That would be a perfectly honest and sensible way to deal with that part of the building. That would run into a great deal of money, but it was money well spent, as the abbey was one of the historical monuments of the land, and all the 12th century and 14th century work was of great interest to architects and part of the history of England. To take in the three bays would mean taking down part of the blocking up done in the 16th century. The wrong way to proceed would be to take it down bodily and remove it out of existence of the church. But there was a right way. It was essential that those three bays should open into the other six left as largely as possible; they could build up the three bays, taking the space into the church. Then as to the refitting of the church; when all that necessary repair was done there would be the refitting. Deal pews with cast-iron ends could be replaced by something different, and better than these would be even chairs. There was no reason why parishioners should not say that they would pay the cost of a pew, and so good oak benches might be put in. All the ancient fittings of the church had absolutely disappeared; there was nothing older than the font, and that could be kept; and there was the organ case with the organ; and he thought that completed all that was old. The stone screens should be kept, and the monuments remain just as they were. The floor ought to be put to its proper level.

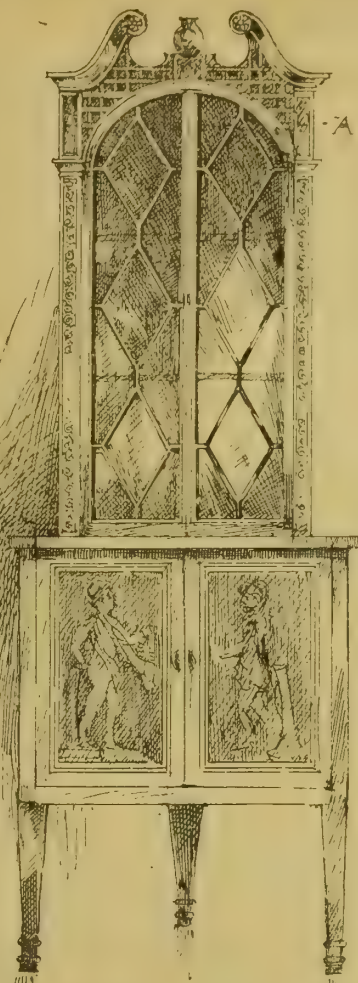
The Rev. G. W. Tucker moved that the work be undertaken in three sections; first to make the present church actually safe, and put it in thorough repair. That could be done at an estimated rough cost of from £500 to £600; second,



# SKETCHES FROM THE SALE ROOMS.



• LOUIS XV SHAPED TABLE.



• A CORNER CABINET.



LOUIS XV SHAPED TABLE.

W. J. W. S.

to prevent the ruined part from falling to further decay, at an estimated cost of £5,000; third, if funds are forthcoming, to rebuild the three ruined bays of the nave, without the north aisle, at a cost of £10,000, so that the total cost would be about £21,000. It was proposed to leave the choice of the architect in the hands of the bishop and himself.

Sir J. Dickson Poynder, M.P., having seconded the resolution, it was carried unanimously, and a general committee was formed for the purpose of carrying out the work, with power to add to their number, and also a local committee with similar power, the Bishop of Bristol to be chairman of both committees, and Mr. C. F. Moir honorary secretary.

## SKETCHES FROM THE SALE ROOMS.

WE give this week illustrations of two Louis XV. shaped Tables, one inlaid with birds, foliage, and flowers, mounted with corner ornaments of chased ormolu, and brass borders. It contains one drawer, and is 20½ in. in width. The other has less ornamentation, but is also mounted with chased ormolu corners, and has one drawer at end, and shelf beneath. The small corner Cabinet, or Sheraton, is of satin and kingwood, with glazed folding-doors above, and folding-doors beneath engraved with Classical figures. This is a pretty and useful piece of furniture. The sketches were made at Messrs. Christie, Manson, and Wood's sale rooms.

## CRICHTON PARISH CHURCH.

TO claim to have the best-vandalised pre-Reformation church in Scotland is, says the *Scotsman*, no mean bid for distinction in a country where the heritor has been abroad in that land for so long, and where "heritors' Gothic" has become at once a classification and a reproach; and yet the parishoners of Crichton need have small fear of their claim to such notoriety being refuted; it will take a big record indeed to break theirs.

Given a beautiful Gothic church, with chancel, tower, and transepts—the nave was never

finished; with ashlar stone interior and lofty vaulted roof 30 feet high; with stone-mullioned and cusped-tracery windows of gorgeous mouldings; given this, and the problem being how best to vandalise it—here is how the heritors, in whose charge the ancient Collegiate Kirk of Crichton was left, solved the problem. By walling off the chancel from the transepts to begin with, thus obtaining a fine rectangular interior, exactly suited for galleries. By erecting three galleries round this chancel, placing the pulpit on one of the longer sides—which necessitated the building up of the two original doorways and the complete or partial building up of three original windows, and the consequent cutting of new doors and windows to take their place. By erecting two great porches without and by wainscoting and ochreing the walls within. And, finally, by using one transept for a family vault and the other for the gravedigger's tools, the large windows of both being built up with stone and lime rubble.

It may be suspected that this description is not without a touch of caricature. The fact remains that all this vandalism was actually carried into effect. Of the original seven windows three and a half were built up, and three new ones were cut out in their place—through walls 4ft. 6in. in thickness, too! Two of the new gallery doors were through old windows; even humour, in the lack of reverence, might have saved the heritors from the perpetration of this atrocity. But they had none. It was a matter of no importance how the worshippers entered, whether by door or window! The base was hacked from the sedilia; the hole for a gallery beam was cloured in the top of one panel; the three panels were filled with lath and plaster, flush with the wall. The rich capitals on the pillars of the chancel arch suffered a like fate in the interest of gallery beams; even the moulding of the arch itself could not be plastered over before it had been hacked and scarred. One indignity only did the poor old building escape, and that was, indeed, proposed in all seriousness by one of her worthy elders, anxious to add to the tale of the heritors' enormities. "You see, sir" (this to the minister) "I've been having my

parlour done up, and the painter has just made the ceiling beautiful. All that our church needs is to have a nice light paper put on to cover the old dirty stone."

Of course the explanation of all this Philistinism was that by this means the heritors were enabled to enjoy the privilege of privacy, or at least of exclusiveness in their public worship. The chief heritor had his private gallery under the chancel arch, with his own wooden stair, once painted white, leading up to it; three other heritors had the gallery opposite the pulpit for their own exclusive use, with special porch and two separate doorways. The third gallery was for the village folks; the farmers and their hinds sat below; it was a perfect arrangement! So much so, that in the Statistical Account of 1845 we read that "within the last twenty years the church has undergone a thorough repair, and is now one of the most handsome and comfortable in all the country."

The church stands on the bank of the infant Tyne, some 400 yards north of Crichton Castle, and was founded by Chancellor Crichton in 1449 "out of thankfulness and gratitude to Almighty God for all the manifold deliverances He had vouchsafed to him." It was at this time that the greater part of the Castle—familiar to all students of "Marmion"—was built by the Chancellor. Macgibbon and Ross tell us that probably the same masons were employed on both. There is a tradition that the founder was buried in the church; a later tradition again that his skeleton was unearthed during some comparatively recent alterations. It was recognised after all these centuries, doubtless by some "impartial Englishman." Of the supposed skeleton of James, Earl of Bothwell, a successor of the Chancellor in the Lordship of Crichton, unearthed in a Danish church some 300 years after burial, it was declared by a certain Captain Marryat, "I defy any impartial Englishman to gaze on this body without at once declaring it to be that of an ugly Scotsman."

Inside the chancel, opposite the sedilia, is a plinth which has carried a tablet inscribed with the Nicolson coat of arms—Agnes Nicolson was the wife of Patrick Murray, first Lord of Elibank,



and son of Gideon Murray, the last Provost of Crichton. And this is mentioned here, because of the strange fate which befell that tablet. When the galleries were being built, this tablet stood in the way. The heritors, who could break that sedilia without a qualm, had scruples when they came to a coat of arms. And so they lifted the tablet from its plinth, and set it—to adorn the west front of the church!

The church is at present being restored to something of its former beauty. For the old building a brighter day has dawned in the history of its fortunes, so far, at least, as the heritors are concerned; for it is in great measure by the splendid liberality of the chief of them, and under his personal supervision, that the present restoration is being carried out.

#### PROJECTED LONDON STREET IMPROVEMENTS.

**T**HE Improvements Bill of the London County Council, embodying the scheme for a new street from Holborn to the Strand, and various other improvements, has been deposited in the Private Bill Office. It is proposed that the new street shall leave High Holborn opposite Southampton-row, and proceed southerly, intersecting Great Queen-street, Sardinia-street, Vere-street, and Stanhope-street. At this point it will bifurcate; the western branch will enter Catherine-street and the Strand close to Wellington-street, so as to form an approach to Waterloo bridge, while the eastern branch will pass through New Inn to the Strand at St. Clement Danes Church. The main street and the two branches will all be 100ft. wide. It is proposed to widen the Strand for a considerable distance on the north side from St. Mary's Church, very unnecessarily, we think, and to acquire the whole area bounded by the Strand and the two branch streets. The cost of the necessary property is estimated at £4,442,000, and the recoupment is expected to yield £1,088,300. The cost of works and of rehousing persons displaced is put at £420,000, making the total estimated net cost £774,200. Powers for the improvement cannot be obtained until July, 1899, after which about two years will probably be occupied in the making of the initial valuation for the improvement charge, the formulation of a scheme for rehousing the displaced persons of the labouring classes, and the receipt of claims consequent upon the services of notices to treat.

The widening of Southampton-row—a corollary to the formation of the new street—is also included in the Improvements Bill. The work is to be carried out on the eastern side, commencing at Vernon-place and Theobald's-road, and terminating at Holborn, exactly opposite the northern end of the proposed new street. There is also to be a widening of Holborn on the northern side, commencing at the southern end of Southampton-row, and to extend some 50 yards eastward from the centre of that thoroughfare. The estimated net cost of the Southampton-row widening is £162,000. The total net cost of the street improvements which are contemplated in this district, and which will be carried to completion on Parliamentary sanction being given for the new Holborn to the Strand thoroughfare, will be £1,721,000, made up as follows:—Strand widening at Holywell-street, £569,000; clearance of insanitary district at Clare-market and Drury-lane, £216,000; Southampton-row widening, £162,000; and the proposed new street from Holborn to the Strand, £774,000. This, compared with £2,246,000, the estimate of 1892 for the same general scheme, shows a difference of £525,000.

The proposed widening of High-street, Kensington, power for which is also sought under the Improvements Bill, is to be executed on the northern side of the thoroughfare, the total net cost of the scheme being £81,000. The proposed widening of Wandsworth-road is to be executed between Vauxhall-cross and Nine Elms-lane. The estimated net cost of this urgently-needed improvement is £55,000, and no contributions will be asked from the local authorities. In connection with this improvement the Council are asking Parliament to exempt them from the operation of section 92 of the Lands Clauses Consolidation Act, 1845, which provides that where the promoters of a public undertaking, acting under statute, require to take a part of a house, building, or manufactory, the owner shall have the right of calling upon them to take the whole. This exemption is asked for because the

widening proposed will only necessitate the acquisition of the fore-courts of a large number of houses on the route.

#### SUGGESTED FREE LIBRARY AND ART GALLERY FOR MANCHESTER.

**A**T the Manchester City Art Gallery on Thursday in last week a meeting was held under the auspices of the Manchester Society of Architects, at which Mr. E. Salomons, F.R.I.B.A., the architect of the Manchester Art Treasures Exhibition, and one of the founders of the Manchester Society of Architects in 1865, delivered an address upon "The Development of Manchester and Suggested Improvements." Mr. R. I. Bennett, president of the Society, occupied the chair.

Mr. Salomons pointed out that the need for a new Art Gallery and Reference Library in Manchester involved questions peculiarly inviting the attention of the Manchester architects, who would be assuredly neglecting an obvious duty if they did not give to them their earnest consideration. After some interesting reminiscences of the condition of Manchester as he remembered it many years ago, Mr. Salomons said his attention was first drawn to the want of foresight and general method in local improvements by the contrast they presented to what he saw in progress in Paris when he first visited that city in 1853. At that time Louis Napoleon, under the advice and guidance of Haussmann and the architect Viollet le Duc, was just beginning the reconstruction of Paris by forming the two great boulevards at first called Sebastopol and Haussmann, and which were cut through some of the lower districts of Paris. What struck him then was that the old historical boulevards and streets were never altered or touched, but left as they always had been and were in the main to-day. The same principle—the opening out of entirely new streets and squares—had been followed in all the great improvements made in the chief cities of Europe. But if they reverted to the changes that had been made and were being made in Manchester, what did they find to be the rule? That the only idea, with rare exceptions, which presented itself to the authorities was to widen or extend existing streets; and now that a new Art Gallery and Reference Library were required they found the same instinct at work, it being strongly urged that the Infirmary should be removed elsewhere. What a fine site that would set free for the new gallery and library! But in the first place a large open space did not alone constitute a fine site. To be that an open space must be surrounded by fine buildings—which was certainly not the case with the Infirmary. Then again, the sum which would have to be paid for the site was far greater than the sum for which an entirely new open space could be created in quite as convenient a part of the city. The only recommendation for the Infirmary site was that it was obvious, and therefore easily apprehended by authorities whose traditional method consisted in improving what already existed, and had resulted in making that city a signal example of the waste of good buildings by placing them in positions where they were seen to the least advantage. He suggested, then, that the creation of a new square should be at least considered as a possibility. The erection of a city library and art gallery presented the opportunity for a really notable improvement, one of the most important in the history of the city. And no chance of making the most of such an opportunity should be lost through failing to consider the question from every reasonable point of view. Was there, then, a reasonable opportunity for opening out a new square sufficiently near to the centre of the city? He thought there was, and his suggestion was that the Corporation should purchase the whole of the land in Oxford-street bounded by the South Junction and Altrincham Railway, Great Marlborough-street, Saville-street, and Pritchard-street. That would give, including streets, an available open space of 58,000 yards or thereabouts, or about twelve acres. Of that 27,700 yards would have to be purchased—the streets accounting for the rest—and he put the extreme value of that land at from £6 to £7 a yard—say £7, at which figure the cost would be about £194,000, as against a minimum of say £500,000 for the Infirmary site. There would be ample space for an art gallery and library—say 4,000 yards each—and some thousands of yards of land would be left for sale

at a considerably enhanced price. Thus a new open space would be formed, only about half a mile from the Town Hall, and there was no doubt it would in a few years become the fashionable centre of Manchester. In suggesting this scheme he went beyond the mere need for a new art gallery and library. His primary idea was to form a new centre for Manchester, which might be developed hereafter by private enterprise in the usual way. Although he thought the situation an excellent one both for art gallery and library, others might not agree with him, especially as regarded the latter, which, it might be thought, should be in a more central position. That might be so. On the other hand, it was possible to divide the students' library from the business library, leaving the latter department in the business centre. But even if the library were not built on the newly-provided site, there were many other uses to which it could, and most probably would, be put, such as a new theatre, with all its necessary appurtenances, which they did not now possess; and a new concert-hall, with better entrances, staircases, and ante-rooms than the Free-trade Hall provided, was also urgently needed. Why should not the Corporation build a new theatre convenient, commodious, and even luxurious, for the benefit of its citizens? The Corporation gave libraries, art galleries, art museums, &c., for the instruction or edification of its ratepayers; why not provide a theatre for the same object? In the former case the cost, both initial and annual, was large, but no one doubted that the money was well spent. In the case of the theatre the cost would be nil; 2,000 yards would be required; the value of the land might be safely put at £5, for wherever a large public building was placed it at once enhanced the value of the land adjacent. The building complete would cost, say, £50,000 or £60,000 in all. If only the same rent was obtained as was now paid by the Theatre Royal the return would be 5 per cent on the outlay, and as the Corporation could borrow at 3 per cent the transaction would be a profitable one for the ratepayers. He further suggested that if such an open space be made, Oxford-street should be widened to, say, 120ft. right up to Whitworth Park. They would have then, in its nearly two miles of length, the Midland Hotel, the theatres, concert-rooms, Art Gallery and Reference Library, School of Art, Owens College, and Whitworth Park and art galleries. A business centre, and a neighbouring literary, art, and educational centre, was the ideal they ought to have in mind, and which they had now the opportunity of realising.

In the course of a brief discussion, Mr. Charles Rowley said that he somewhat agreed with the view expressed by the reader of the paper. He thought it would be much better to adopt some such scheme as that laid before the meeting than to enlarge on the Infirmary site, which seemed to him impracticable. Inasmuch as, some years ago, the value of the land occupied by the Infirmary was stated to be £750,000, it might safely be put at a million of money to-day. Oxford-road was the main street leading out of Manchester, but anything more hideous than that thoroughfare beyond the railway arch could not be found in any great city. The shabbiness of the whole situation was disgraceful. Some such scheme as that proposed would certainly give a filip to the improvement of the whole of that side of the city. They had some extremely beautiful buildings in Manchester, but they were utterly ruined by the dirt and filth of the atmosphere.

Mr. Plummer, a member of the City Council, said he held as lofty an ideal of what Manchester might become as any man present, and could he have had his own way in the matter he should have laid down, upon Mr. Salomons' ideal, a Manchester which might possibly have taken a hundred years to realise. It did not follow that they need despair if they could not carry out such a scheme as that suggested by Mr. Salomons in one day. He thought Mr. Salomons had taken a very modest view of the cost of the work. At the present time Manchester was very heavily burdened in the matter of rates, and in the present apathetic condition of the public mind he felt that the scheme would hardly receive the recognition which it merited.

Mr. Salomons, in reply, said he had carefully gone through the question of expense, and he had no hesitation in saying that in the course of a few years it would be actually a profitable and not a losing scheme.



### ADDITIONS TO THE SOUTH KENSINGTON MUSEUM.

THE collections of the South Kensington Museum have lately been enriched by the liberality of several gentlemen who have either lent or given their works of art for exhibition.

Sir T. D. Gibson Carmichael, Bart., M.P., has sent a varied and valuable collection. Four ivory plaques, dating from the 14th century, are of French workmanship, and are most delicately carved in openwork with scenes from the life of our Lord. Two other plaques from the same set are in the permanent collection of the Museum.

Another very interesting ivory carving is the circular plaque of the Deposition from the Cross. It is probably Flemish work of the latter half of the 15th century; some of the figures bear great resemblance to those on the fine Brussels tapestries of that period. The tiny triangular shrine of silver holding carved ivory figures of the Virgin and Child, with St. John the Baptist and Saint Catherine of Alexandria, is decorated at the back with the subject of the Crucifixion on a dark blue enamelled ground. This little treasure is also French work of the 14th century. In a frame are two very beautiful portraits of Dante and Beatrice in niello; these medallions date probably from the first half of the 16th century, and are mentioned by Cicognara in his "Memorie spettanti alla Storia della Calcografia." A flat, circular reliquary of silver is also decorated in niello-work, with representations of the Annunciation and the Resurrection. There are several crystal objects in this collection; but probably the most interesting of them all is the little cylindrical reliquary of rock crystal, carved with a Kufic inscription, and mounted in silver gilt of a considerably later date. An Italian rock crystal cross, of the 15th century, is mounted on a gilt metal foot, with two silver plaques decorated with angels in translucent enamel. At the other end of the case is a beautiful lapis lazuli cup, carved in Italy in the 16th century; the handle is of pure gold, and is in the form of a triton with a conch. Sir Thomas Carmichael's specimens of metal-work are arranged in another case, and first among them should be especially noticed the boat-shaped incense-vessel of gilt copper, which was formerly in the Magniac collection. It is engraved with compartments inclosing figures of St. Catherine of Alexandria and a sainted bishop; the latter was formerly concealed by a copper plate, attached by solder, and engraved with a similar figure (probably of a successor); this has been removed, and is now fixed on the under side of the lid.

Immediately above this incense vessel is a 15th century bronze of a baby from Florence. By the side of the navette is a very interesting inkstand, with plaquettes by Giovanni delle Corniole, illustrating scenes in the story of Coriolanus. At the bottom of the case is an elaborate inkstand, with figures forming a group, representing the martyrdom of St. Lawrence. A bronze figure of Chastity trampling on Vice, is similar to one on an inkstand by Benvenuto Cellini, formerly in the Borghese collection. Some of the other bronzes are adapted from antiques which were held in high repute by the connoisseurs of the 16th century; notably amongst these may be mentioned a bronze head, which very closely resembles the famous Medusa Ludovica, and the small figure of the boy extracting a thorn, the original of which is in the Palazzo dei Conservatori, Rome. In this collection there is a manuscript of the rules for the conduct of a school at Florence. The first page is beautifully illuminated with the Holy Trinity surrounded by angels and cherubs; within the initial letter is a figure of St. John the Evangelist. The greater portion of the scroll-work round the border forms little compartments, enclosing youthful figures clad in white robes and wearing leafy crowns, probably the students of the school. The third case is filled with Sir Thomas Carmichael's terracotta figures from Tanagra, in Boeotia, and from Asia Minor.

Major V. A. Farquharson has lent a most interesting series of gun-locks, a complete history of this portion of a lock through all its developments, from the primitive matchlock down to the most finished flintlock, used in the early part of the 19th century. Some of these specimens are beautifully decorated and are excellent works of art, notably three flintlocks (Nos. 63, 64 and 65) of Spanish manufacture of about 1680; they are delicately chiselled with floral ornament, monsters and demi-figures.

Others are finely engraved as, for instance, Nos. 39 and 40, made by the Zellners of Salzburg.

Another case is devoted to this gentleman's collection of firearms. Amongst them are weapons by some of the most famous armourers of the time, such as Lazarino Cominazzo and Lazro Lazarino and Caspar Zellner. There are also some specimens of the well-known Highland pistol, many of which are elaborately engraved.

Mr. T. Foster Shattock has lent two large pieces of old French furniture of the 16th century. The first is a cabinet of walnut carved with terminal figures and with panels of architectural and other ornaments. The second is a buffet with an arcade in front, and cupboard and recesses behind. The arcade is covered with an elaborate carving of terminal figures, and the drawers and panels are also carved with strapwork and masks and floral ornament. These two pieces of furniture are exhibited in the Tapestry Court.

A case in the South Court contains Mr. Shattock's collection of small wood-carvings. First amongst these specimens should be mentioned the seated figure of Vulcan, carved in box-wood. On the shelf below are four groups of the Evangelists, apparently carved for some shrine or altar-piece. One of the treasures in this collection is the conventional lion-mask, with wings on either side and horns above. In the centre of the case is a walnut panel from a French cabinet of the 16th century; it is carved with a figure of Minerva beneath a pedimental canopy, which is surrounded by leafy stemwork and cherubs. There are many other carvings in this case which are of great interest, and show to what skill the craftsman in wood-carving could attain.

Mr. J. Fletcher Moulton, Q.C., M.P., has lent a small but valuable collection of so-called Rhodian and Damascus wares. The large mug is of peculiar interest because of its rare salmon-coloured ground, which is covered with floral decoration. The little mug, with sloping side and square-shaped handle, has a diaper pattern on the magnificent red ground. In the same case is a fine tall bottle painted in blue green and red with hyacinths and other flowers. Two fine tiles with olive-green leaves and blue flowers, probably come from Damascus, and form part of a large slab, of which the Museum already possesses three tiles. Mr. Fletcher Moulton has also lent a small collection of metal-work, including a silver gilt Benitier in repoussé work, bearing the Paris hall-mark for 1725-6, and a silver jug emblematic of Abundance, designed by J. C. Delafosse, and figured in his "Nouvelle Iconologie Historique"; this piece is stamped with the marks of H. Clavel, Farmer of the Duties, 1783-89. A bronze figure of Hercules, of the same owner, is attributed to Gian da Bologna.

Mr. Henry Wallis has lent a small collection of old Italian pottery, probably made in Tuscany before the 16th century. The specimens are, for the most part, drug-vases, which were used in the pharmacies attached to monasteries and houses of noble families. This collection is very valuable to the student of Italian majolica, as it illustrates very well the beginnings of this art, which was to culminate a little later on in the magnificent wares in which the Museum is so rich.

During the month the section of textile fabrics in the Museum has received a most important and interesting gift from Miss Smithies and Mr. W. T. Smithies, of Manchester. This lady and gentleman have greatly interested themselves in the manners and customs of the inhabitants of Peru before the Spanish Conquest in the 16th century. Mr. Smithies has recently arrived from Lima, and has brought with him a very large collection of objects taken from the graveyards in the neighbourhood of that city. In this collection were many fragments of robes and shrouds; these he has given to the Museum, and they are now temporarily on view in the Tapestry Court. The work closely resembles in execution the garments which have been found at Akhnai, in Egypt, inasmuch as some are decorated with tapestry work and others in embroidery. The garments, however, from Peru are made of cotton, whilst those from Akhnai were, for the most part, of linen; the decoration in both cases is of worsted. The patterns of both series bear a certain resemblance to one another. The Museum did not possess before any of these fragments, and the thanks of all are due to Miss Smithies and Mr. Smithies for this very interesting collection, which forms a most valuable link in the history of the textile craft.

The Museum has just acquired a small but very interesting collection of newel posts; they have been obtained at Brussels, and come from houses of the last century, which had recently been demolished. The posts are for the most part of oak, and are carved with the ornament usually seen on the woodwork of that period, such as festoons, rosettes, and acanthus leaves. These newels must have been the ordinary form in use on staircases in houses in Brussels, as the Museum in that city possesses quite a large collection of them. These specimens of house decoration are exhibited in the Furniture corridor.

### WALL MARKS ON HERTFORDSHIRE CHURCHES.

At a meeting of the St. Alban's and Hertfordshire Architectural and Archaeological Society, held at the Abbey Institute, St. Alban's, on Friday evening, under the presidency of the Ven. Archdeacon Lawrance, Dr. V. H. W. Wingrave read a paper on "Caps, Circles, and Other Marks on the Walls of Hertfordshire Churches." The author observed that Hertfordshire, unfortunately, was not so rich in these marks as many other districts, especially the Midland counties. This was perhaps due to four causes:—(1) the extensive and energetic restoration from which so many of its churches had suffered, (2) the existence of much flint work, (3) the softness of the prevailing Totternhoe stone, and (4) the lavish employment of bricks and cement in patching up crumbling structures. An illustration of the last course was well afforded by Flamstead Church, and to a less degree by Sandridge. Bearing these facts in mind, it was scarcely surprising that the city of St. Alban's at the present moment could not supply a single example of an unequivocal cup or circle mark. He proposed only to call attention to those marks found on the external church walls and on ancient monuments, which, by reason of their frequent occurrence, the regularity of their disposition, and the wide distribution would afford material worthy of their attention and discussion. With regard to the age of these marks, he (Dr. Wingrave) thought he might place them unhesitatingly before the 18th century; how much earlier, it was very difficult to determine. That in one instance they could not be more than 350 years old was well proved in the case of All Saints Tower, Derby, which, according to Mr. W. Andrews, of Coventry, was peppered with cup marks, and was built during the reign of Henry VIII. Still, he was inclined to agree with Mr. Andrews that many of the marks, and especially the simpler circle forms, belonged to a much earlier period. At Stoke Church, Warwick, there were

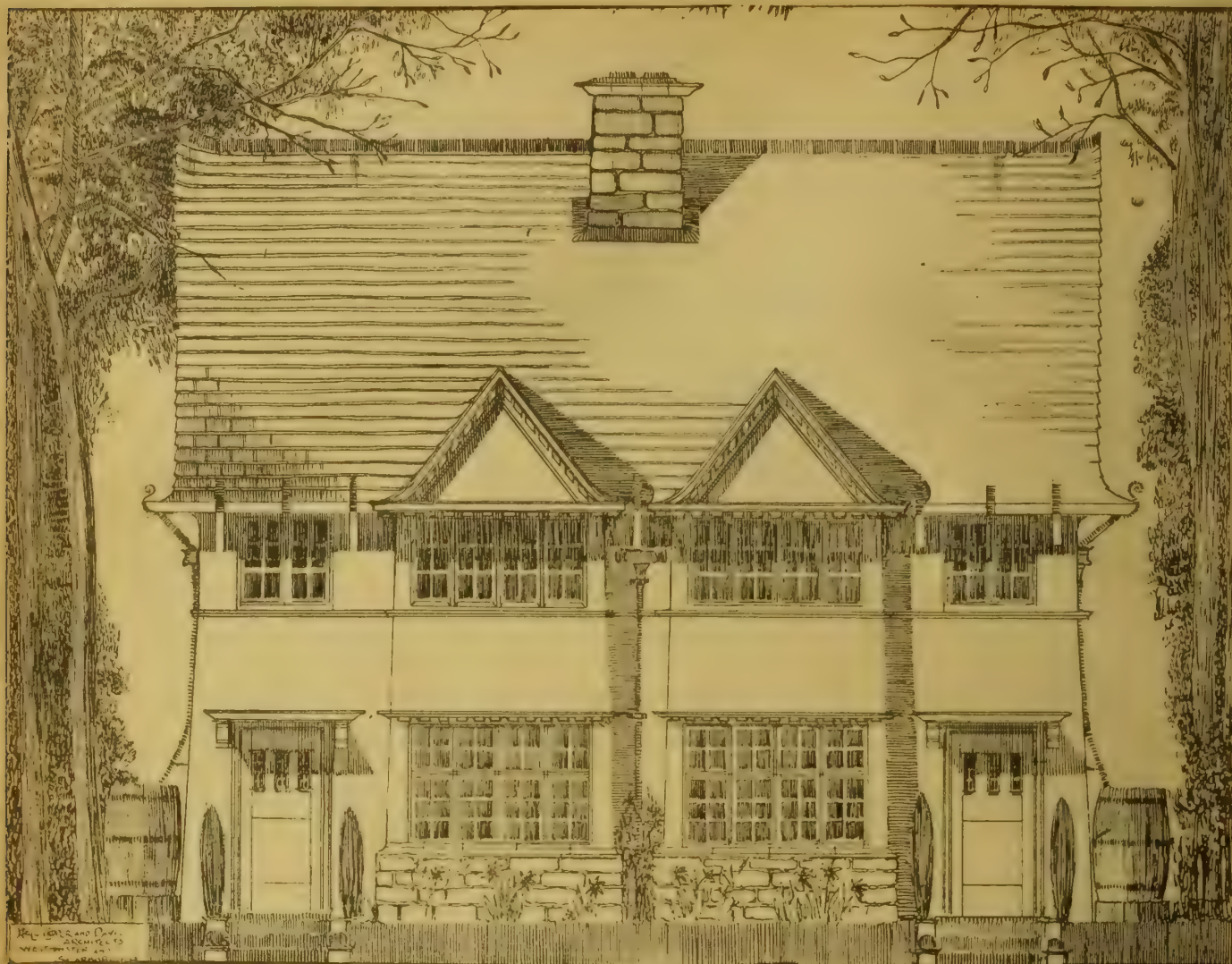
#### ARROW GROOVES

on the base mouldings of the tower, so placed in relation to a 14th-century buttress that they could not possibly have been cut since the date of that addition to the structure. He had seen arrow grooves on masonry from the city walls of Coventry, which had been buried since 1662, when they were destroyed by Charles II., and also cup-marks on 12th-century masonry, which he saw uncovered six years ago, having been covered up since the dissolution of Kenilworth Abbey 360 years before. There were initials scratched on Flamstead Church, and dated 1709, which, although originally shallow, were still sharp in comparison with the circles, which were originally more deeply incised, and obviously of a much earlier period. With regard to arrow grooves, they were not likely to belong to a time when those arms ceased to be employed. He had already shown that they were made before or during the 14th century, and reference to the history of the Honourable Artillery Company showed that long bows were replaced by culverins and muskets, by an order issued on Oct. 26, 1595. But they were evidently used to a slight extent as late as 1644, as the Acts showed an item of "300 long bows at 4s. 8d. each." On the whole, judging from what he had seen of the relative states of these marks, compared with those of known dates, their various degrees of sharpness in relation to the different matrices in which they were cut, and their architectural surroundings, he felt sure that many of them belonged to a very early period of Church history, especially those which had been rightly or wrongly associated with

#### EARLY SYMBOLS AND SUPERSTITIONS.

On a subject of so highly speculative a character,





COTTAGES AT EAST HOATHLY, SUSSEX.—MESSRS. HALL, COOPER, AND DAVIS, Architects.

it would be inexpedient to offer any remarks other than suggestive to stimulate to more thorough research. Perhaps the most significant feature connected with these mural marks was their striking conformity to certain patterns, for, disregarding the minute analytical differences which he had drawn, there were less than half-a-dozen types, and examples of these were to be found, widely distributed, not only in Great Britain, but also on the Continent of Europe, and, he believed, also in India and Africa. He thought it would be allowed that these marks were serious efforts, and not mere fanciful scratchings. The circles were clearly of two distinct classes, the radiated and the non-radiated. An interpretation of the former, which was most likely to suggest itself was that they were dials, or in some way

#### CONNECTED WITH TIME MARKING.

The evidence in favour of this view was (1) the presence of radii; (2) their position on the south-south-east and south-west aspects of churches, and never on the north; (3) preponderance of examples with rays in the lower half only; (4) subdivision into inter-radial segments, such as an example to be found at Redbourn; and (5) the presence of a deep socket, and often metal, at the radial point or centre of the circle, probably for the insertion of an indicator. Against this view it might be argued that their sunny situation might have a superstitious significance relating to sun worship; that the rays were irregular, as to their number and arrangement, and did not conform to those of a proper sundial; or that no figures or letters had ever been demonstrated. Now, it was quite possible that some of these, especially the Redbourn circles, might have been used as sundials, or as fanciful imitations; but the majority certainly could not have been so used. It had been suggested that the sunny side of a church was more likely to be

frequented by loiterers than the cold northern side, and consequently would be the more likely spot for any mural defacings. Again, too, there was the superstition as to a Satanic proprietorship in the northern portion of a churchyard, and hence the fewness of funerals there, and the scarcity of these marks. But these influences could have but little, if any, bearing upon the special marks under discussion, and that they were

#### SERIOUS PRODUCTIONS

was proved by the great care, accuracy, and attention that must have been spent in their cutting, and that they were in many instances situated above the reach of anyone standing on the ground level. One significant feature of these rays was the frequency with which the number twelve occurred, and was repeated in different forms. This number suggested many interpretations, which were quite obvious. That these radiated circles might be associated with some ancient superstitious relic of sun-worship was, he ventured to suggest, not improbable. They might even have some reference to the signs of the Zodiac, to the symbol of St. Catherine, to the custom of hieroscopes, or perhaps to the orientation of the church. With regard to the non-radiated or plainer circles, they had to deal with something which might be much more remote in origin, or even more difficult of interpretation. They were generally found occupying much lower positions on the walls, quite within reach, and, according to Mr. Andrews, one example was to be found on the north side of the church, on the north-west buttress of the abbey church at Bath. This situation, however, was exceptional. A slight knowledge of the history of religious symbols enabled us to fully appreciate the case in which the signs used in early and

#### EXTINCT WORSHIPS

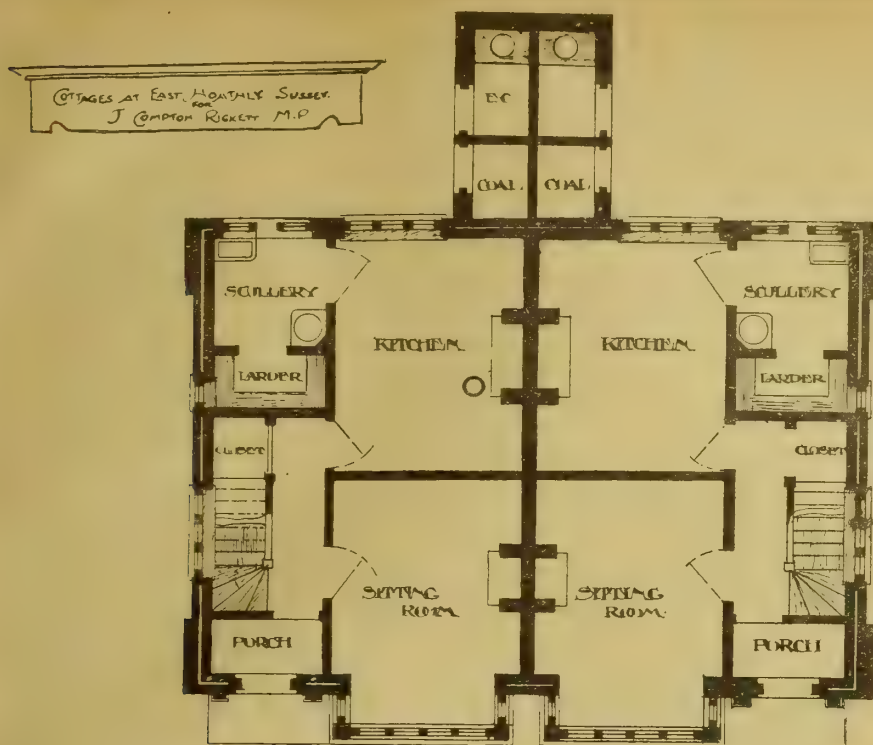
existed and became blended with the forms used

in the new religion. The circle had at all times been a symbol of importance, whether associated with moon, phallic, and serpent worship, or in connection with the mysteries of Rosicrucians and astrologers, alchemists, and witches. Consequently we need not be surprised to find this ancient mark and its numerous modifications occurring so frequently upon our churches, particularly when we considered the probable dates of their incising, and the standard of education then prevailing. It had been suggested that they might be "consecration marks"; but he did not think they would admit of that interpretation, for such marks were generally cruciform in circles, and were more usually found inside churches. A striking object-lesson which should teach us to exercise care in our explanations was to be found on the outer walls of St. Pancras Station, close to the east side of the large entrance gates. There might be found several incised spots in the brickwork, surrounded by roughly-scratched and chalked circles. Their origin, however, was easily explained. In the early part of this year, someone was shot close by, and the bullet striking the wall, left a well-marked indentation. This impression was enlarged with pocket-knives and emphasised with a circle about 3 in. in diameter. During the course of a week, that evidence of the crime had been faithfully repeated in several places, and these remained as modern examples of the ancient spot circles. With regard to what, for want of a better name, were called

#### CUP MARKS,

Dr. Wingrave said he was inclined to suggest that the rough marks of this kind were the result of impact from some hard substance, such as a bolt, bullet, or arrow. In the early days of fire-arms, iron and even stone bullets were employed. These would, at short range, make considerable indentations, especially in the case of soft sand-





GROUND PLAN.

stone and Totternhoe stone, which would subsequently be enlarged by "weathering." This view was supported by the fact that these marks were mostly found associated with arrow grooves, not only on churches, but also on city walls, castles, and even on Thor stone, a relic remote from cities in the Cheshire Wirral. The smooth form of hollow hemisphere would not admit of such an interpretation, for they were uniformly sharp in outline, regular, and smooth in concavity, and presented every indication of having been drilled and made by rotating some hard instrument. There were generally found within a few feet of the ground level, and often, but not always, in association with arrow grooves. Unlike circles, they occurred quite as often on the northern aspect of churches as on the south-east and west. He was unacquainted with any instrument used in architecture which might reasonably have caused them; but the smoothing of bolt-heads, or the primitive forms of round shot and other weapons, would be very likely to produce such marks. Whether or not they were made in these or under more peaceful circumstances, there was, at all events, strong evidence that they were

## CONNECTED WITH SUPERSTITION.

Personal inquiry in several instances proved the existence of local traditions that they were witch marks. According to the *Proceedings* of the Berlin Archaeological Society for June, 1875, they were generally found on the south side of churches near an entrance, and not above the reach of a man. These cups were believed to possess healing virtues, chiefly for charming away fevers, and in some modern instances they had been anointed with grease as an offering for that purpose. In Posen, a tradition referred to the cups as the work of condemned souls, who ground them out during the night-time. The next group of marks—namely, the arrow-scorings, gave no trouble whatever. These elliptical grooves were of two kinds, vertical and horizontal. The vertical had doubtless been produced by pointing arrow-heads, pikes, &c., while the horizontal were most likely caused by sharpening swords, halberds, axes, and other cutting weapons. Good examples of these marks, but filled with cement, were to be found at Flamstead, on the south porch of the church. Of the "various" marks, perhaps the most interesting were the twelve dots arranged as oblongs. They were common in Hertfordshire, Redbourn and Flamstead supplying many examples, but their interpretation he would leave in the hands of the members present. It was perhaps almost superfluous to remark that neither on the Abbey nor on any of the St. Alban's churches were any of these marks to

be seen. Before the restoration, a circle on the southern aspect, and a few cup marks were to be seen on St. Michael's. There were two or three doubtful marks on the Grammar School, but he was very sceptical as to their genuineness, since all isolated marks must be viewed with suspicion. In conclusion, Dr. Wingrave said it would indeed be difficult to conceive that marks possessing such striking uniformity in character could be incised on churches in all parts of Great Britain without possessing some common primary cause or influence.

## COTTAGES AT EAST HOATHLY, SUSSEX.

THESE cottages are now being erected for Mr. J. Compton Rickett, M.P. The materials used for the exterior are rough-cast and Broseley tiles. The whole of the woodwork to be painted a light apple-green. Messrs. Hall, Cooper, and Davis, of Old Queen-street, Westminster, and Scarborough, are the architects.

## BUILDING PROGRESS IN WAKEFIELD.

THE annual return just prepared by Mr. Richard Porter, the city surveyor of Wakefield, states that an unusually large number of building plans have been passed by the general works committee during 1898. The building trade in Wakefield and the immediate neighbourhood has not been so brisk as during this year for a very long period. Almost in every part of the city and its suburbs residential property has been erected, new shops built, and a large number of shops have been re-fronted, modernised, and extended. The block of offices for the West Riding County Council, known as the County Hall, has been completed and taken possession of by the officials, and this has cost the ratepayers of the West Riding at least £130,000. An extensive range of buildings is fast approaching completion in connection with the asylum at a cost of over £80,000, and these are to be used as acute blocks. The board of guardians are just completing and will open on Thursday, January 19th, a new infirmary and steam laundry, which have cost upwards of £25,000. Considerable additions have been made to the Strafford Arms Hotel, an improvement to the front of which has been effected by sweeping away the old Boy and Barrel Inn and a bootshop, making the Bull Ring into an open space. In Northgate, Kirkgate, and Westgate many new shops have been provided or existing establishments improved. Sir Lionel M. S. Pilkington, Bart., of Chevet Park, has given an impetus to the building trade in the Sandal district by offering portions of his

estate as building sites. Villa residences have been erected in Castle-terrace, and in the Wakefield and Barnsley-road. Between Haddingley Hill and the cemetery a street is being formed, and it is expected that ere long a large number of houses will be seen in this locality. The districts of Pinderfields, Mount Pleasant, Thornes, Bradford-road, Ings-road, and other parts of the city and its suburbs continue to grow rapidly. Westgate Common will shortly present a changed appearance. The Plumpton estate came into the hands of Mr. A. E. Elvey, builder, some time ago, and he is effecting a complete transformation. The large mansion, known as Plumpton House, has been swept away, and on the site, and on the adjoining land, streets of good cottages are being reared. The council of the Clayton Hospital have erected new consulting-rooms and a mortuary, and extended the laundry, &c.; additions have been made to Mr. Milnes Gaskell's school at Thornes; a school and classroom have been erected in connection with the Chapel of Christ in Duke of York-street; the residence of the late Ald. Carter in Market-street has been converted into a Liberal Club; the city council are just completing the erection of workshops and office in King-street for the waterworks department; they have provided an electric substation in St. John's, North, and they are about to convert a little schoolroom in Holmfild-lane, Thornes, into two almshouses. The governors of the Wakefield charities have had plans approved for two new streets and thirteen almshouses and a nurses' residence near Thornes Church.

## PLUMBERS' REGISTRATION BILL.

A DEPUTATION of those interested in the promotion of the Parliamentary Bill for the Registration of Plumbers waited on the Secretary for Scotland, Lord Balfour of Burleigh, at his chambers in Parliament-square, Edinburgh, on Tuesday, for the purpose of representing to him the desirableness of making the bill a Government measure. The deputation, which was representative of the whole of the six district councils in Scotland of the National Registration of Plumbers, consisted of the following members:—Edinburgh—Sir James Russell; Dr. Brock, Medical Officer for Lothians and Peebles; Mr. Henry Kerr, architect; Mr. D. W. Kemp Leith; Mr. John Adams, master; Mr. John K. Paterson, master; Mr. John Park and Mr. Andrew Harkess, operatives; and Mr. James Marchbank, S.S.C. Dumfries: Mr. Thomas Rodden, master plumber; Mr. J. D. Moffat, operative plumber; and Mr. James Hyslop, secretary. Dundee: Mr. Andrew Hutcheson, J.P., Perth; Mr. William Watson, R.P., Perth; Mr. T. Millar Dewar, R.P., Dundee; and Mr. John James Henderson, secretary, Dundee. Aberdeen: Mr. John F. Anderson, master, Aberdeen. Inverness: Mr. Alexander Knowles, secretary, Inverness. Glasgow: Ex-Bailie Crawford, D.L., Glasgow; Professor Glaister, M.D.; Mr. James Costello, master plumber, Glasgow; Mr. James Dickie, operative plumber, Glasgow; and Mr. Archibald Craig, M.A., LL.B., secretary, Glasgow. Sir James Russell introduced the deputation. Ex-Bailie Crawford briefly explained the objects of the movement, and the necessity felt for legislative sanction for it. The movement had now been in existence for 15 years, and a Bill had been read a second time in three successive Parliaments, and had twice passed through committees of the House of Commons. The Bill did not seek in any way to create a monopoly. Its aim was solely to establish a thoroughly representative general council, which would have certain discretionary powers, and the Bill would also prohibit under a penalty the use by anyone of the term "registered" who was not registered under the Act. Mr. Andrew Hutcheson, vice-convenor of the County of Perth, and convenor of the Health Committee of Perth County Council, spoke in support of the Bill from the standpoint of the county authorities; and Messrs. John Adams, master plumber, Edinburgh; T. M. Dewar, operative plumber, Dundee; and John F. Anderson, master plumber, Aberdeen, from the trade standpoint. After remarks by Mr. Alexander Knowles, sanitary inspector, Inverness, Professor Glaister addressed his Lordship from the scientific and public health point of view, and Mr. Archibald Craig, Glasgow, replying to questions by his Lordship, explained the difficulties which the



Bill had encountered notwithstanding the large body of opinion in its favour. Lord Burleigh, in reply, expressed his sense of the importance of the deputation, which he observed was fairly representative of Scotland. He also gave expression to his complete sympathy with the movement for introducing a higher standard of qualification, and a higher code of honour among those to whom the responsible work of the plumbing and the drainage of dwelling-houses was intrusted. He was satisfied that the movement did not aim at any monopoly. While he was not in a position to commit the Government at that stage, he would undertake to report immediately on his return to London in the beginning of the year the representations which had been submitted to him, and to confer with the representatives of the Local Government Board for England as to possible assistance towards securing the passage of the Bill into law.

## CHEMICAL AND PHYSICAL QUALITIES OF PIGMENT.

### THE ACTION OF OXYGEN ON PIGMENTS AND ON PAINTS.

IT is no exaggeration to say that oxygen is the most active element in affecting paints and pigments for good or evil. How it affects them we shall endeavour to show in this article. To do so effectively we shall separate the subject matter into several sections, such as the presence of oxygen as a component of a paint, the chemical and physical reactions brought about by such component, the effects of oxidation of a pigment and of a vehicle, the effects of deoxidation of a pigment, &c. In the first place we will inquire into what pigment possesses oxygen as a component. Many pigments are oxides of metal pure and simple, as for example the red oxides of iron, such as red ochre, Venetian red, light red, Indian red, colcothar, rouge, crocus martis, and these pigments vary in colour according to the relative proportion between the oxygen and metal of which they are composed.

Red lead is also an oxide of the metal, so likewise is chrome green of chromium. Now the first two named oxides differ materially from the last in this way: oxides of iron and of lead are of variable composition; the degree of brightness or depth of colour of the pigment depends on the relative proportion between the oxygen and the metal. Now it is characteristic that where there is more than one set of oxides of a metal, that such oxides do not form permanent pigments under all conditions, because there is always a tendency among such oxides to become still further oxidised if brought under suitable conditions, or else to become a lower oxide of the metal, according to whether such oxide parts with some of its oxygen to the oil vehicle or to other pigments it is brought in contact with. This is more notably the case with red lead than it is with red oxides of iron; but in the case of green oxide of chromium there is no such tendency for the metal to part with, or unite with, a further quantity of oxygen; such a pigment, therefore, is permanent or unchangeable under all conditions of use in painting.

It is greatly due to the exchange of oxygen in pigment, such as just mentioned, that injurious changes are brought about in painted surfaces, because during the giving up of, or reception by, oxygen by such pigment, both pigment and vehicle undergo a partial decomposition. To give examples: a lower oxide of iron, by imbibing oxygen, will become changed into a higher oxide of a different hue; but during this absorption of oxygen the vehicle in the paint will undergo change, and if the red oxide had been mixed with another pigment—such as indigo, which is chemically acted on by oxygen—such pigment will also suffer change if the indigo itself imbibes oxygen: then it will lose its blue colour and become bleached; or, if oxygen is abstracted from the indigo, the blue colour will also disappear. In either case, we can see that a colour made up of Venetian or Indian red and indigo (producing a purple hue), that by the catalytic action of the oxygen the blue pigment—the indigo—loses its colour, and consequently leaves its fellow pigment—the red oxide—almost alone in its strength of colour. We have examples of such changes in the Report that was issued under the direction of the Science and Art Department ten years ago on the "Action of Light on Water Colours," for in the tabulated results "showing the changes that took place in mixtures

of two or more colours when exposed to light in moist air," we note the following changes:—A mixture of "Venetian red, madder red, and Indian yellow," had gone red. [Indian yellow is a pigment of organic origin; indigo blue is also.] A mixture of "indigo, Indian yellow, raw and burnt sienna" [these are oxides of iron] had also "gone red." A mixture of "burnt sienna and Antwerp blue" had "gone brown." A mixture of "Prussian blue, raw and burnt sienna, and Indian yellow" had also "gone brown," while a mixture of "Prussian blue and burnt sienna" had "gone red." Prussian blue and raw sienna gone brown, indigo and raw sienna gone red, indigo and burnt sienna gone brown, indigo and burnt and raw sienna gone red, indigo and French red gone red, indigo and Indian red gone red, indigo, Venetian red, and yellow ochre gone red; Prussian blue and Venetian red gone red; but in a mixture of cobalt and Indian red there was no change. If the above mixtures and their results be carefully scrutinised, it will be noted that only in one case had "no change" appeared, in a mixture of which indigo formed a component. In this particular case, however, its other component of the mixture was a pigment (cobalt blue), which itself suffers no change under any conditions of mixture or atmospheric influence, and, consequently, no chemical reactions were set up; but in all the other cases where blue and red pigments were mixed the blue colour had disappeared, leaving only the red one behind to exhibit its presence.

Now, in the cases where indigo is a component, the disappearance of the blue colour of the pigment may have been due to deoxidation of it, or to a supersaturation of it with oxygen. If the first case is the cause, the indigo has simply returned to its original condition of white indigo; if the latter, it has become bleached by being supersaturated with oxygen. In the case of the Prussian blue and red pigment, however, the loss of the blue colour is only to be explained by one action—viz., loss of oxygen. Prussian blue is a peculiarly constructed pigment. Its intensity of colour is absolutely dependent on the amount of oxygen it possesses. (A commonly made Prussian blue is a whitish green base, which is eventually converted into a blue pigment by oxidising the whitish green mass by the aid of suitable oxidising agents.) Consequently any loss of oxygen will reduce it in colour intensity, and as the red pigment is one which exerts a catalytic reaction in abstracting oxygen from wherever it can, we can quite understand that the amount of oxygen originally present in the blue pigment has been diminished so much as to deprive the pigment of its colour entirely, and therefore the mixture preserved only the hue of its fellow component—viz., the Venetian red or burnt sienna (which is a brown pigment). Antwerp blue is a blue prepared on almost identical lines as Prussian blue, and, therefore, suffers in the same way by the depletion of oxygen from it. Besides pigments which are oxides pure and simple, there are many pigments which contain oxygen as a component, as carbonates and other compounds; thus, for example, carbonate of metals contains oxygen as well as carbon, and in addition to the metallic base—to wit, pure carbonate of lead consists of carbon, oxygen, and metallic lead; therefore, in pigments which are carbonates, such as white lead, many of the copper greens, &c., oxygen is present. Likewise in chromates, oxygen forms one of the components, being in combination with chromium and another metal, thus yellow chromates of lead consist of chromium, oxygen, and lead; chromate of zinc consists of chromium, oxygen, and zinc, &c. So also in many other pigments, such as the light-coloured green obtained from copper, the yellow and red ochres, and most of the coloured earths, oxygen is a component.

Now, the part such oxygen component plays, as regards its chemical nature, when brought into contact with other pigments or vehicles affected by oxygen can be typified by the following examples.

Let us consider the cases of carbonates and of chromates of metals. Carbonate (a dry or anhydrous carbonate free from hydrate of lead) consists of a combination of the three elements—carbon, oxygen, and lead, the chemical formula of which is  $\text{PbCO}_3$  or  $\text{PbO} \cdot \text{CO}_2$ . The first symbol merely expresses the elements which compose the carbonate; but the second symbol attempts to express in what condition these elements are arranged. Thus in the symbol  $\text{PbO} \cdot \text{CO}_2$ , the  $\text{PbO}$  expresses a compound composed of a union of lead and oxygen, and the  $\text{CO}_2$  is a compound

composed of a union of one equivalent of carbon united with two equivalents of oxygen. The symbol  $\text{PbO}$  chemically stands for an oxide of lead, while the symbol  $\text{CO}_2$  stands for the chemical expression of carbon dioxide (or carbonic acid gas as it is called), and the whole symbol  $\text{PbO} \cdot \text{CO}_2$  attempts to express that lead oxide is united with carbonic dioxide. Now it is found that there is not such a close combination between the lead oxide and carbonic dioxide as there is between the lead and its oxygen components, or the carbon and its oxygen comrade, and, as a matter of fact, the two components can be very readily separated, whereby the carbonic dioxide is expelled as a gas, or else it combines with some other metallic base to form a carbonate of another metal. For example, put a little dry pure carbonate of lead into a saucer, and pour on to it a little mineral acid, such as hydrochloric or sulphuric; effervescence will ensue and oxide of lead ( $\text{PbO}$ ) will be left behind. The effervescence has been set up by the escape of the carbonic acid gas ( $\text{CO}_2$ ) through the mass. If, however, the carbonate of lead be mixed with a little water and the mixture with a solution of a nitrate, sulphate, of another metal, double decomposition will ensue, and the  $\text{CO}_2$ , instead of escaping as a gas, will displace a portion of the other chemical salt and unite with the remainder and form a carbonate of the metallic base, while the displaced compound unites with the discarded lead oxide (of the lead carbonate), which thereby becomes converted into a lead nitrate, sulphate, &c.

In the case of a chromate of a metal, the oxygen is most intimately combined with the chromium, and when decomposition takes place part of the oxygen unites with the lead, and part only remains with the chromium; the lead chromate is  $\text{PbCrO}_4$ , and when this is decomposed it became split up into  $\text{PbO}$  and  $\text{CrO}_2$ ; thus,  $2\text{PbCrO}_4 - 2\text{PbO} = \text{Cr}_2\text{O}_3 + 3\text{O}$ . By this decomposition we note that a large amount of oxygen is set free, and this free oxygen plays a very important part in the paint compound of such pigment. Now, the action of oxygen on the oil vehicle is to oxidise the fatty oil acids into tough oxidised linseed oil; but unless the free oxygen does this it may act destructively on oily pigments, either by oxidising them into other products, or else by bleaching them.

In our next article we shall consider the action of sulphur amongst pigments, and then show by practical examples how the facts thus set forth can be utilised in producing a permanent coat of paint. H. C. S.

### HUDSON AND KEARNS' DIARIES.

NO architect or builder or surveyor needs more than our reminder—if, indeed, he needs that, to secure at once for 1899 whichever variety of Messrs. Hudson and Kearns' indispensable diaries or desk-pads his long experience of their usefulness has dictated the selection. Whichever it is, he is almost sure to find that some happy thought has inspired the adoption of some little improvement or addition which, during the coming year, will in a still greater degree facilitate his business or add to his convenience. One characteristic alone never changes, and that is the sterling quality of every bit of material employed in the manufacture of the diaries and desk-pads.

The Prince and Princess of Wales, and other members of the Royal family, on Saturday attended the reopening service of Shorncliffe church, Norfolk, on the Prince's estate. The cost of restoration is about £2,000, towards which His Royal Highness has contributed three-fourths.

On resigning his appointment as Chief Assistant-engineer to the Coventry Corporation, to commence business on his own account as an engineer, architect, and surveyor, the Corporation officials presented Mr. G. E. Jenkins with a Tantalus stand and planimeter, each having a plate with a suitable inscription. Mr. Jenkins was also presented with an address signed by all the officials, including the town clerk.

At a special meeting of the Ealing Urban District Council, held on Saturday, it was agreed to accept the offer of Sir Spencer Walpole to sell to the council for the purposes of a public park the Walpole property, including a mansion, grounds, and park, covering in all about 31 acres, for the sum of £40,000. The sale is subject to the life interest of Miss Percival. The mansion was for many years the residence of the late Right Hon. S. H. Walpole, who died there a few months ago.



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## ILLUSTRATIONS.

DAWYCK HOUSE, PEEBLESHPHIRE.—THE OLD WHITE HOUSE, OXFORD.—CHURCH OF ST. JOHN THE EVANGELIST, FORD, WILTS.—HOUSES ON LINTON BOULEVARD, NOTTINGHAM.—COTTAGES AT PORT SUNLIGHT.—NEW BEDFORD COUNTY HOSPITAL.—SKETCHES FROM THE SALE ROOMS.—COTTAGES AT EAST HOATHLY.

## Our Illustrations.

## DAWYCK MANSION HOUSE, PEEBLESHPHIRE.

This double-page plate represents an extensive mansion now being considerably enlarged from the designs of Mr. John Archibald Campbell, architect, of Glasgow, for Mrs. Balfour, of Edinburgh, who lately acquired the property which lies on the banks of the Tweed. The enlargements comprise, on the ground plan, a new billiard-room, additions to the dining-room, hall, a new gun-room, and servants' apartments. On the bedroom floor there are four new sleeping apartments, a ladies' maids' room, dressing-room, bath-room, and lavatory. In the basement the servants' department is also increased, and the scheme includes new water supply and electric-lighting. New kennels and stables, lodge and cottages, have been erected. In the spring, the new gardens will be laid out. The property, which is historic, had fallen into bad repair, and the work of renovation generally has been carried out with due regard to the older buildings. The drawing given was exhibited this year at the Glasgow Institute of the Fine Arts.

## THE OLD WHITE HOUSE, OXFORD.

This building was erected to take the place of an interesting old house, which still remains in the rear. The materials used are rubble stone walling, with Douling stone dressings in the ground floor, the upper story being in cement, finished with a coarse surface. The roofs are covered with hand-made red tiles. The drawing reproduced was shown at the Royal Academy this year. Mr. Henry T. Hare, F.R.I.B.A., was the architect.

## CHURCH OF ST. JOHN THE EVANGELIST, FORD, WILTS.

This church, which has been built for the Rev. F. Harrison, occupies an exceptionally picturesque site on the hillside above the "By-Brook," at Ford, five miles from Chippenham. It is built entirely of stone, with Chapel Knapp rustic-faced walling, and Bath stone dressings, and the roofs are covered with Ruabon tiles, except the spire, which has cleft-oak shingles instead. A lych-gate of oak, and tile-covered, opens from the road to a sloping path up to the porch, which has a barrel-vaulted ceiling. Most of the nave is paved with wood blocks, and the remainder of the church with tiles. The internal walls are plastered, except where the stone reveals and arches to doors and windows are allowed to appear. An unusual feature in the building is the slope

of the nave floor from west to east, following the natural fall of the site. The church is arranged to seat 170 worshippers, and has cost about £2,300. It is warmed by a Musgrave stove, and fresh-air inlets are provided in the window-sills. All the internal woodwork is painted olive-green, parts of the screen and chancel ceiling being gilded. An altar frontal has been given by Mrs. Walmsley, and has been worked by the Sisters of St. Katherine's School of Embroidery. The dossal hangings and curtains are of velvet and serge. The niche in the large buttress on the south side contains a statue of St. John, carved by Mr. Harry Hems, from a cartoon furnished by the architect, Mr. C. E. Ponting, of Marlborough. Messrs. Jacob Long and Sons, of Bath, were the builders.

## HOUSES, LENTON BOULEVARD, NOTTINGHAM.

The above houses were built with red sand-faced bricks, the roof is covered with red tiles, the windows are glazed with lead lights, and the exterior paint generally is white. The interior is fitted up in the general design of the period, which is indicated by the exterior work. Messrs. Brewill and Baily are the architects. The drawing given among our plates to-day was exhibited at the Royal Academy last summer.

## COTTAGES AT PORT SUNLIGHT.

These cottages form part of Messrs. Lever's "model" village at Port Sunlight. They are built near Bebington Station, and were erected by Messrs. Beckett. The architect is Mr. Ernest Newton.

## NEW BEDFORD COUNTY HOSPITAL: DETAIL OF ELEVATIONS.

We published a view and plan of this important county hospital on April 23, 1897, which is now in course of building, from the designs of Mr. H. Percy Adams, at a cost of about £32,000. Messrs. Kerridge and Shaw, of Cambridge, are the builders. To-day we give a reproduction of the working drawing of the elevations to the ends of the main wards, showing the arcaded vestibule or porch, with the open balcony above, protected by the roof-pent over, as a sunny airing-place for the more convalescent patients.

## CHIPS.

The Admiralty have instructed Mr. G. H. M. Trew, Civil Engineer in the Admiralty Works Department, Devonport, to hold himself in readiness to embark for China to survey the harbour and approaches of Wei-Hai-Wei. If the port is suited for the base of a Squadron, plans are to be prepared for coaling wharves, permanent moorings, and substantial Admiralty buildings.

A stained window in memory of the late Canon Birley has been unveiled in St. Philip's Church, Hulme, Manchester. The window is in the south aisle, and contains three lights, the central one being representative of the Good Shepherd and those on the east and west of Michael the Archangel and St. John the Apostle.

St. Marychurch parish church tower has been restored at a cost of close on £1,000. It was erected less than twenty-five years since at a cost of £3,700 as a memorial to the late Bishop Philpots, of Exeter, whose grave is near the recently restored lychgate. Reopening sermons took place on Friday.

The Primate attended the King's School at Canterbury last week on the occasion of the re-opening of the schoolroom after its decoration in memory of the last four headmasters, Dr. Wallace, Bishop Mitchison, Dr. Blore, and Dr. Field, now of Radley. A panelled dado in oak, with embattled moulding along the top, has been provided, and new windows have been inserted containing representations of the coats of arms of distinguished personages who have been connected with the school. The decorations have been carried out in accordance with designs by Mr. Bertram Vaughan-Johnson, of South Kensington.

An altar frontal worked for Winchester Cathedral by ladies of the diocese has just been completed. The design, preparation, and mounting were carried out by Mr. William Baker, of Wigmore-street, W. The background is a violet damask, on which a design of Passion flowers is embroidered in square panels, divided on either side of the frontal by a cross of violet velvet. The orphreys and super-frontal are also of violet velvet, the former worked with a design of white lilies surmounted by a crown, the latter with alternate lilies and Passion flowers. In the centre of the frontal is the sacred monogram, with gold trellis and other laid gold work as a medallion in the centre of the velvet

## PROFESSIONAL AND TRADE SOCIETIES.

**BARRY MASTER BUILDERS' ASSOCIATION.**—The second annual banquet of the members of the Barry Master Builders' Association was held on Dec. 21st at the Barry Hotel. There was a large attendance. The president, Mr. Edward Phillips, occupied the chair, supported by Mr. G. Rutter, Mr. G. W. Boucher (Dinas Powis), Mr. J. Prout (secretary), Mr. Couzens, and Mr. Howaway (Cardiff). The toast of "Success to the Barry Master Builders' Association" was proposed by Mr. G. W. Boucher. The president, in his reply, referring to the recent dispute which the master builders had had with the masons, said what they fought for was the right of managing their own works as they pleased, and not in any antagonistic spirit to the men. Mr. S. Hopkins, vice-president, and Mr. G. Rutter also responded. Other toasts followed.

**EDINBURGH ARCHITECTURAL SOCIETY.**—The following prizes have been awarded by this society:—The Hon. President's prize for three designs, P. E. Nobbs; the summer's work prize (presented by Mr. J. A. Morris, F.R.I.B.A.), J. Hervey Rutherford; the president's prize (façade design), Ramsey Traquair; the vice-president's prize (entrance gates design), P. E. Nobbs. The following office-bearers have been elected for the year:—President, Mr. A. Lorne Campbell; vice-president, Mr. Alfred Greig; treasurer, Mr. John Matthew; librarian, Mr. T. A. Patterson; joint hon. secretaries, Messrs. P. E. Nobbs and Andrew Muir.

**GLASGOW ARCHITECTURAL ASSOCIATION.**—At a meeting of this association, held on Tuesday in last week, Mr. George S. Hill in the chair, a lecture on "Blake, Poet and Artist," was delivered by Mr. Lewis Crosskey. The lecture was illustrated by limelight views of Blake's work. Mr. Crosskey reviewed Blake's life from his birth, in the middle of last century, to his death, which occurred in 1827. From an early period it was seen that he was possessed of a very powerful imaginative nature, which found vent in his poetical and artistic works. It was as an engraver of other men's work that Blake earned his livelihood. In his own work there was too marked an originality, which did not suit the strong conventional ideas of his age. His sweet poetic fancies were known but to a few. It is only recently that the genius of Blake, both as artist and poet, has been recognised. The Songs of Innocence and the Songs of Experience, which were written and illustrated by Blake, and the illustrations which he did for a fellow artist for the Book of Job were fully illustrated by Mr. Crosskey's slides. The engravings which Blake did of other men's paintings, and those which he did of his own pictures, showed great difference in technique. The illustrations of the Book of Job showed the very strong imagination possessed by Blake.

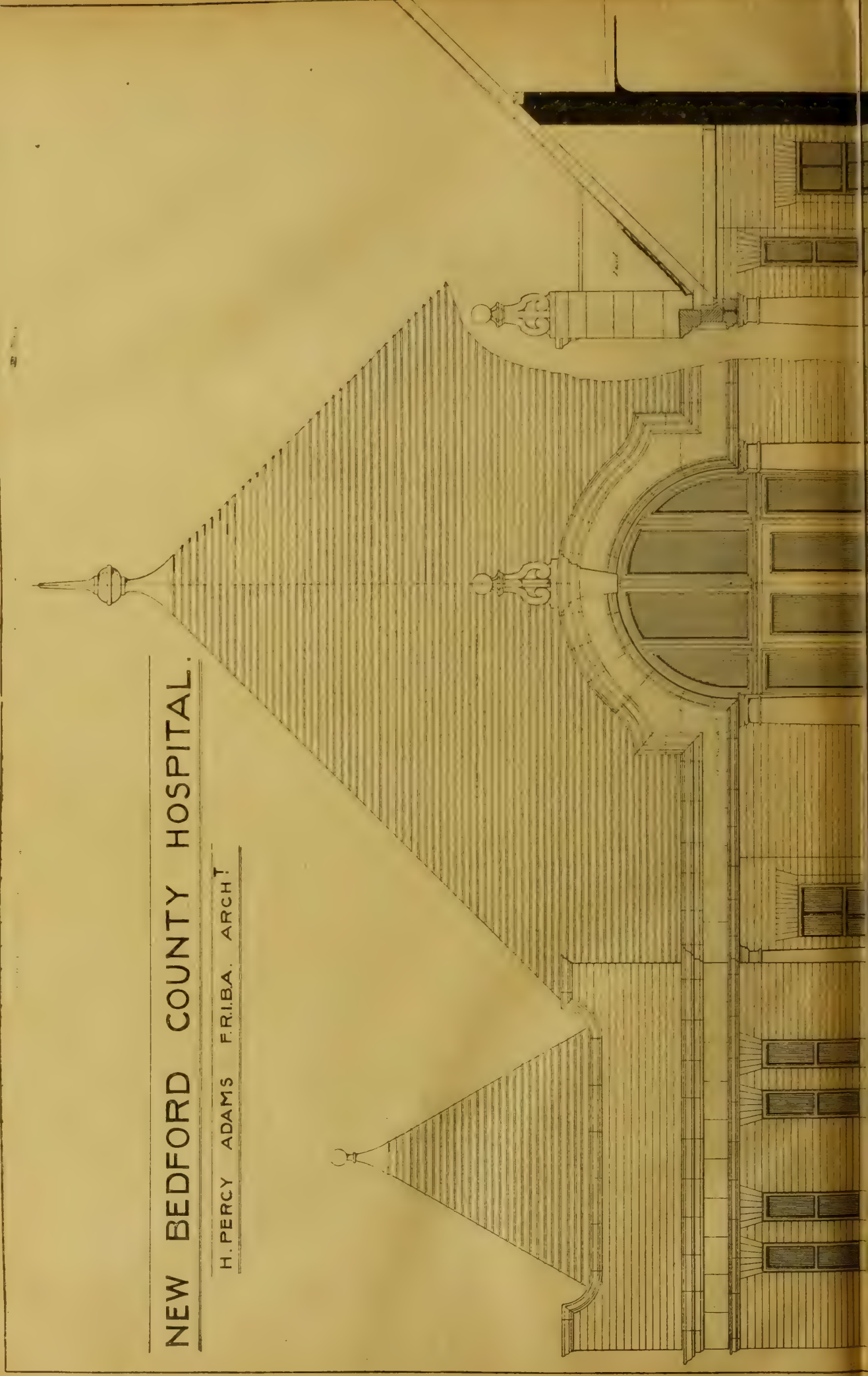
A stained-glass window has been placed in the east end of Merton Church, North Devon, to the memory of the late Prebendary Kemp (for forty-eight years rector of the parish) and his wife, by their surviving children. There are four lights; two representing the holy women at the sepulchre on Easter morning, and two representing the Apostles hauling in the miraculous draught of fishes after the resurrection, and receiving the commission, "Feed My lambs, feed My sheep." The window is by Mr. C. E. Kempe, of London.

At the Battersea Coroner's Court, on Saturday, Mr. Braxton Hicks held an inquest on the body of William Soan Pulham, 62, builder and contractor, 212, Ferndale-road, Brixton, who committed suicide by drowning himself in Mount pond, Clapham Common. The widow, Ann Pulham, said that deceased left home on Thursday morning to see their daughter off by train at Liverpool-street. The next she heard was that his body had been found in Mount pond. The following note, found upon her husband's body, was in his handwriting:—"When you find my body . . . my eldest son William is the cause of my death." Witness added that her son William had misappropriated deceased's money and had threatened to shoot him. After evidence had been given by several other members of the family, William Pulham was called, and, in answer to questions by the coroner, said that if he ever made a threat against his father he did not remember it. His father was fond of drink and had not been sober for two years. The jury found that the deceased committed suicide whilst his mind was unbalanced, and that his mind became unbalanced through the ill-treatment of his son William.

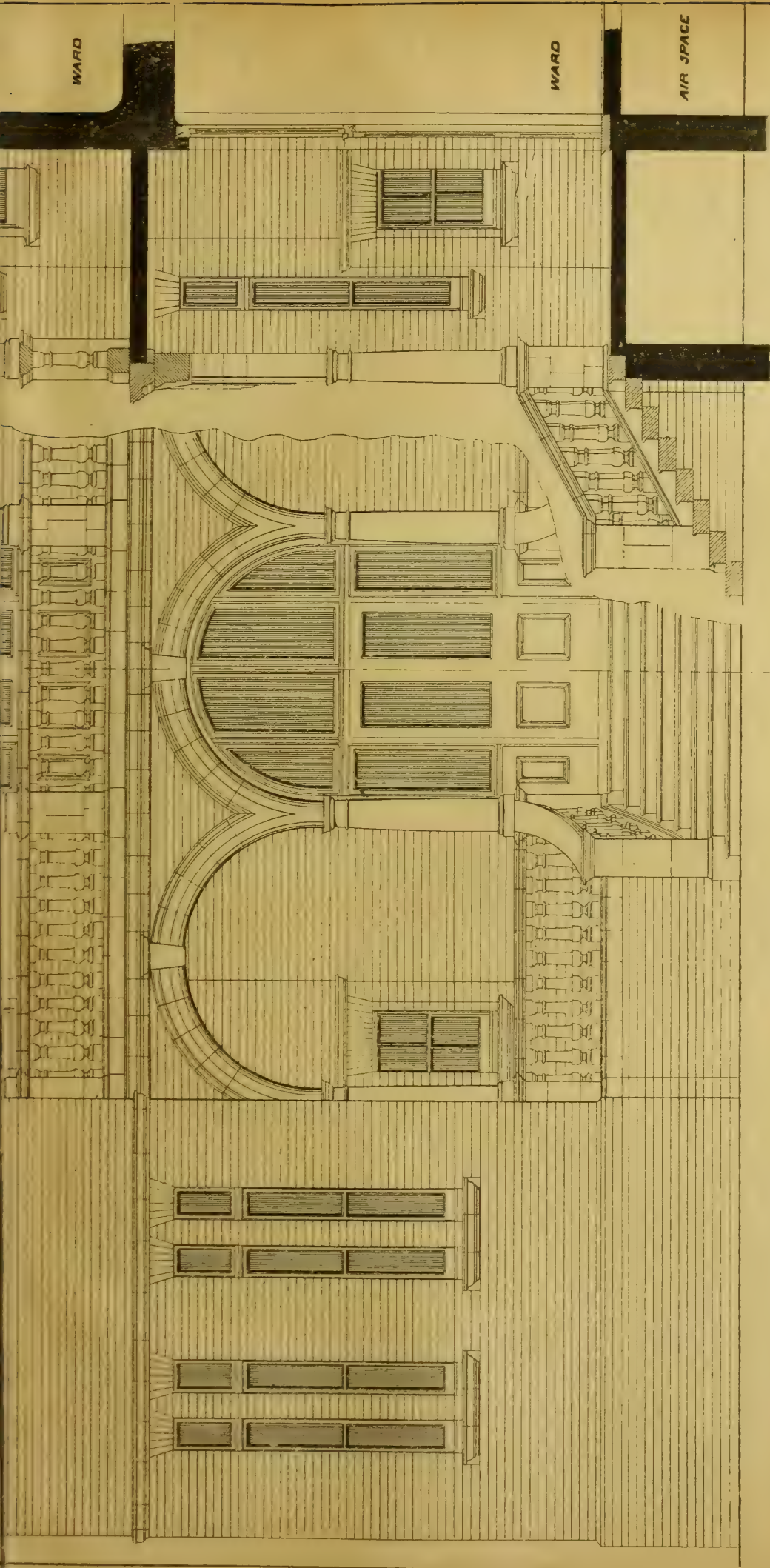


NEW BEDFORD COUNTY HOSPITAL.

H. PERCY ADAMS F.R.I.B.A. ARCHT.







WARD

WARD

AIR SPACE

- SECTION -

- ELEVATION OF WARD ENDS - S.W.





## OBITUARY.

THE death is announced of Mr. CHRISTOPHER YOUNG MICHIE, a leading Scotch authority on forestry. Thirty years ago he was appointed forester and ground manager on the Cullen House estate, a position he practically held till his death. His extensive experience was often called into requisition to report on forests in Scotland. For her Majesty he reported on the forests of Ballochbuie. His report on the Earl of Aberdeen's woods was only recently printed. Mr. Michie was the author of several books, including "The Larch" and "The Practice of Forestry."

Mr. Thomas Holmes, missionary at the North London Police-court, informed Mr. Fordham on Wednesday that Mrs. LAXTON CLARK, the widow of Mr. Laxton, the well-known engineer, died on the previous day. He made this announcement because, owing to the poverty into which the lady and her second husband (Mr. Clark) fell, there was a liberal response to an appeal made at that court, and now he wished that those who subscribed might know that during the 18 months since the appeal was made the deceased lady had been comfortably kept, and that he (Mr. Holmes) had now made arrangements to pay for a respectable funeral. The late Mr. Laxton was the architect and founder of the Botanical Gardens at Regent's Park, but is more widely known in the profession as the author of the price-book which bears his name.

## CHIPS.

A new stained-glass west window, erected in the parish church of Wappenbury, has just been dedicated to the memory of Beauchamp Henry John Scott, sixth Earl of Clonmel.

The old oak Communion-rails of Canterbury Cathedral have been superseded by new rails of brass, estimated to cost £2,000. The design and drawings were prepared by Sir Arthur Blomfield, A.R.A., and the work has been executed by Messrs. Hart, Son, Peard, and Co., Ltd., of London and Birmingham. A new stained-glass window, illustrating various scenes in the lives of St. Paul and St. Peter, has been placed in the Trinity Chapel, and a clock has been placed in the Treasury.

The mission church on Kingsley Moor, which has been enlarged, was reopened last week by the Suffragan Bishop of Shrewsbury. Mr. T. Forrester was the hon. architect, and Mr. W. Blake the builder.

Tilstock Parish Church, near Whitchurch, was reopened, after extensive alterations, on Tuesday week. The floor has been relaid, the seats in the body of the church have been re-arranged, iron fret-work has been substituted for the old wood front of the gallery, and the church has been painted and decorated. The new oak pulpit, choir-stalls, lectern, and prayer desk, brass lamp for chancel, and the laying of the chancel with encaustic tiles, are the gifts of the vicar. The work has been carried out by Mr. R. Powell, from designs by Mr. W. Webb, Whitchurch.

Mr. A. B. Itter, "The Mayor of Fletton," declared on Monday night that he was prepared to solve the old age pension question, at least for the Fletton and Peterborough district. He would contribute £250 towards such a fund, providing each of the brick-making firms would do the same.

It was reported to the Huddersfield Corporation at their last meeting that, up to the 30th November last, the sum of £200,825 has been expended on the construction of the new reservoir at Battingley.

The Local Government Board have sanctioned a loan of £5,124 to the Sheerness Town Council for various improvements, including £2,530 for erecting a dwarf-wall on the Marine Parade, and £236 for making a mound to stop the sea on the rural side of the town.

The heritors of Coldingham, N.B., have adopted recommendations by Mr. Heaton, architect, for the preservation of the remains of the old Priory Church of Coldingham. They have ordered the work to be done at Mr. Heaton's sight on the remains of the north and south transepts and nave, and to mark out the site occupied by the original church. Mr. Heaton has also prepared a report on the best means of extending the church, should it ever be required, on the lines of the ancient site.

The Thetford Town Council have decided to ask for a loan of £2,500, for the restoration of the town-hall, in accordance with plans and a report by Mr. Herbert J. Green, of Norwich.

The County Hospital, Bedford, is being warmed and ventilated throughout by means of Shorland's patent double-fronted Manchester stoves with descending smoke-flues, the same being supplied by Messrs. E. H. Shorland and Brother, of Manchester.

## Engineering Notes.

**ECCLES.**—The borough of Eccles was put in possession of the electric light on Thursday in last week. The undertaking has been carried out by the Corporation, and henceforth the streets of the town, besides many of the shops and places of business, will be illuminated by electricity. A sum of £12,000 has been spent upon the works in Cawdor-street, Patricroft, and the necessary plant. This latter consists of two Lancashire boilers, 28ft. long and 7ft. 6in. broad, and two steam alternators, each of 200 horse-power, and each capable of supplying 4,800 eight-candle power lamps. The engines are of the marine inverted type, running at the rate of 2,000 revolutions per minute and being directly coupled to the alternators. There are also provided accumulators, which will maintain 1,000 eight-candle power lamps for seven hours. These accumulators are charged from the alternators by a motor generator, this latter, in its turn, being run by the accumulators, and supplying electricity direct to the mains. The system of distribution adopted is the high tension alternating current, at a pressure of 2,000 volts, which is reduced on the consumer's premises to 200 volts. This system has been selected owing to the exceedingly scattered nature of the district to be supplied. It is intended to carry out the whole of the public lighting of the borough by means of electricity, and this will involve a supply of some 1,700 lamp columns. At the present moment there are about five miles of mains laid in the district, and applications have already been received for over 4,000 eight-candle power lamps. About thirty miles of streets will eventually be lighted. The work has been carried out by Mr. S. V. Clirehugh, M.I.E.E., of the firm of Messrs. Lacy Clirehugh, and Sellar.

**LEITH.**—During the year good progress has been made in the construction of the various works for the enlargement of the harbour and docks at Leith. The works were undertaken by the Commissioners to meet the requirements of the larger class of steamers which are being constructed for the Transatlantic and Eastern trades. The new dock is being constructed to a depth of 40ft., which will give a depth of about 30ft. at high water of the ordinary spring tides. The works necessitated the reclamation from the sea of upwards of 75 acres, which was accomplished a year or two ago. Since that time good progress has been made with the construction of the new dock itself, the walls of which are nearly all up to coping level, and nearly the whole of the excavation has been completed. At the present rate, a few months will see the whole of the walls finished, and sufficient of the quays formed to enable sheds and cranes and other works to be proceeded with in the course of the ensuing year. An important part of the work—the construction of the massive dock-gates for the entrance lock—is now in hand. These gates have been constructed wholly of steel and fine iron, and each pair will weigh close upon 300 tons, and they will be moved by hydraulic machinery, the whole of which is now being made by the firm of Sir W. G. Armstrong and Company, Newcastle-on-Tyne. A feature in connection with the new dock is the construction of a passage between it and the present Albert Dock. This work is now well advanced, the walls being up to fully half their height, and it is apparent that in the course of two or three months these walls will be completed and be ready for the dock-gates to be placed in the passage. The east wall of the new dock is not at present being completed to its full extent. Arrangements have been made so that when desired the dock can be extended to nearly twice its present length at a very small expense, and the work can be carried out in a very short time. The dock, as now being constructed, is 1,100ft. long and 550ft. wide. The width of ground on either side is upwards of 400ft., or double the width of the quays on the sides of the Edinburgh Dock. An adjunct of the new dock, and which is placed at the south-west corner of the Edinburgh Dock, is a red-brick building with a high tower, in which additional hydraulic engines for working the coal cranes and machinery are now being placed. An additional coal hoist has been ordered, which will be capable of lifting waggons 20 tons to a height of 50ft. It is expected that the new dock works, sheds, &c., will be finished and open for traffic within two years from the present time.

**NORWICH.**—A system of tramways some 16½ miles in total length is being laid down in the city from plans by Mr. Winslow, engineer to the company. The construction of the works was commenced on June 22, in Thorpe-road and on Earlham-road. The total length of track completed is 4 miles 2fur. 6 chains, of which 1 mile 1fur. 4 chains was laid during the month of November. The length of track in course of construction, in addition to the above, is five-eighths of a mile. The following lines have been constructed:—Thorpe-road to Prince of Wales-road, near the Post-office (with the exception of Foundry Bridge). Earlham-road and St. Giles's-street to the entrance to the old Norfolk Hotel Yard. Bracondale and King-street to City side of Albion Mills. Dereham-road from Lord Nelson public-house to Heigham-road. Aylsham-road to a distance of 300 yards from Philadelphia-lane. Magdalen-road from Denmark-road to Magdalen Gates. Lines are in course of construction in the following places:—Prince of Wales-road, Castle Meadow, Agricultural Hall Plain, St. Giles's-street, Dereham-road, Aylsham-road, King-street, Newmarket-road, and City-road. The company have purchased the whole of the properties on the east side of Red Lion-street, and have widened the street to 40ft. The widening in Magdalen-street, Eye Bridge-street, and Wensum-street are progressing, and the company have purchased the majority of the properties required.

## COMPETITIONS.

**SHREWSBURY.**—Out of five sets of designs submitted in competition by local architects for the Technical Institution School, the town council have unanimously selected those sent in by Mr. C. R. Dalgleish, architect, Shrewsbury and Wellington, Salop.

The Municipality of Venice, desiring to encourage artistic culture and to arouse a wide movement of observation, analysis, and criticism among the Venetian International Exhibitions of Art, offers four prizes for competition among art critics. A single prize of 1,500 Italian lire is offered for the best essay on the organisation of the Exhibition. Three other prizes of 1,500, 1,000, and 500 Italian lire respectively are offered for the best criticisms on the works exhibited. Competitors must send four copies of their work to the Secretary's office (Municipio di Venezia) not later than October 10, 1899.

A memorial stained-glass south window has been erected in the Birmingham Old Meeting Church, Bristol-street. The window is the work of Messrs. Heaton, Butler, and Bayne. The three lancet lights are filled in with representations, symbolic figures, and incidents setting forth the idea of Mercy, the treatment having been suggested by Milton's description of Mercy descending from heaven. The central light represents the Angel of Mercy with hands outstretched. The left-hand light pictures the Good Shepherd, and that on the right-hand two incidents from the parable of the Good Samaritan.

A chaste mural monument has been placed in the south-east corner of the nave of Ripon Cathedral, immediately above the entrance to the Saxon crypt, by Admiral Oxley, of Minster House, in memory of his late wife. The monument, which was unveiled on Saturday, is of white marble.

The Glasgow Corporation (Police Department) have appointed Mr. David Home Morton, M.I.C.E., M.I.Mech.E., 95, Bath-street, Glasgow, their consulting engineer to design and superintend the erection, &c., of all the pumping and other machinery required in connection with the Glasgow Main Drainage—Western Sewage Scheme. The value of the machinery will probably be about £30,000.

In the electric light station, Junction-street, Leith, on Friday night, Provost Bennet formally turned on the Leith Walk section of the electric light in Leith. The work has cost about £30,000, and has been carried out from plans by Mr. Bryson, corporation electrical engineer. The contract for the engines, dynamos and accessories was carried out by the Indiarubber, Gutta-percha, and Telegraph Works Company (Limited), Silvertown: for boilers and accessories by Mr. George Sinclair, Albion Boiler Works, Leith; and for 8-ton travelling-crane, by Messrs. Carrick and Ritchie. The architect for the mason work was Mr. George Simpson, the burgh surveyor.

The widow of John Glaza, of Lime-street, Whitmore Reans, who was killed at the Wolverhampton Gasworks through falling from a gasometer, has received £175 under the Workmen's Compensation Act from the contractor, Mr. Melton, of Glasgow.







THE OLD WHITE HOUSE, OXFORD. H. T. HARE, ARCHITECT





Ms. DEC. 30, 1898.













DAWYCK HOUSE, PEEBLES SHIRE.

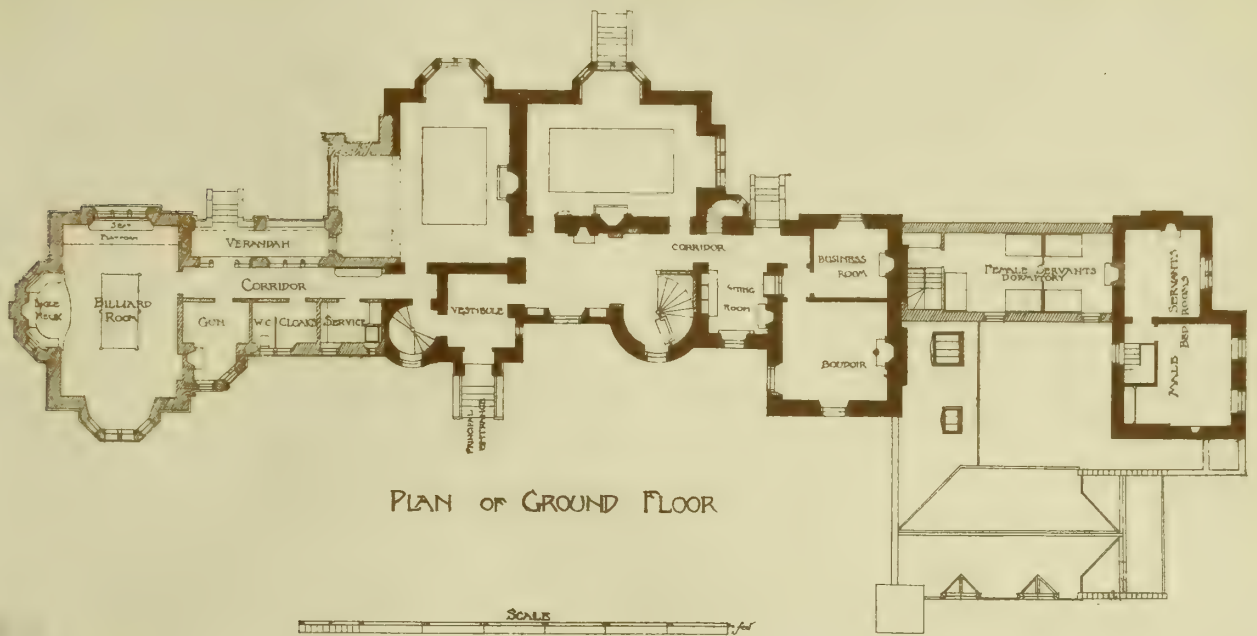
JOHN A. CAMPBELL ARCHITECT



HOUSE AS BEFORE ALTERATION



















# HOUSES ON LINTON BOULEVARD NOTTINGHAM. ARCHITECT BREWILL AND BAILY NOTT



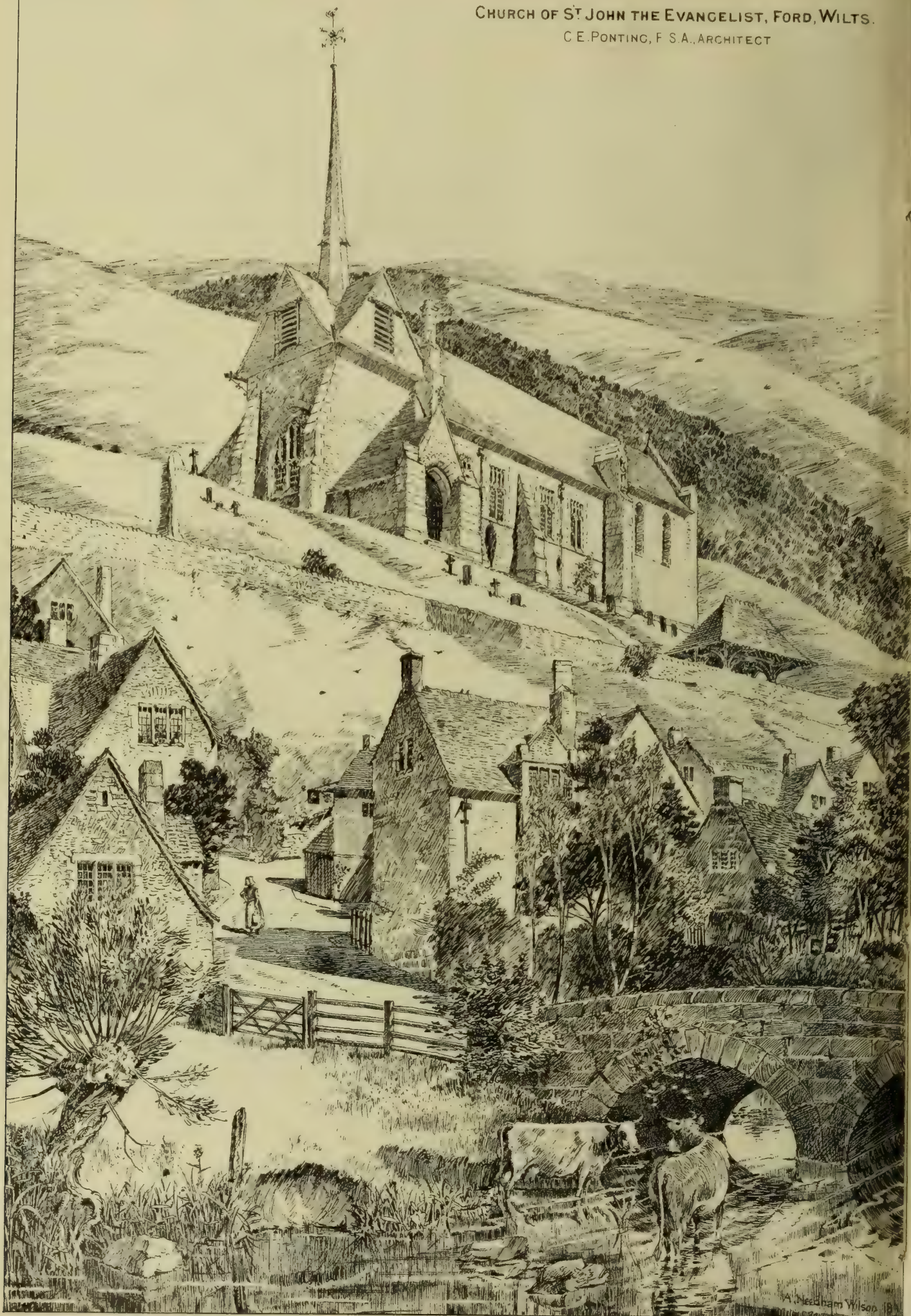




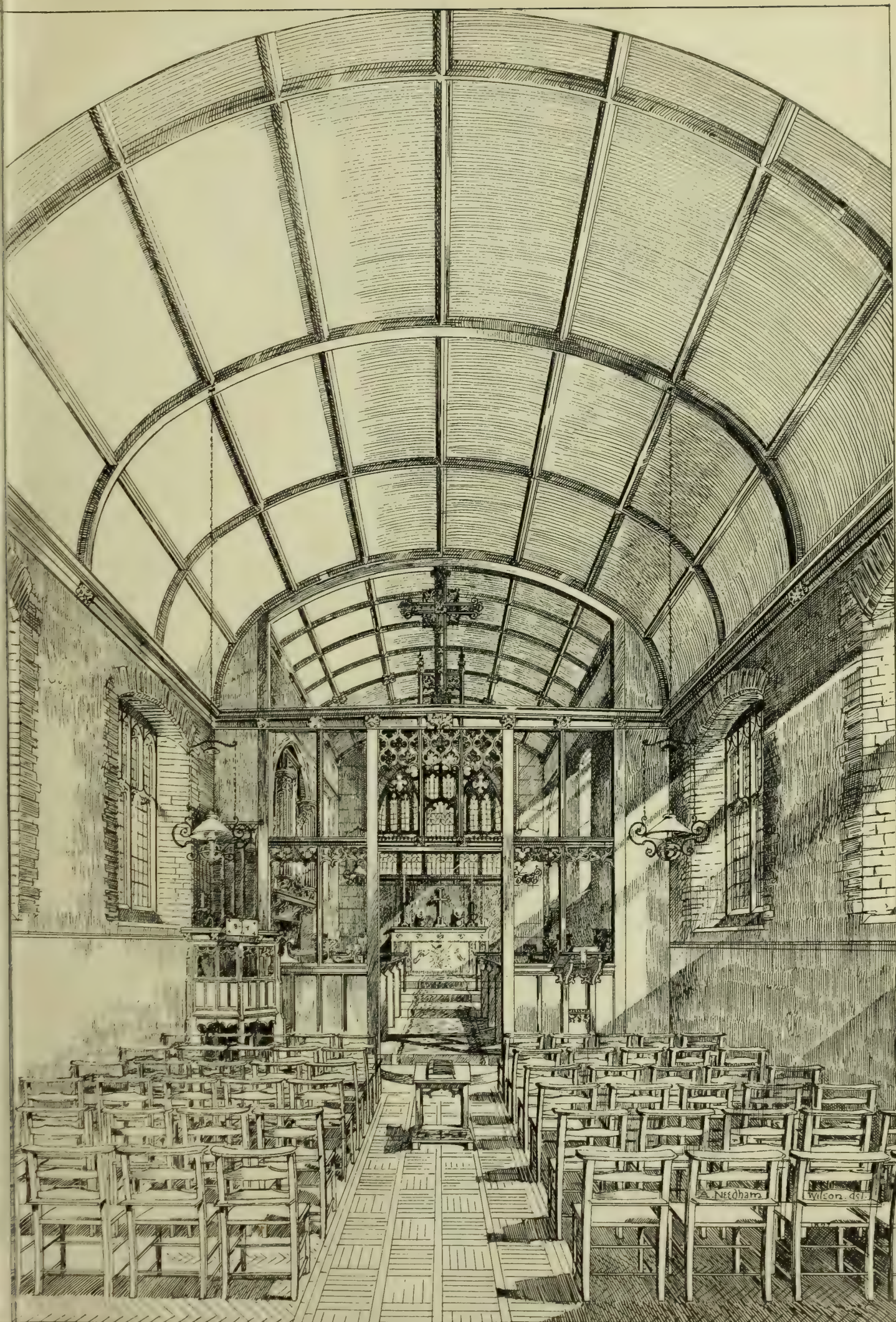


CHURCH OF ST JOHN THE EVANGELIST, FORD, WILTS.

C. E. PONTING, F. S. A., ARCHITECT















Cottages at Port Sunlight  
Ernest Newton Architect

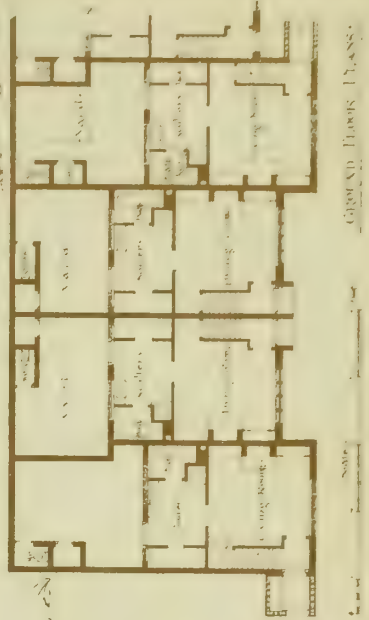








FIG. 1.

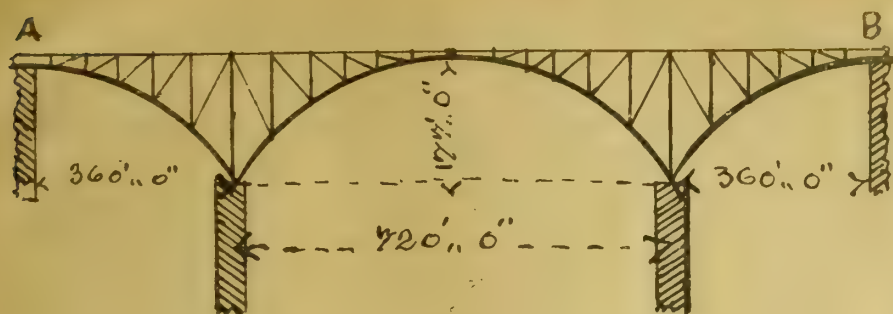
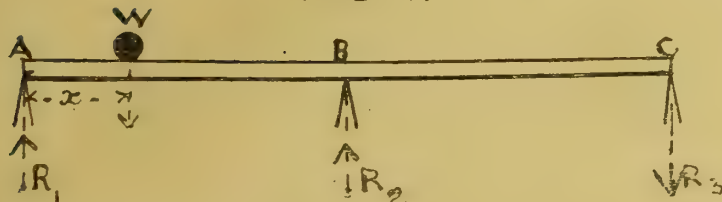


FIG. 2.



### THE CANTILEVER BRIDGE: ITS DESIGN AND CONSTRUCTION.—VI.

IT must not be supposed, as might perhaps be inferred from our preceding articles, that cantilever bridges are restricted to one or other of the three types already illustrated and described. The principle admits of a great variety of forms, as will be seen from the example given in Fig. 1, which is a skeleton elevation of a bridge in present course of construction in France, and of which the principal dimensions are marked on the drawing. This design is essentially that of a cantilever or continuous bridge, as may be seen from the arrangement of the central and side spans. The central span is hinged or pivoted at the crown, and each of the semi-arches comprising it is held in equilibrium by the side spans, which consist also of half-arches. In all arch bridges of single span the bending moment produces a maximum horizontal thrust at the crown, resulting not only from the action of a uniformly distributed load, but from that of variable and concentrated loads as well. When the span of the arch becomes large, and the rise proportionately small, the stress at the crown becomes correspondingly increased in magnitude, and the net sectional area of material required to resist it is greatly augmented. Engineers, therefore, soon began to turn their attention to devising some means for obviating these disadvantages, and among the methods offering themselves as available for the purpose was that shown in Fig. 1. Instead of the bridge consisting of a single span from A to B, the total span was divided into three, which permitted not only of the rise of each span being increased, attended by a corresponding diminution in the central stress, but possesses some additional advantages.

In the first place, the introduction of the hinge at the crown virtually divides the central span into two halves which are counterpoised by the two additional side spans, as already pointed out. These side-spans or semi-arches may be anchored down or otherwise securely fixed to the abutments. It should be mentioned that they sometimes are not carried back far enough to rest upon the abutments, but their free extremities are attached to one end of a longitudinal girder, the other end of which is fastened to the abutment. The object of this arrangement is to prevent the rise and fall of temperature affecting the structure in any appreciable degree. Whether this result is really accomplished in practice may be a matter of opinion. This type of arched cantilever bridge was adopted by the German engineers for their railway bridges, but not until some experiments had been carried out, which, in combination with theoretical considerations and calculations, fully demonstrated the superiority of the more modern design. While, therefore, the cantilever principle is common to the arched as well as to the ordinary types of the horizontal

bridges described in our previous articles, there is a point of difference between them that should be noticed. In the ordinary cantilever bridge, the reactions of the anchor or side-spans are vertical, whether they be positive or negative, but in the design shown in Fig. 1 they are inclined at a certain angle, the value of which varies with the amount of the thrust at the crown, and the magnitude and position of the moving load. In other words, the arched anchor spans exert a certain degree of thrust against the abutments, and the latter must, in consequence, be made strong enough to withstand this oblique pressure.

The reactions of the supports of a discontinuous horizontal girder are always of the same description; but this condition does not obtain in continuous and in cantilever girders and in suspension bridges. As reference has been made to both positive and negative reaction, they require further explanation, especially the latter, as it is much less frequently met with than the former. When a horizontal beam is carried on two supports, it exercises a vertically downward pressure upon both of them, which is resisted, on the principle that action and reaction must be equal and opposite to maintain equilibrium, by the reaction of the supports, which must, therefore, be in a vertically upward direction. This description of reaction is termed positive, and is usually denoted in equations and formulæ by the sign + or described as "plus." If we now take the case of the anchor and cantilever arms of a cantilever bridge, and suppose the latter to be so heavily loaded in excess of the other as to tend to lift it right off its bearings over the abutment, it is evident that the former arm must be anchored down. In this instance, therefore, the reaction of the abutment must be in a downward direction, and is termed negative, and represented by the sign - or written "minus." The determination of both the direction and the amounts of these reactions in cantilever bridges is of the greatest importance, as the reactions at the same points of supports, both piers and abutments, will sometimes be positive and sometimes negative, according to the disposition of the loading. When the separate reactions of a continuous or cantilever girder of many spans have to be investigated, it is not altogether a simple matter to either calculate their amount or determine their sign. Though at present our examples of cantilever bridges have been restricted to elevations comprising only three spans, yet the great Forth Bridge has four—two central and two side or semi-spans. It should be stated that the assignment of the plus and minus sign to the positive or upward, and to the negative or downward reaction is perfectly arbitrary, as it is altogether immaterial what signs are used, or how they are distinguished, so long as there is some prefix to each which will insure their individuality.

Let ABC in Fig. 2 represent a horizontal continuous girder of two spans, supported at the

points A, B, and C, loaded with a single weight, W, situated at a distance equal to x from the support. Let the length of each span be equal to L, and the three reactions be respectively R<sub>1</sub>, R<sub>2</sub>, and R<sub>3</sub>. The pressure W is downward, as shown by the arrow, on both the supports A and B, and in an upward direction at the support C. Consequently, the reactions at the three points of support will be vertical and upwards at A and B, and vertical and downwards at C—that is, R<sub>1</sub> and R<sub>2</sub> are positive, and R<sub>3</sub> negative. This arrangement of loading is not the most usual, but it serves exceedingly well to illustrate the effect produced by the introduction of the principle of continuity in a beam or girder, upon the value of the reactions and other stresses brought upon them. In the first place, suppose the intermediate support at B be removed, then by the laws of the lever—

$$R_1 = \left( \frac{2L - x}{L} \right) \times W \dots\dots(1)$$

and by similar reasoning—

$$R_2 = \frac{W \times x}{2 \times L} \dots\dots(2)$$

Now, replace the support B, and consider the beam AB as independent, and resting on two supports only, A and B. Under these conditions the value of the reaction at A is given by the equation—

$$R_0 = W \left( \frac{L - x}{L} \right) \dots\dots(3)$$

and that at B by—

$$R = \frac{W \times x}{L} \dots\dots(4)$$

since in this instance there is no negative reaction. But when the beam is made continuous, there is a negative reaction, as R<sub>3</sub> is minus. Therefore, the total reaction at the support A will be the algebraical sum of the two reactions R<sub>1</sub> and R<sub>3</sub>, so that the value of R<sub>1</sub> is—

$$R_1 = R_0 - R_3 \dots\dots(5)$$

Similarly we have for the value of R<sub>3</sub>—

$$R_2 = (R + 2R_3) \dots\dots(6)$$

If, therefore, we can obtain the value of the reaction R<sub>3</sub>, the other reactions are easily found. The value of R<sub>3</sub> is given by the expression—

$$R_3 = \frac{W}{4} \left( \frac{x - x^3}{L - L^3} \right)$$

from which we obtain—

$$R_1 = W \left( \frac{L - x}{L} \right) - \frac{W}{4} \left( \frac{x - x^3}{L - L^3} \right) \dots\dots(7)$$

[For the proofs of these formulæ and equations recourse must be had to works on the integral calculus, as they are too long and complicated to be given here.]

So also we find for R<sub>2</sub>

$$R_2 = \frac{W \times x}{L} + \frac{W}{2} \left( \frac{x - x^3}{L - L^3} \right) \dots\dots(8)$$

These equations, though apparently rather lengthy, are very readily solved, as the following practical application will point out. Let W = 12 tons, L = 120ft., x = 40ft.

Then from (7) we have—

$$R_1 = 12 \left( \frac{80}{120} \right) - \frac{12}{4} \left( \frac{40 - 40^3}{120 - 120^3} \right) \dots\dots(9)$$

There is no necessity for squaring or cubing either the number 40 or 120, which greatly simplifies the working out of the result, for the formula may be put—

$$R_1 = 8 - 3 \left( \frac{40 \times 120^2 - 40^3}{120^3} \right) \dots\dots(10)$$

from which, by dividing and reducing, we get—

$$R_1 = 8 - 3 \left( \frac{8}{27} \right) = 8 - \frac{8}{9} = 7\frac{1}{9} \text{ tons} \dots\dots(11)$$

Were it certain that the previous calculations were perfectly correct, R<sub>3</sub> could be obtained by simple subtraction, but then there would be no check on the total result. It cannot be too strongly urged that the necessity for checking the final calculation, which in itself is composed of several separate and independent minor calculations, is absolutely indispensable. It usually entails, as in the present instance, some additional trouble, but it is cheaply purchased by the knowledge and the satisfaction that a designer feels when he is convinced beyond doubt that his calculations are thoroughly reliable and accurate. As a check on the sum of the three reactions, it will therefore be advisable to calculate the value of



$R_2$ , which is a very simple matter. From (6) we have—

$$R_2 = (R + 2R_3) = \left( \frac{W \times x}{L} + 2R_3 \right)$$

but  $2R_3 = \frac{16}{9}$ , and substituting the same values for the other symbols, the equation becomes—

$$R_2 = \left( \frac{12 \times 40}{120} + \frac{16}{9} \right) = 5\frac{1}{3} \text{ tons.}$$

These separate calculations may now be summed up to ascertain if they will satisfy the general equation applicable to all cases of weights and reactions, no matter what their number nor what their amount. This general equation is for the example before us—

$$R_1 + R_2 - R_3 = W = 12 \text{ tons.}$$

Substituting for  $R_1$ ,  $R_2$ , and  $R_3$  their respective values already found of  $7\frac{1}{3}$ ,  $5\frac{1}{3}$ , and  $\frac{8}{9}$ , the relation may be expressed as—

$$\frac{64}{9} + \frac{52}{9} - \frac{8}{9} = \frac{108}{9} = 12 \text{ tons.}$$

The practical deductions to be drawn from the analytical investigation entered into and proved is the value of the comparison between the two spans A B and B C, considered as independent beams—that is, severed completely over the support B—and when they are united, or, so to speak, made one over that support for the whole length from A to C. In the case of two independent beams, the weight W will obviously not affect the other beam B C in any degree, and the reactions at A and B are from (3) and (4) 8 and 4 tons respectively. But when the two beams are joined up continuously they become  $7\frac{1}{3}$  and  $5\frac{1}{3}$ , so that there is no particular gain either way in this limited application of the continuous principle; nor is it to be expected. It should, however, be borne in mind that, so far as the beam or girder itself is regarded, there is an advantage in transferring as much of the pressure as possible upon the central support or the pier. This peculiarity constitutes one of the chief merits of the cantilever principle, for, instead of the maximum stress occurring at the centre of the span, they are transferred to the piers, where the resistance is also a maximum. While it is true that a heavy engine standing on a bridge similar in design to that shown in Fig. 2, and representing the weight W, would fairly fulfil the conditions in the example selected, yet the modern practice is to reduce all concentrated loads to a single equivalent uniformly-distributed loading, and the modification has the merit of simplifying and facilitating the calculations, and also of erring, if it should err, on the safe side. The two instances which occur the most frequently in actual practice are, first, when the loading is uniformly distributed over one of the spans in Fig. 2, as in the passage of a train over the bridge; and, secondly, when the load covers both spans. Both these cases will be investigated in our succeeding article.

T. C.

The Bishop of Bath and Wells rededicated the tower and bells of Heathfield Church on Friday. The repairs have been carried out as a part of the general restoration of the church. The tower has had all the rough-cast removed, and the stonework has been repointed; the bells have all been recast, and the cage has been repaired.

The Duchess of Albany will visit Tottenham on April 29, and lay the stone of a parochial and working-men's club for the Marlborough College Mission district. Twelve years ago her Royal Highness laid the stone of St. Mary's Church for this mission. The new buildings, including site, will cost over £4,000, of which nearly £3,000 is in hand.

The first sod of the new loop line between Blackpool and Fleetwood has been cut. The new line will directly connect the two towns without going by Poulton.

As a memorial to the late vicar of Dotling, Kent (the Rev. J. Cave-Browne), his widow and children have defrayed the cost of a stained-glass window at the east end of that church. It has been erected by Messrs. Heaton, Butler, and Bayne, of London, and has three lights. Its two outer lights represent respectively the Virgin Mary and St. John, and the centre one the Crucifixion.

At Newport, Isle of Wight, on Wednesday, the opening took place of new waterworks constructed at a cost of about £21,000. Mr. Baldwin Latham, the engineer of the works, stated that the supply was sufficient for several towns the size of Newport, and the absolute purity of the water was attested by the highest analytical authority.

## Building Intelligence.

BUCKNALL, HANLEY.—The additions to the Hanley, Stoke, and Fenton Joint Hospital for Infectious Diseases, situated at Bucknall, were opened on Wednesday week. The buildings consist of two pavilions, each having accommodation for twelve beds, one isolation block for four beds, making a total addition of 28 beds, with additions to administrative block, and a discharging block. The buildings are built of common brickwork, relieved with red pressed brickwork to angles, cornices, and arches; stone sills throughout; the roofs are covered with red brindled tiles. The site of every building has been concreted over, and the buildings are all (with the exception of additions to administrative block) one story. The two twelve-bed pavilions have each a central entrance, approached from a carriage drive, the floor of entrance vestibule is paved with tiles, the walls have a glazed-brick dado, there are especially wide swing doors, and entrances to wards off the vestibule corridor to admit of stretchers being carried in. Each ward measures 36ft. by 26ft. and is 13ft. high. It is heated by a green-glazed faience-ware stove, and the cold air is admitted by air-flues from the outside of the building; it then passes through hot flues in the stove. The stoves are on the down-draught principle. All the floors of wards, nurses' rooms, and bathrooms are of pitch-pine polished. Between two six-bed wards is situated the nurse-room, having inspection windows looking into either ward. At the opposite end of each ward is an annexe, disconnected from the main building by a ventilating corridor, heated by a hot-water radiator, supplied by bath boiler. The bathroom is provided with white glazed porcelain baths and lavatories. The isolation block is arranged with nurse's room in centre, and two wards, one on either side. The administrative block additions adjoin the old portion of this block. They provide, on the ground floor, nurses' dining-room, three bedrooms, and pantry, with central corridor, and on the first floor, three bedrooms, bath, and w.c. The accommodation provided by these additions is for 28 beds, and the cost is £7,000. The contractor is Mr. John Bagnall, builder, Fenton. The glazed bricks have been supplied by the Midland Glazed Brick Company, Hanley; floor tiles by the Campbell Tile Company; the asylum closets, lavatories, pedestals, and combination hospital sinks by Messrs. George Howson and Sons, Ltd., Eastwood, Hanley; the special hospital sinks by Messrs. Doulton; the porcelain baths and fittings by Messrs. Twyford, Ltd.; the faience stoves by Messrs. Shorland Brothers, Manchester. The works have been carried out from designs, and under the supervision of Mr. Elijah Jones, M.S.A., architect, Hanley.

DUNDEE.—The Dundee Advertiser states that in that city the year now closing has been marked by an almost phenomenal activity in the building trade, and this in spite of the fears expressed a year or two ago that the boom had largely spent itself, and that a reaction must come. At the beginning of the year there was an enormous amount of work on hand, and as the spring wore on additional contracts were entered into, and the result has been that all branches of the building trade have been kept fully employed. Indeed, difficulty was experienced at times in getting qualified men, and in many cases new properties were not ready at the stipulated day. The feature of the year's building operations in Dundee has been the extraordinary increase in the number of tenement dwelling-houses erected—a revival of the boom of several years ago in this class of property. In 1895 there were complaints that numerous three and four-roomed houses were standing empty, and that occupiers of such dwellings were finding their way to suburban districts; now it seems as if too many tenements could not be erected, while the demand is pronounced. These tenements have for the most part been put up in the eastern and northern districts. The new post office has at length been occupied by the Postal authorities. Another ornate edifice, nearly completed, is that in Meadowside of the Pearl Assurance Company. Immediately opposite is a new block which will in future form the Dundee offices of the Scottish Provident Institution. Another undertaking recently finished is the Seagate establishment of John Robertson and Son, Limited, wine merchants. Operations at

the new Royal Bank, High-street, have been steadily carried on. The British Linen Company Bank have effected extensive improvements on the property at Couttie's Wynd, Nethergate, and converted the place into a branch office. The same company are having a bank, with dwelling-house above, erected in Scouringburn, near West Port. Other building works are the erection of a church at Park-avenue and Morgan-street for Park U.P. congregation; the addition of a physical laboratory to the High School properties, the enlargement of a section of the West Poor-house, and alterations on Willison and M'Cheyne Free Churches, and an addition to and renovation of the mission premises at Cherryfield, the hospital at Balcay finished this year, and St. Patrick's Roman Catholic Chapel in Arthurs-terrace just opened. The ensuing year, with, amongst other things, the extensions at King's Cross Hospital, the erection of new parish council offices, and the Foresters' Public Hall, promises to be even busier than the present has been.

HORTON, SURREY.—The Asylums Committee of the London County Council intend shortly to inaugurate an experiment in the housing and treatment of the male epileptic insane who come under their care. The committee report that a favourable opportunity is now presented for establishing a working colony for epileptics, to be specially selected by transfer from the London asylums. On the estate of 1,060 acres at Horton, near Epsom, already acquired by the Council for the construction of a large general asylum, there is a triangular piece of land 127 acres in extent, which could not be well utilised in connection with the construction of a second large asylum on the estate. A public footpath runs across the land, dividing it into two sections, the larger of which, 80 acres in extent, is the site proposed for the colony buildings. The asylums engineer has reported on the probable cost of a scheme for the erection of buildings for housing 300 male patients, and has submitted plans of detached structures in the temporary style as recently adopted for the Horton Manor Asylum. They are eight in number, each self-contained, and designed to accommodate 36 patients, with three attendants. A common dining-hall, seating 300 patients, which will be used for religious and recreative purposes, is provided, the patients taking their other meals in their own villas. In each villa clothes and food stores are included. The houses are necessarily ground-floor buildings only, it being undesirable to house epileptics in two-story buildings, and the only heating arrangements will be the open fireplace. A detached house for the medical superintendent is provided, and the administrative building will provide accommodation for an assistant medical officer and staff officers. Attached to the building will be the infirmary. The lighting will be by electricity, and a simple system of telephones and other electrical appliances will be provided. The approximate cost of the temporary buildings comprised in the scheme is £43,189, or £144 per bed. If the buildings are carried out in brickwork, the estimated cost is £66,012, or £220 per bed. These are only cube estimates, and do not include equipment, which would cost in addition £25 to £30 per bed. The committee are of opinion that the temporary style of building is preferable by reason of its being the cheaper, and they are satisfied that there is as remote a probability of danger from fire in plaster-lined iron structures as in the more permanent buildings. The report recommends the Council to sanction preliminary expenses in connection with the scheme.

KENNINGTON, S.E.—The Princess of Wales's Theatre at the corner of Kennington-road and South-place was opened on Monday night. The building has frontages of about 80ft. to Kennington Park-road, 150ft. to South-place, and 90ft. to De Laune-street. The whole of the main frontages are in stone, and are Italian Renaissance in style. The principal entrance is from Kennington Park-road. A spacious colonnade leads into the vestibule and thence to the grand crush-room, which is 42ft. by 20ft. The walls are lined with Favonozza marble. Directly above is a ladies' foyer and grand saloon, and a flight of steps leads from the grand crush-room to the dress-circle. There is not a single column anywhere to obstruct the view. The auditorium is about 70ft. by 60ft. On the ground level are the stalls, pit-stalls, and pit. The dress-circle forms the first tier and the amphitheatre, and gallery the second. The style of decoration adopted throughout the interior is the French



Renaissance. Paintings are freely introduced on the ceilings and walls, and adjacent to each section of the house is a saloon. Electric light is used throughout, the fittings being in harmony with the general decoration. The stage is one of the largest in London, being 80ft. wide by 50ft. deep. The dressing-rooms are separated from the stage by brick walls and iron doors. The theatre was designed by Mr. W. G. R. Sprague.

LIVERPOOL.—An operating theatre which has just been added to the workhouse infirmary in Mill-road, belonging to the West Derby Board of Guardians, was formally opened last week. The operating-room is situated on the top flat of the infirmary. To the right is the anæsthetic-room. The theatre is lighted by a large roof-light facing south and west. The walls are lined with white glazed tiles, and the junctions of the walls with the floor and corners are supplied with rounded tiles. The floor is of marble, and has a slope to a sink for flushing purposes. Artificial lighting is by means of electric light, and the electric current is also utilised for medical and surgical purposes, there being also hand-lamps for operative work. Irrigators for the supply of absolutely sterile water are provided, and all the wash basins are fitted with foot-pedals, thus obviating the necessity of touching the taps with the hand. The instruments are kept on glass shelves, in a dustproof case. The theatre has been built by Mr. William Hall, of Christian-street, Liverpool, from designs of Mr. C. H. Lancaster, architect to the West Derby Union.

LURGAN.—A memorial stone pulpit which has been erected in Christ Church, Lurgan, was dedicated by the Dean of Down on Friday. The pulpit occupies a position in the north side of the church, immediately outside the chancel. The general material is Caen stone. The plinth is an octagonal block of polished Kilkenny black marble, the upper edging of which bears an inscription in gold letters. Rising from the plinth are eight shafts of Cork red marble supported on moulded bases, and surmounted by foliated capitals, which in their turn support the floor. The upper portion consists of a series of carved and moulded arches, supported on Middleton marble columns, each arch being contained in a panel formed by columns of Cork red marble, rising from the floor to the cushion, and terminating in floral capitals. The general plan of the pulpit is octagonal, the style Late Gothic. Its width is 5ft. and height 8ft. 3in. A carved cornice runs round the top of the pulpit, finished on an abacus of polished Derbyshire alabaster. The sculptor is Mr. L. F. Harrison, of Dublin.

METROPOLITAN TABERNACLE.—The committee appointed to arrange for the rebuilding of the Metropolitan Tabernacle at Newington Butts announce that the lower hall is ready for occupation, and will be opened on Sunday next. There is seating accommodation for nearly 2,000 persons. The contract for the restoration of the main building has been given, after public tendering, to Messrs. Higgs and Hill (Limited), the cost of the work to be executed being £32,550. The late Mr. William Higgs, the founder of the firm, built the original structure in 1860-1. Messrs. Searle and Hayes, of Ludgate Hill, are the architects. The amount to be spent on furniture and fittings is £3,500.

NEWCASTLE-ON-TYNE.—Under the management of the new directorate, the old-established soap-works of Thos. Hedley and Co., Ltd., in City-road, are being overhauled and adapted to present day requirements. The offices have been gutted, and now occupy nearly the whole of the ground floor in the City-road frontage, and are more than double their former area. They are now approached by a new entrance, built of red sandstone. The machinery is also in course of rearrangement, and in many cases is being reconstructed, as it is intended to utilise every inch of the building, which is mostly six stories in height. A new laboratory is about to be constructed, and the sanitary arrangements are to be overhauled, and new stables and cartsheds will be erected at an early date. Mr. B. Veitch has been the contractor for the offices, &c., and the architect is Mr. Charles S. Errington, A.R.I.B.A., of Newcastle.

PIETERMARITZBURG, NATAL.—In our issue of the 9th September last, we gave an illustration from a photograph of the town-hall of Pietermaritzburg, destroyed by fire on July 12, accompanied by a description of the building, and

details of the disaster, written by Mr. Harry Hems, of Exeter. From a copy of the *Natal Witness* just to hand, we learn that the town council of Pietermaritzburg recently held a special meeting, at which a committee submitted plans, drawings, and a report by Mr. W. Street Wilson, the original architect of the town-hall, who had been instructed to prepare these as a basis for a competition scheme for the re-erection of the building. Having adjourned for a meeting in committee, the members decided to abandon the proposed competition, and to adopt the principle of the plans submitted by Mr. Street Wilson for the new building, estimated to cost £47,500, less old material £8,000—£39,500, and that after the council has definitely settled what alterations, if any, be made, to the architect's plans, tenders be called for the erection of the buildings as early as possible; the erection of the tower to be proceeded with immediately on receipt of the specifications. All the available old walls are to be utilised; but the edifice will be considerably enlarged. The main hall will be extended to 128ft. by 66ft., and 53ft. in height to flat elliptical roof, as against 52ft. by 28ft., and 41ft. in height in the old building. A new smaller hall, 47ft. by 29ft., is proposed. The mayor's parlour, supper-room, and accountant's offices are enlarged, and the tower will be raised from 112ft. to 155ft. in height, and the tender of Messrs. Gillett and Johnson, of Croydon, the makers of the original clock and chime of bells, has been accepted at £1,490 for their replacement. The cost of the original building was £42,320.

### CHIPS.

At the railway crossing at Poole on Thursday night in last week, Mrs. John Elford, wife of the borough surveyor, was knocked down by the Weymouth and London express and killed.

As the result of an examination by Mr. Hawley Lloyd, of Birmingham, the diocesan surveyor, upon the condition of St. John's church, Henley-in-Arden, he has reported that it is in immediate need of repair to prevent further and serious decay. Mr. Lloyd estimates that the urgent and necessary work will cost about £700. A committee has been formed, and is taking active steps to raise the necessary funds.

In order to allow the citizens of Glasgow an opportunity of inspecting the competitive designs for the sculpture of the new Fine Art Galleries, they will be on exhibition in the Corporation Galleries in that city till Saturday, January 7.

Mr. Alma Tadema, R.A., has prepared a design for the seal of the Library Association, recently incorporated, and it has been accepted by the council, to whom the artist has kindly presented it.

Mr. C. E. Davenport, A.M.I.C.E., has reported to the Nantwich Urban District Council upon the methods of sewage disposal at Hendon, Sutton, and Friern Barnet, and has made suggestions for dealing with the sewage of Nantwich.

The two remaining bays and the west front of St. Oswald's Church, Small Heath, Birmingham, are to be completed by Mr. C. Wriothesley Digby, of Meriden Hall, as a memorial to his wife, who laid the foundation-stone of the church in 1892.

That the Maidstone Waterworks Company is prepared to face its heavy responsibilities is shown by the decision arrived at by the shareholders on Thursday in last week with regard to raising fresh capital. The directors have a scheme in hand for enlarging the works of the company at the Forstal at a cost of about £28,000. They propose to spend £2,100 on the purchase of land, £16,000 on well-sinking and engine-house extension, £6,500 on a new storage reservoir, and £6,000 on trunks and mains. These proposals were all sanctioned by the shareholders.

At Pendeen, Cornwall, the work connected with the erection of the new lighthouse has been commenced. Some days ago the first sod was cut in the presence of Mr. T. Matthews, chief engineer of Trinity House, and the contractor, Mr. A. Carkeek, is now having the excavations made.

There was little business done at the Auction Mart, Tokenhouse-yard, last week, the few sales that were held producing the insignificant aggregate of £3,535, which compares unfavourably with the amount registered for the corresponding period of last year—£14,025.

Mr. H. P. Boulnois, M.Inst.C.E., held an inquiry at Kingswood, near Bristol, on Friday, on behalf of the Local Government Board, into an application by the Kingswood Urban District Council for sanction to borrow £2,700 for works of private street improvement and £320 for the purchase of certain sanitary appliances. Mr. A. J. Saiss, surveyor to the urban council, explained the proposals.

### TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. All communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondents.]

It is particularly requested that all drawings and all communications respecting illustrations or literary matter should be addressed to the EDITOR of the BUILDING NEWS, 332, Strand, W.C., and not to members of the staff by name. Delay is not unfrequently otherwise caused. All drawings and other communications are sent at contributors' risks, and the Editor will not undertake to pay for, or be liable for, unsought contributions.

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The charge for Competition and Contract Advertisements, Public Companies, and all official advertisements is 1s. per line of Eight words, the first line counting as two, the minimum charge being 5s. for four lines.

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Front-page Advertisements 2s. per line, and Paragraph Advertisements 1s. per line. No Front-page or Paragraph Advertisement inserted for less than 5s.

Advertisements for the current week must reach the office not later than 3 p.m. on Thursday. Front-page Advertisements and alterations in serial advertisements must reach the office by Tuesday morning to secure insertion.

### SITUATIONS.

The charge for advertisements for "Situations Vacant" or "Situations Wanted" is ONE SHILLING for TWENTY-FOUR WORDS, and Sixpence for every eight words after. All Situation Advertisements must be prepaid.

### NOTICE.

Bound copies of Vol. LXXIV. are now ready, and should be ordered early (price Twelve Shillings each), as only a limited number are done up. A few bound volumes of Vols. XXXIX., XL., XLVI., XLIX., LI., LIII., LVIII., LIX., LXI., LXII., LXIII., LXIV., LXV., LXVI., LXVII., LXVIII., LXIX., LXX., LXXI., LXXII., and LXXIII., may still be had, price Twelve Shillings; all the other bound volumes are out of print. Most of the back numbers of former volumes are, however, to be had singly. Subscribers requiring any back numbers to complete volume just ended should order at once, as many of them soon run out of print.

RECEIVED.—O. J.—A. B.—K. W. G.—N. L. S. and Co.—W. M. and S.—F. H.

"BUILDING NEWS" DESIGNING CLUB.

DRAWINGS RECEIVED.—"Indian Ink," "Brown Bread," "Dodo," "Dachs," "Delia," "Dick," "Brush," "First Attempt," "Lotts," "Nothe," "Tie-beam," "The Auk."

## Correspondence.

### RE MOSCOW MANSIONS.

To the Editor of the BUILDING NEWS.

SIR,—With reference to the perspective drawing of Moscow Mansions, Cromwell-road, Kensington, which appeared in your issue of the 16th inst., I desire to state that the building, having been disposed of by my client, is now being erected under the supervision of Mr. Arthur Blackford, of 61, Chancery-lane, W.C. I shall be obliged if you will notify this in your next issue.—I am, &c.,

CHARLES J. C. PAWLEY.  
25, Victoria-street, Westminster, S.W., Dec. 22.

An offer has been made by the Ocean Accident and Guarantee Association to purchase East Parade Congregational Chapel, Leeds, and the trustees of the building have recommended the same for acceptance by the members. Some ten years ago Mr. F. R. Spark sought to buy the building with the intention of transforming it into a printing establishment; but the negotiations fell through, the price then agreed to being £17,250. The price which the present purchasers have agreed to pay is £28,500 for the building alone; but another firm has since increased this offer to £30,000. The trustees will retain the organ and internal fittings, and will erect another place of worship on a fresh site. East Parade Chapel, which was opened in January, 1841, is in the Grecian Doric style.



# Intercommunication.

## QUESTIONS.

[12143.]—**Payment for Plans.**—I prepared plans for a villa, and, after some delay, find that my client is about to purchase a house put up by a speculator. What is the correct charge to make for plans without specification or quantities? I thought a commission of 2½ per cent. would be fair.—**YOUNG PRACTITIONER.**

[12144.]—**Perspective.**—I am desirous of learning to draw in perspective. Are there any elementary works published that will explain how I can put a building into perspective? Any information will be thankfully received.—**TYRO.**

[12145.]—**Factory Chimneys.**—Should these be built in two thicknesses, or is a solid construction better? Are there any good examples to go by? I should be glad to know of any.—**ENQUIRER.**

[12143.]—**Moving Brick Houses.**—I believe there have been many instances of buildings having been removed bodily in America. Can any reader give me any information of such removals, and how they have been accomplished. What is the plant required? I am told jack-screws have been employed, with several tiers of timbers, and that blocks of houses have been shifted as much as 9ft. or 10ft. in a day.—**QUERIST.**

[12147.]—**Private Road.**—I am about to pave or otherwise finish a private road about 100 yds. long by 15 yds. wide. Can any of your numerous readers give me information as to what is best for a road of that kind—that is, a road simply for pedestrians, or tenants of the houses built thereon? No doubt cabs will have to run over the same, but not great removal vans. I want it, also, light in colour, and, I thought, in blocks or squares of some hard concrete pavements. I do not want (if possible to do without) ordinary stone setts. I want something more uniform on the surface, and light in colour.—**JOHN SMITH, 14, Curzon-street, Burnley.**

[12148.]—**Washing-House Tubs.**—Whether is wood or freestone to be preferred? If of wood, what kind and thickness, and how long may be expected to last?—**INEXPERIENCED.**

[12149.]—**Value of Brick Earth.**—I have bought a building estate in Essex, with the idea of developing it in the future. The soil is clay, and I am told of considerable commercial value as brick earth. What is the usual royalty paid by brickmakers, and how can I ascertain that I am getting it?—**SPECULATOR.**

## REPLIES.

[12131.]—**Lime Kiln.**—It would be impossible to help E. Bolton by answering his queries in this column, as he seems to know so little about the business he contemplates entry into. I should advise him to acquire practical knowledge of the working of lime kilns in some way before having one of his own.—**LOUIS EARWOLD.**

[12134.]—**Lime-Kilns.**—It may be worth your while to look at *Clay Workers* sold at Essex-street, Strand, W.C., I believe, a few doors south of Strand, monthly publication, 6d.; or at "Notes on Building Construction," Longmans and Co.—both to be seen at Patent Office Library, 10 to 10; part 3, Materials. Many pages on subject of clays, bricks, kilns, clamp, Scotch, patent, &c.—**REGENT'S PARK.**

[12136.]—**Architect's Responsibility.**—I think an architect would be held responsible for any serious defect, such as the want of air-pipes to prevent siphonage, if these were omitted; or the connection of waste and soil-pipes. The latter might result in serious consequences to the inmates of the house. But for things like the weight of lead he would not be held responsible. Happily, there are not many tradesmen, who have any respect for their trade, who would allow a connection of a waste-pipe with a soil-pipe; and now plumbers are registered, architects have not much to complain of when the work is contracted for by a respectable builder.—**A. J.**

[12136.]—**Ceiling Decoration.**—I fancy not; this is the general way. Have you tried uncoloured (usually sold in tints) Lincrusta or akin material, secured by one-third glue and two-thirds paste composition? Asbestos Salamander is first class for plain plaster (or ornamental); hardly anything better than the preparation of oxide of zinc and size; wash or paint, and then go over with solution of chloride of zinc; you get a smooth, bright surface.—**REGENT'S PARK.**

[12136.]—**Architect's Responsibility.**—I should certainly say that an architect is responsible for the whole of the work, or else why does his client pay any fees for his supervision if it is not to insure good work? If he cannot manage to spare the time himself, he should engage a representative as clerk of works to supervise the work and materials.—**L. E.**

[12137.]—**Ceiling Decoration.**—Glue and paste mixed will stick ceiling decorations similar in texture to "Anaglypta" and "Lincrusta Walton," tacks being put in to hold it in its place while the paste is setting.—**L. E.**

[12138.]—**Kitchen Range.**—I think the landlord can be called upon to put in a new range under the circumstances. No respectable landlord could refuse to accede to the requirements of a tenant of several years, unless there is a special proviso that the tenant is to repair, which is rather unusual.—**ANOTHER TENANT.**

[12138.]—**Kitchen Range.**—Reasonable thing for landlord to do. Try American ranges.—**REGENT'S PARK.**

[12139.]—**Wash-Down Closets.**—I should recommend "A. L." to use one of Duckett's wash-down pedestal closets, which is self-contained, and has a 2in. seal and a flushing rim.—**G. H.**

[12139.]—**Wash-Down Closets.**—In reply to "A. L." of course, every maker would strongly recommend his own particular type of closet; but I would suggest, as a very satisfactory course to adopt, that "A. L." should write to the various makers (or, at least, some of them) for particulars of their specialities, and

then make a selection. I do not think that any one closet is very much superior to another.—**A. A. M.**

[12139.]—**Wash-Down Closets.**—Some of the most efficient are Twyford's, Southampton-row, W.C.; Doulton and Co., Lambeth; Hellyer, Newcastle-street, W.C.; Jas. Woodward (the "Kensington"), Anchor Pottery, Swadlincote, or R. H. Rowley, Swadlincote. Prices according to finish; but all alike suitable for cottage or palace. Get lists.—**REGENT'S PARK.**

[12140.]—**Casting in Plaster.**—A book full of data and illustrations is by Wm. Miller, "Plastering," published by B. T. Batsford, 94, High Holborn, W.C., some 600 pages. There is a small book on modelling in plaster sold by (I think) Vago, modeller, High Holborn, W.C.—dealing with the casting of figures; but this you may not require.—**REGENT'S PARK.**

[12141.]—**Depreciation of Property.**—An answer to "Fair Play's" question can only be given by an inspection and survey. The assessment of the injury caused by the erection of a board school to the remainder of the estate would be a large sum, and depend on the rental value of the houses in the part affected. "Fair Play" had better find out similar compensations that have been paid. The noise of playground is a serious drawback to houses that may join on either side or back on the site of school. The result would be a depreciation of property and a fall of rent of in many cases 25 to 30 per cent., and these should be made the basis of the calculation.—**G. H.**

[12141.]—**Depreciation of Property.**—Your best plan is to consult a good surveyor, and you may do well to apply to Secretary of the Surveyors' Institution at present in Savoy-street, Strand, W.C., until their Great George-street premises are ready, as they have thousands of members in town and country. He would most likely be able to give you a good pick, and get what the law provides.—**REGENT'S PARK.**

[12142.]—**Damp Cellar.**—In London, they have (in many places in damp soils, say clays) the soil taken away from walls and laid open, concreted, the brick walls built up level with surface, air-bricks inserted in house-walls, and land side of walls asphalted, also with arched top, with air-bricks set in on wet lias clay. At Bristol, &c., they have this arrangement; otherwise, you could have anti-damp solutions applied to inside walls, or enamels or washes, such as carbolineum, of Peters, Bartsch, and Co., Derby.—**REGENT'S PARK.**

[12142.]—**Damp Cellar.**—You can line the walls with White's Composition, which may be placed on the inside or outside of the cellar walls, or cover them with a coating of Portland cement. I should prefer White's Composition as a non-impermeous lining. The floor of cellar may also have a layer of the material.—**G.**

[12142.]—**Damp Cellar.**—Callender's pure bitumen damp-course can be applied to the floor of the cellar and inserted as a damp-course in the walls and brought up outside to level of ground. Perhaps the ground is charged with water. If so, I should advise land-drains to be put in round the foundations and carried to a convenient outlet; but if the cellar is below the level of drains, the cellar must be made perfectly water-tight by the means suggested above. Asphalt has been used for this purpose placed on the outside of walls and also over the floor, so as to make an impermeable skin round and under the cellar.—**ARCHITECT.**

[12142.]—**Damp Cellar.**—If there is space outside or round the cellar, dig out dry areas to the bottom, or a few inches below cellar floor, and cover the same with iron gratings. This will effectually cure the dampness. The floor should be covered with asphalt on a bed of concrete 6in. thick.—**M. S. A.**

## CHIPS.

Carpenters' Hall, London, E.C., was crowded on Thursday evening in last week, when the Duke of Fife distributed medals and certificates to successful candidates of the trades' training schools, which are carried on under the auspices of several City of London companies. The Master of the Carpenters' Company, Mr. J. C. Preston, occupied the chair.

The Luckie H. rsehoe Sick Club held their fourth annual meeting at Messrs. Hem's and Sons' studios, Longbrook-street, Ex-ter, on Friday, Mr. William Eliott, one of the senior craftsmen, in the chair. A dividend of 22½ per cent. upon the year's subscriptions was declared and paid to the various members (all in the employ are members), and Mr. H. Turner Hem's was re-elected hon. treasurer.

The Salvation Army Building Association, which went into liquidation after supplying General Booth with many thousands of pounds for the purpose of building "fortresses," "citadels," and "barracks," has now made arrangements under which all the shareholders will receive back the full amount of their shares, together with a small dividend. Early in the New Year a final instalment of 15s. per £1 share will be paid to the shareholders.

After considerable delay, owing to the illness of the architect, the town hall which has been built at Conway has just been opened. The building replaces the old market, the materials of which have been largely utilised. On the basement there are council and committee-rooms, with offices for the borough officials. The upper floor is devoted to a concert and assembly hall, with retiring and waiting-rooms, and which has a separate approach from the street. The original plans were designed by Mr. T. B. Farrington, C.E., the borough surveyor, but since his illness the works have been superintended by Mr. Richard Davies, architect, Bangor. Messrs. E. Thorpe and Son, Llandudno, were the contractors, the approximate cost being £4,000.

## LEGAL INTELLIGENCE.

**AS THE CROW FLIES.**—Eight workmen sued Messrs. Lovett, builders, West Kensington, at Brompton County-court on Friday, for sums ranging from 2s. 6d. to 4s. 6d. for expenses under a rule of their society which provided that all men in the building trade "having to go from 'shop to job' more than six miles were to be allowed an extra 6d. per diem." The plaintiffs had to go each morning from West Kensington to Limehouse, which, according to the police measurement, was six miles and five hundred yards. Mr. J. Jones, for the defendants, said that measurement was not in a straight line, and he must object to its being taken as being actually correct. The Judge: I suppose you want the line as the crow flies. Mr. J. Jones: Yes, your Honour. The Judge: Well, you will have to produce the crow. Mr. Chester Jones, for the plaintiffs: I do not think crows always fly in a straight line. Mr. J. Jones: The distance must be measured in a straight line. The Judge: Oh, no. The distance must be taken as the most practical way of getting from one point to another. Judgment was reserved.

**BUILDER'S OR BUILDING OWNER'S LIABILITY FOR ACCIDENT.**—**FINCH V. WOODROW.**—Court of Appeal, Dec. 16, before Lord Justice A. L. Smith, Lord Justice Rigby, and Lord Justice Collins. This was an appeal by the plaintiff from the judgment of Mr. Justice Wills at a trial of the action with a common jury. The plaintiff was a licensed victualler carrying on business at the Maggie and Punch Bowl, Bishopsgate-street Within, in the City of London, and in October, 1896, the defendant, who was a builder, verbally agreed to execute for the plaintiff certain alterations at the Maggie and Punch Bowl, including the laying of a new patent fireproof flooring between the flooring of first floor and the ceiling of the refreshment bar on the ground floor. The defendant agreed to carry out the work so as not to interfere with the business in the bar, which was to be carried on as usual. On November 2, while three customers were having refreshments in the bar, a part of the ceiling fell upon them and injured them. The accident was caused in this way:—The flooring on the first floor was taken up in order to substitute steel joists for the wooden ones, and some of the steel joists were fixed, and then a loose joist was laid down, when one of the defendant's workmen negligently stepped upon the end of the loose joist, which tilted up, and the workman's foot went through the ceiling and the plaster fell upon the customers. The three injured customers having threatened proceedings against the plaintiff, the latter's solicitor had an interview with the defendant, who said that he assumed responsibility, and that he was insured, both as regards his own workmen and the public, and that the claims must be resisted. One of the customers brought an action against the plaintiff in the City of London Court, and the Judge gave judgment for him for £50 and costs, which were taxed at £29 6s. 8d., making a total of £79 6s. 8d. The insurance company paid this sum, which was handed to the plaintiff. The two other customers also brought action against the plaintiff, when the plaintiff paid sums of money into court in each case, the sum paid in one case being accepted, and in the other the Judge held that it was sufficient. The insurance company refused to pay these sums, saying that they had paid the first claim by mistake, and the defendant consequently refused to pay them to the plaintiff. The plaintiff thereupon brought this action to recover the sums, including the taxed costs recovered by the customers in the two last actions and the costs incurred by the plaintiff to his solicitor in the three actions. The defendant paid £6 17s. 8d. into Court, making, with the sum of £79 6s. 8d. already paid, one-half of the plaintiff's damages and costs. The jury found that the accident was caused by the negligence of the workman employed by the defendant. Mr. Justice Wills held that the plaintiff was not liable to the customers in their actions, and therefore could not now sue the defendant upon his agreement to indemnify. The plaintiff appealed. The Court allowed the appeal. Lord Justice A. L. Smith said that the defendant paid the plaintiff's claim in respect of the first action for damages and costs—namely, £79 6s. 8d., because he got the money from the insurance company. The insurance company, for some reason or other, refused to pay the further sums recovered by the injured customers in the other two actions. The first question which arose was whether there was evidence before the Judge of the City of London Court to go to a jury that the present plaintiff was liable to the three customers. It seemed to him that it would have been impossible for the learned Judge to have nonsuited the customers. Then came the question whether the plaintiff could make out a cause of action for the amount claimed. The defendant contracted with the plaintiff to execute certain works in such a way that the business in the bar could be carried on without interruption. The breach alleged was that the defendant did not fulfil his contract because the business was interrupted, and three customers were injured, and by reason of that injury and disturbance of business the plaintiff



## Our Office Table.

had to pay certain damages and costs. As regards the damages, the defendant had broken his contract, *per quod* the plaintiff had to pay damages. As regards the costs, at the very least the conversation between the plaintiff's solicitor and the defendant amounted to this—that the plaintiff must resist the claims, and that the defendant would indemnify him in respect of the costs. Lord Justice Rigby concurred. He did not think that they were differing from Mr. Justice Wills on the law, but upon the facts. The evidence was that the operations on the floor above the bar were of such a nature that they might be a source of danger to those using the bar. If the plaintiff had been carrying out the work himself, his duty towards those persons whom he invited to do business with him in the bar would clearly be to take every reasonable precaution that they should not be injured. It would be no answer to say that the defendant was guilty of negligence. Therefore, in his opinion, there was evidence for a jury that the plaintiff was liable to the customers who were injured. Then, in his view, the evidence showed that the defendant had agreed to indemnify the plaintiff against the damages and costs, which the latter might have to pay to the customers, because, as between those two, the defendant and not the plaintiff was solely to blame. Lord Justice Collins concurred. It seemed clear to him that if the actions against the present plaintiff had been tried before a Judge of the High Court and a jury, the judge would not have been justified in withdrawing the case from the jury. The plaintiff entered into a contract with the defendant that the latter should do certain work, and delegated to him the duty of safeguarding the public who might come to the bar. The plaintiff was aware that the work which the defendant was doing might be dangerous to those using the bar, and he ought to have taken reasonable precautions for the protection of those persons, whom, in those circumstances, he invited on business into the bar. As regards the right of the plaintiff to recover against the defendant, his Lordship expressed his concurrence in the view that, in the circumstances, the plaintiff was entitled to recover.

**ARBITRATION CASE AT CLAPTON.**—At the Sheriff's Court, Red Lion-square, Holborn, last week, Mr. Under-Sheriff Burchell and a special jury heard the case of "Motton v. the School Board for London," a claim for compensation in respect of a vacant site at Mandeville-street, Clapton. The claimant, a builder, took the land in question on a building lease in June, 1894, for 99 years at a yearly ground rent of £66, the site to be used for the erection of 11 houses at a ground rent of £6 each, and to be covered within a year. This period was subsequently extended for six months. In August, 1895, the freeholder received notice to treat from the school board, and in 1897 the claimant also received a notice to treat, and sent in a claim for £375 and the usual allowance for compulsory sale. Mr. Matthews (Matthews and Matthews) and other witnesses explained how the site could have been utilised so as to produce a considerable yearly income from tenement houses, which, it was stated, were in great demand in North-east London. On behalf of the school board, it was contended that the site was worthless, and that there was a great quantity of vacant land in the district. In support of this contention, Mr. Percy H. Clarke, Mr. Thomas C. Marsh, Mr. W. S. Cooke, and Mr. H. R. McCarthy gave evidence. After a long deliberation, the jury awarded the claimant the sum of £160, inclusive of the customary 10 per cent. for compulsory sale.

The late Miss Isabella Ross, Hamilton-place, has bequeathed to the Aberdeen Art Gallery her portrait by John Philip, R.A.

The Board of Trade have confirmed an Order, authorising the construction of light railways in the Boroughs of Oldham and Middleton, and the Urban Districts of Castleton and Chadderton, in the county of Lancaster.

A scheme for an electric tramway has been approved by the Dewsbury Town Council, in accordance with the report of a sub-committee, which lately visited Halifax, accompanied by Mr. Jonas, the electrical engineer to the Dewsbury Corporation. The installation, including six trams on the overhead trolley system, was approved informally, and is estimated to cost £19,750.

At the foundation-stone laying of the new Jenny Lind Infirmary last week at Norwich, there was placed in a prepared cavity in the stone, beside the usual copy of the newspaper of the day, a brass plate with the date and this inscription engraved upon it: "Norwich population, 113,000. Fastest train to London, 2 hours 37 minutes. Electric tramways commenced. Price of large sheep, 63 shillings. Bricklayers' wages 7½d. per hour." The infirmary is being built, from plans by Messrs. Edward Boardman and Son, by Mr. T. H. Yelf, all of Norwich.

VARIOUS additions of considerable interest have just been made to the collections at the National Portrait Gallery, and were exhibited for the first time on Boxing Day. They include half-a-dozen portraits presented by various donors and two purchased by the trustees. In the former class are those of Prince Charles Edward Stuart, a small bronze bust on a porphyry pedestal, brought from Italy in the latter half of the 18th century by Edward King, the antiquary; presented by Mr. William Aldis Wright, Vice-Master of Trinity College, Cambridge. Jane Welsh Carlyle, a small portrait painted in oils by Samuel Laurence; presented by Major-General J. B. Sterling. Sydney, Lady Morgan, a pen-and-ink sketch by W. Behnes; presented by Mr. F. Draper. Alexander Pope, the poet, painted by Sir Godfrey Kneller; presented by Mr. Alfred A. de Pass. Alfred, Lord Tennyson, cast from a posthumous bust by Francis J. Williamson; presented by the artist; and William Carr, Lord Beresford, a small portrait in oils by E. Beresford; presented by the Rev. Francis Warre. The two purchases are Admiral Sir George Rooke, K.B., the captor of Gibraltar, painted by M. Dahl; and Joseph Mallord William Turner, R.A., drawn in coloured chalks by Charles Turner, the engraver.

THE Bill to empower the London County Council to acquire the undertakings of the London water companies has been deposited for introduction into Parliament next Session. The preamble asserts that some of the eight companies proposed to be purchased were established by Parliament in consequence of popular dissatisfaction with the quality of water supplied, and the prices charged by the previously-established companies—namely, the New River, the Chelsea, and Lambeth Companies. The new companies were empowered to supply water in the same districts as the previously existing companies with the object of improving the supply, and reducing the charges by competition. The companies subsequently combined with one another by arrangements, not sanctioned or authorised by Parliament, to divide the supply of London between themselves and to refrain from mutual competition, and by such agreement the companies have evaded competition, and generally charged to the ordinary domestic consumer the full maximum rate. The preamble further complains that, by the system of charging on the rateable value, unaided by competition, the rate to the consumer is periodically increased without any increase in the amount of water supplied. After setting out the findings of various Water Commissions, the preamble states that, in order to avoid further delay in finally settling the question of Metropolitan Water Supply, it is expedient that provision should be made for forthwith placing the undertakings of the company in the hands of the Council.

THE Glasgow Corporation opened on Friday an exhibition of pictures by members of the Royal Scottish Society of Painters in Water Colours, and of wood-carving and ornamentation, in the People's Palace. The east gallery is devoted to the water-colours (about a hundred in number), and a work by Sir Francis Powell, P.R.S.W., "Windmill, Essex Coast," occupies the place of honour; near by is John Smart's "Flowing to the Sea." A. K. Brown is represented by "A Perthshire Landscape," James Paterson by an "Old House at Inverkeithing," Archibald Kay by a study of "South Queensferry," J. Cadenhead by "A Moorland Road," R. B. Nisbet by "A Windy Day" and "Evening on a River," and Hans Hansen by a study of "Scarborough, Regatta Day." Other works of interest are James G. Laing's "Market Day, Seville, Spain," James Fulton's "Old Road, Blairgowrie," Tom-David's cattle scenes. In the wood-carving section prizes were offered to competitors, and 70 entered from England as well as others from Scotland. For the most part the work consisted of decorative panels, medallions, friezes, picture and photograph frames, and furniture. The first prize of £5 has been awarded to Allen S. Randle, Hastings, for a boxwood frieze, showing high skill, combined with delicate artistic workmanship; the second prize of £3 to Arthur W. Simpson, Kendall; and the third prize of £2 to James Buckley, Claythorn-street, Glasgow. In addition to the competitive works, loan works

were received for the carving section from the South Kensington Museum and the Royal School of Wood-Carving, London, illustrative of the German, Italian, French, and other school boards, and the Glasgow Corporation's collection of French sixteenth and seventeenth century carvings.

At a lecture given at Liverpool on Friday Mr. Scott Fraser pointed out that no memorial of the gifted young architect of St. George's Hall, Harvey Lonsdale Elmes, exists in Liverpool. It was suggested that a tablet should be erected in the hall or at the least an inscription cut into the wall, a stone in the plinth or on the floor, to indicate to visitors the name of the designer of this well-proportioned and interesting building.

LORD IVEAGH's munificent scheme for the improvement of an insanitary area in the heart of the city of Dublin will probably cost the donor a quarter of a million sterling. The proposal, which is to take the form of a Bill in the coming Session of Parliament, will deal with that part of the Irish metropolis which is known as the Bull-alley area, forming the centre portion of the district between St. Patrick's Cathedral and Christchurch Cathedral. Lord Iveagh contemplates acquiring the area between Bull-alley and Brides-alley, and utilising the site, partly by giving certain portions to the corporation of Dublin for the straightening, widening, and improving of the adjacent streets, but chiefly for the erection of two classes of buildings—viz., (1) workmen's dwellings, a lodging-house for single men, shops, &c.; (2) certain recreative buildings, such as a concert hall, reading and lecture rooms, swimming bath, gymnasium, &c. The promoter will execute the whole scheme at his own cost, but without personally deriving any pecuniary profit from it, and eventually the control and management of the property is to be handed over to the Trustees of the Guinness Trust for the amelioration of the condition of the labouring classes in Dublin.

A DISASTROUS fire occurred early on Friday morning at the new Palace Theatre of Varieties, at Plymouth. The building, which was opened in September, having been erected by a company at a cost of £100,000, was designed to accommodate 2,500 persons. The outbreak occurred near the stage entrance, and every effort was directed to prevent the spread of the flames to the auditorium; but owing to the fact that no one had been left on the premises in charge of the building, it was impossible to gain access to the fire-proof curtain, the fierceness of the flames cutting off access to the stage. If the curtain could have been lowered the area of the fire might obviously have been restricted. The effect of the conflagration was to utterly destroy everything connected with the stage, the only remnants left being a spiral staircase, an iron gangway from wing to wing, and a few girders, and to do an immense amount of damage to the auditorium. All the decorations were consumed, but the façade and the grand staircase escaped destruction.

At Bishopthorpe, on Thursday in last week, the Archbishop of York placed and blessed the chancel cross on the gable end of the new church. The choir and clergy marched in procession from the palace, led by the vicar, and followed by the Archbishop in his scarlet robes, who was attended by the rural dean and his chaplain, carrying the silver cross. The new cross stands on the west side of the York-road, just outside the palace grounds, and almost opposite Archbishop Sharpe's avenue. The builder had erected a temporary staircase which led to the apex of the chancel roof. By this the procession ascended, and all took their place on a small platform round the cross. The Archbishop, taking a ladle, poured the molten sulphur into the socket and formally blessed the cross. A collect followed, with a prayer for the workmen, who, sitting in a row on the top of the south chancel wall, were attentive observers of the ceremony. A hymn was then sung, and the service concluded with the Benediction. The church, excepting the tower, will be finished by the early summer; the cost, so far, will be about £5,500, towards which £4,360 has been promised. The architect is Mr. Hodgson Fowler, F.S.A., of Durham.

THE Venetian journal *Adriatico* publishes an article upon the present condition of the Doge's Palace, in which it traverses the optimistic report recently made by the architect to the District Architectural Committee, and urges that the subsidies are not all due to the enormous



weight of the volumes composing the library of St. Mark, although they form a constant danger to the edifice. The three points of movement are on the Ponte della Paglia, on that adjacent to the Ponte di Canonica, and on that by the Porta della Carta. The movement at the corner by the Porta della Carta is apparent on the walls and arches, especially of the Sala della Scrutinio, which may possibly be due to the remains of the tower of the old palace, which is said to have been built on a narrow foundation. At all events, the cracks have continued to appear and to spread. On the corner overlooking the Ponte di Canonica a more noticeable movement by cracks and displacements is visible, especially in the Sala del Senato and Sala del Collegio, and still more in the small church and anti-church in which, in addition to the cracks, the posts of the doors are out of position, so that some of the doors cannot be closed. A very weak point is that fronting the canal over the entrance by water, and here the cracks are perhaps of more importance. There is a break in the senators' staircase, and here the movement is more evident. The steps are slightly separated from the walls, thus demonstrating that the lateral walls are not in a state of perfect stability. This movement tends towards the ground floor and the centre of the building. The beams in the Ducal Palace are said to be in a dangerous, rotten condition. Several beams were removed from the palace in such a state as to leave a great part of the upper floor supported solely by the cohesion of the cement of the flooring. Three halls of the library are now shored up, but merely as a precautionary measure.

EVERY gratified friend of Messrs. Eastwood and Co., Ltd., who was able to accept their hospitable invitation down to the mouth of the river on the 28th of June last had one of the most enjoyable days of his life, and will well remember the picturesque craft that competed for the prizes offered in the barge sailing-matches, in which Mr. George E. Wragge, the managing director, takes such a natural and healthy interest. We have just received a Christmas souvenir of the barge sailing-match day in the shape of an admirably-executed drawing thereof by Mr. W. Monk, which is really a gift to be valued by all fortunate enough to receive it. May every future summer add to the triumphs of Messrs. Eastwood and Co.'s sturdy barge-skippers, and every Christmas to the artistic records of their prowess, and that of the increased prosperity of the firm they serve.

#### MEETINGS FOR THE ENSUING WEEK.

MONDAY.—Architectural Association Lyric Club. Cinderella Dance, King's Hall, Holborn Restaurant. 7.30 p.m.

WEDNESDAY.—Society of Arts. "Hands and Feet," Juvenile Lecture, by Professor F. Jeffrey Bell. 7 p.m.

#### THE ARCHITECTURAL ASSOCIATION.

JANUARY 6th.—ORDINARY MEETING, at 9, Conduit-street, W. 7.30 p.m. Mr. H. H. STATHAM on "HOUSE PLANNING FROM THE AESTHETIC POINT OF VIEW."

E. HOWLEY SIM } Hon. Secs.  
G. B. CARVILL }

At Litherland a new mission church is in course of erection from plans by Mr. George Bradbury, diocesan surveyor, of Liverpool. Accommodation will be provided for 680 persons. Messrs. Blakeley and Co., of Liverpool, are the contractors.

To perpetuate the memory of the late Dowager Countess of Morley at Plympton the Earl of Morley has erected choir stalls in Plympton St. Mary church. These were dedicated on Christmas evening. The stalls, which are of carved oak, are after the design of Mr. Sedding, the carving having been executed by the Misses Penwill, of Erimington.

St. Paul's Episcopal Church, York-place, Edinburgh, has just been embellished by the insertion of another stained-glass window at the north-west end. The subject illustrates the text from Revelation, "Blessed are they that do His commandments that they may have the right to the Tree of Life and enter through the gates into the city." The Saviour, seated in judgment, holding the seven stars as an orb, and the sceptre of majesty, occupies the centre composition. On either side stand the Angels of the Judgment and the Record, while a group of heavenly elders form the background, their white robes bathed in golden light. In the lower compartments angel messengers from the heavenly Jerusalem bring the Record of the Judgment and the crown of glory to a group of saints and martyrs. The artists were Messrs. A. Ballantyne and Gardiner, Edinburgh.

## Trade News.

### WAGES MOVEMENTS.

PROFIT-SHARING IN THE SLATING TRADE.—Mr. J. E. Nelson, member of the Executive Committee of the Slaters' Federation, and head of a well-known and old-established firm, addressed a gathering of his workmen at Sunderland on Friday at which he intimated his decision to adopt the profit-sharing system under the new arrangement. Every workman, apprentice, and carman who has been twelve months in Mr. Nelson's employ will be entitled to a share of 16 per cent. of the year's profits. He anticipates that the rearrangement will result in an all-round improvement of the position of all steady workmen.

### CHIPS.

Plans for the enlargement of St. Michael's Church, Princetown, have been prepared by Mr. E. Sedding, of Plymouth. The Government have granted £500, and the Church Building Society £80.

The Church of Holy Trinity, Minorities, is at last about to be closed, under an Order of her Majesty in Council, and the benefice is to be amalgamated with that of St. Botolph, Aldgate.

Mr. Henry Hill, of Maidenhead, has just completed three large contracts: a drainage scheme at Maidenhead at a cost of £70,000, waterworks at a cost of £30,000, and a drainage scheme at a cost of £20,000 at Carisbrooke, Isle of Wight, opened last week. Mr. Hill has also secured the contract at £39,000 for new sewerage works at Deal.

In Waverley Station, Edinburgh, last week, a statue to the memory of the late Mr. John Walker, manager of the North British Railway Company, was unveiled.

With the addition of 37 new members elected at the last council meeting, the present number of members of the Auctioneers' Institute is 1,010.

In consequence of representations made by Mr. F. Warner, on behalf of the Coventry Master Builders' Association, the Foleshill Rural District Council have appointed a special committee to inquire whether or not the existing by-laws press unduly upon builders.

At the half-yearly meeting of the Chelsea Waterworks Company the directors reported that in the summer they entered into a contract with Messrs. Docwra and Sons for raising the banks of the subsidence reservoirs at West Molesey by 5ft., which would give them a considerable increase in their storage; and they now reported that they had entered into a contract with Messrs. Aird and Son for constructing another filtered-water service reservoir at Putney Heath, the amount of the contract for the latter work being £48,527. When this new reservoir was finished the company would have about two days' supply of filtered water always ready at hand.

On Friday a preliminary meeting of master builders of Southend was held at the Westcliff Hotel, Southend-on-Sea, when it was decided to form a master builders' association. Mr. W. Stubbs was chosen president, Mr. L. W. Stubbs was elected hon. sec., and Mr. W. H. Adams, treasurer. The following were appointed upon an executive committee:—Messrs. W. Bradley, J. Carter, W. E. Davey, C. Freakley, C. M. Howard, Payne, R. W. Piper, T. Sloman, and Whurr.

At Exminster parish church a stained-glass window was unveiled on St. Thomas's Day. It is of three lights, and depicts Christ preaching to the multitude on the shore of the Sea of Galilee. Messrs. Fouracre and Son, of Stonehouse, Plymouth, were the artists.

Mr. W. Harpur, borough surveyor, of Cardiff, is making experiments as to the wearing qualities of various road-making stones in Castle-road in that borough. Half a dozen materials are being tried—Irish, Guernsey, and Penmaenmawr granites, and Cornish, Clee Hill, and Irish basalts. Mr. Harpur will report the results of the tests to a sub-committee of the town council.

The restoration of Aylesbeare Church, Devon, under the direction of Mr. E. H. Harbottle, of Exeter, is being proceeded with rapidly. Mr. Dart, of Crediton, is the contractor. The east window has been filled this week with stained glass, the subjects depicted being the Annunciation, Nativity, and Crucifixion. The window was designed and executed by Messrs. Fredk. Drake and Sons, of The Close, Exeter.

Mr. W. Edgar Horne, F.S.I., has taken into partnership Mr. William Vincent Jull and Mr. John Roy Lancaster, who have for several years assisted him in the conduct of his business. As Mr. Horne's father retired some years ago, he takes this opportunity of altering the title of the firm from Horne, Son, and Eversfield to Horne and Co. The offices, as before, remain at 85, Gresham-street, City, and 19, Great George-street, Westminster.

## LATEST PRICES.

### IRON, &c.

	Per ton.	Per ton.
Roller-Iron Joists, Belgian.....	£6 0 0	to £6 10 0
Roller-Iron Joists, English.....	6 10 0	" 7 0 0
Wrought-Iron Girder Plates.....	5 15 0	" 6 10 0
Bar Iron, good Stuffs.....	7 5 0	" 8 5 0
Do., Lowmoor, Flat, Round, or Square.....	17 0 0	" 17 5 0
Do., Welsh.....	5 15 0	" 5 17 6
Boiler Plates, Iron—		
South Staffs.....	7 17 6	" 8 5 0
Best Sneathill.....	10 0 0	" 10 10 0

Builders' Hoop Iron, for bonding, &c., £8 15s.  
Builders' Hoop Iron, galvanised, £15 10s. Od. per ton.  
Galvanised Corrugated Sheet Iron—

	No. 18 to 20.	No. 22 to 24.
6ft. to 8ft. long, inclusive gauge.....	£10 15 0	Per ton. £11 0 0
Best ditto.....	11 5 6	" 11 10 0

	Per ton.	Per ton.
Cast-Iron Columns.....	£8 5 0	to £8 15 0
Cast-Iron Stanchions.....	6 5 0	" 8 15 0
Roller-Iron Fencing Wire.....	7 5 0	" 8 5 0
Roller-Iron Fencing Wire.....	7 5 0	" 7 15 0
Cast-Iron Sash Weights.....	10 10 0	" 11 10 0
Cut Clasp Nails, 3in. to 6in.....	4 2 6	" 4 5 0
Cut Floor Brads.....	9 0 0	" 10 0 0
Wire Nails (Pointed &c. Wire).....	8 15 0	" 9 15 0

	0 to 7	8	9	10	11	12	13	14	15	B.W.G.
Cast-Iron Socket Pipes.....	9/0	9/6	10/0	10/9	11/6	12/6	13/6	15/3	17/3	per cwt.

	Per ton.	Per ton.
Sin. diameter.....	£5 10 0	to £5 15 0
4in. to 6in.....	5 5 0	" 5 10 0
7in. to 24in. (all sizes).....	4 15 0	" 5 0 0
[Coated with composition, 2s. 6d. per ton extra; turned and bored joints, 5s. per ton extra.]		

	Per ton.	Per ton.
Pig Iron—		
Cold Blast, Lilleshall.....	105s.	to 110s.
Hot Blast, ditto.....	57s. 6d.	to 62s. 6d.

Wrought-Iron Tubes and Fittings—Discount off Standard Lists f.o.b.:—

	75p.c.	70p.c.
Gas-Tubes.....	75p.c.	70p.c.
Water-Tubes.....	70p.c.	70p.c.
Steam-Tubes.....	70p.c.	70p.c.
Galvanised Gas-Tubes.....	62½	60
Galvanised Water-Tubes.....	55	55
Galvanised Steam-Tubes.....	45	45

	10cwt. casks.	5cwt. casks.
Zinc, English.....	£27 10 0	to £28 0 0

	Per ton.	Per ton.
Do., Vieille Montagne.....	29 10 0	" 29 15 0
Sheet Lead, 8lb. per sq. ft. super.....	14 10 0	" 15 10 0
Pig Lead, in 1cwt. pigs.....	14 7 6	" 15 7 6
Lead Shot, in 28lb. bags.....	17 15 0	" 18 15 0
Copper Sheet, sheathing and rods.....	67 0 0	" 68 0 0
Copper, British Cake and Ingot.....	55 10 0	" 56 0 0
Tin, Straits.....	82 0 0	" 83 0 0
Do., English Ingots.....	85 0 0	" 86 0 0
Spelter, Silesian.....	21 0 0	" 22 0 0

### TIMBER.

	per load	£13	0 0	to £15 10 0
Teak, Burmah.....				
" Bangkok.....				
Quebec Pine, yellow.....				
" Oak.....				
" Birch.....				
" Elm.....				
" Ash.....				
Danitic and Memel Oak.....				
Fir.....				
Wainscot, Riga p. log.....				
Lath, Danitic, p.f.....				
St. Petersburg.....				
Greenheart.....				
Box.....				
Sequoia, U.S.A. per cube foot.....				
Mahogany, Cuba, per super foot.....				

	lin. thick	0 0 5½	" 0 0 7
" Honduras.....			
" Mexican.....			

	0 0 4	" 0 0 4½	" 0 0 4½
Cedar, Cuba.....			
" Honduras.....			

	0 0 9	" 0 0 9½	" 0 0 9½
Satinwood.....			
Walnut, Italian.....			

	0 0 8	" 0 0 7	" 0 0 7
Deals, per St. Petersburg Standard, 120—12ft. by 1½in. by 1½in.:—			

	£18 15 0	to £25 5 0
Quebec, Pine, 1st.....		
" 2nd.....		
" 3rd.....		

	8 10 0	" 10 10 0
Canada Spruce, 1st.....		
" 2nd and 3rd.....		

	7 5 0	" 8 5 0
New Brunswick.....		
Riga.....		

	9 15 0	" 12 5 0
St. Petersburg.....		
Swedish.....		

	9 15 0	" 10 5 0
Finland.....		
White Sea.....		

	10 15 0	" 18 0 0
Battens, all sorts.....		
Flooring Boards, per square of lin.:—		

	£0 9 6	" £0 16 3
1st prepared.....		
2nd ditto.....		
Other qualities.....		

	0 8 0	" 0 13 0
2nd ditto.....		
Staves, per standard M:—		

	0 6 3	" 0 7 0
Quebec pipe.....		
U.S. ditto.....		
Memel, cr. pipe.....		

	£35 0 0	" £42 10 0
Memel, brack.....		
Memel, brack.....		

### OILS.

	per ton.	£16 2 6	to £16 12 6
Linsed.....			
Rapeseed, English pale.....			

	£22 0 0	" £22 5 0
Do., brown.....		
Cottonseed, refined.....		

	£13 17 6	" £14 5 0
Olive, Spanish.....		
Seal, pale.....		

	£21 5 0	" £21 10 0
Cocunut, Cochin.....		
Do., Ceylon.....		

	£25 0 0	" £26 0 0
Palm, Lagos.....		
Oleine.....		















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